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| **ID\_ART** | **Authors** | **Title** | **Year** | **Abstract** |
| 1 | Jati H., Irmawati D., Utami P., Destiana B., Sukirman, Hariyanto D. | Development of an online assessment based on the Shareable Content Object Reference Model (SCORM) to optimize the use of BeSmart UNY | 2020 | This study aimed at developing an Online Assessment based on the Shareable Content Object Reference Model (SCORM) package. This study focused on: (1) obtaining an online assessment design based on SCORM package for the subject of Medical Instrumentation and Electronics based on needs analysis; (2) examining the functionality of the developed online assessment and (3) analyzing the usability of the developed online assessment. This software development process used the ADDIE development model. The testing stage of this study was conducted to verify and to validate the software. The software verification process was performed with functionality testing by media and material experts, and usability testing by users. The results indicated that: (1) it was obtained the design of an online assessment based on SCORM package for the subject of Medical Instrumentation and Electronics, including an online assessment in Besmart packed with SCORM Packages in the form of quiz integration (multiple-choice, short answer, true or false, drag and drop questions); (2) the functionality testing by material experts with a score of 3.88 and a media expert with a score of 4.16 suggested that the developed online assessment was feasible in the aspect of functionality; (3) usability testing by users achieved the score of 3.88 indicating that the developed online assessment was feasible in the aspect of usability. © Published under licence by IOP Publishing Ltd. |
| 2 | Cajander Å. | Usability and user's health issues | 2020 | Computer supported work is often stressful and inadequate computer systems and poor usability contribute to the problem. Still the work situation, and work environment of users are seldom considered when developing computer systems. Hence, my research focuses on attitudes about and practices for integrating usability and occupational health issues in IT systems development processes to improve the resulting work situation and well-being of users. The overall goal of the research is to impact software development in practice, hence I do research in real life settings with all the irregularities that occur in such projects. © BCS HCI Group Conference: Engage, HCI 2006.All right reserved. |
| 3 | Bekele R., Biru T., Sametinger J., Groher I., Pomberger G., Floyd C. | Adapting ethnography for design research: Lessons learnt from design of mobile systems for rural health care in Ethiopia | 2020 | This paper attempts to address how ethnography can be adapted and customized to design research for software development in resource constrained social settings. Based on the experience from the Technology Enabled Maternal and Child Health Care (TEMACC-Ethiopia) research project, the work reported demonstrates the suitability of a modified ethnography in a design research particularly in mediating the communication between users and programmers, facilitating reflection and communication among users, programmers and stakeholders, transforming field study insights into design artefacts, testing and deploying software tools as well as supporting users in their work places. The practical guidelines that emerged in the course of the research work are presented as lessons learnt. Extending the ethnography to support usability assessment and change management beyond those conducted in this study are also identified for further research. © 40th International Conference on Information Systems, ICIS 2019. All rights reserved. |
| 4 | Barbosa C.P., Belian R.B., de Araújo C.M.T. | Continuing education in the child health handbook: an educational software for primary care1 | 2020 | Objective: To present, the process of development and evaluation of an educational software on the Child Health Handbook proposed for the continuing education of primary care nurses and physicians. Methods: Quantitative study of methodological development. For software development, the following steps were followed: definition of objectives; determination of the target audience; choice of pedagogical and theoretical reference for content; content selection and structuring; software development and evaluation by experts (five nurses and four physicians). All responded to an instrument that included four domains: pedagogical; content; functionality; system presentation and usability. The evaluation criteria were arranged on a Likert-type scale. The percentage of agreement and Content Validity Index were used for the quantitative analysis of the degree of agreement, considering a Content Validity Index cutoff point equal to 0.80. Results: The overall agreement index, calculated by the arithmetic mean of the Contents Validity Index of the evaluated domains, was 0.96, with scores ranging from 0.90 to 1.00. The average percentage of agreement of the experts per domain was 92.86%, with lower agreement in the content (80.95%), presentation, and usability (90.48%) domains. 100% of percentage of agreement was observed in the pedagogical and functionality domains among the evaluated specialists. Conclusion: The percentage of agreement, Content Validity Index and overall agreement index of the Child Health Handbook educational software in the context of primary care disclosed the software adequacy as an educational resource for continuing education of primary care nurses and physicians. Considering the assessed dimensions, it can also be used by other health professionals and undergraduate students. © 2020 |
| 5 | Wang Y., Ijaz K., Yuan D., Calvo R.A. | VR-Rides: An object-oriented application framework for immersive virtual reality exergames | 2020 | Exercise can improve health and well-being. With this in mind, immersive virtual reality (VR) games are being developed to promote physical activity, and are generally evaluated through user studies. However, building such applications is time consuming and expensive. This paper introduces VR-Rides, an object-oriented application framework focused on the development of experiment-oriented VR exergames. Following the modular programming pattern, this framework facilitates the integration of different hardware (such as VR devices, sensors, and physical activity devices) within immersive VR experiences that overlay game narratives on Google Street View panoramas. Combining software engineering and interaction patterns, modules of VR-Rides can be easily added and managed in the Unity game engine. We evaluate the code efficiency and development effort across our VR exergames developed using VR-Rides. The reliability, maintainability, and usability of our framework are also demonstrated via code metrics analysis and user studies. The results show that investing in a systematic approach to reusing code and design can be a worthwhile effort for researchers beyond software engineering. © 2020 John Wiley & Sons, Ltd. |
| 6 | Sik-Lanyi C., Orbán-Mihálykó É. | Accessibility Testing of European Health-Related Websites | 2019 | The current development of the Internet and its growing use make it necessary to satisfy the needs of users with disabilities. The primary objective of this study is to examine healthcare-related websites in nine European countries in order to evaluate the status of their accessibility. Such a detailed statistical comparison has not yet been made in Europe, especially as the present study offers a dual measurement system combining both the application of automated testing software and statistical analysis of user feedback. The study compares 48 websites from Eastern Europe with 51 sites from Western and Northern Europe. The research phase was performed in three steps: firstly by using AChecker, secondly by Nibbler and subsequently followed by user feedback questionnaires evaluated by a group of experts. The overall goal of this study is to determine the most common accessibility problems and to draw site owners’ attention to shortcomings so that they can improve the quality of service of their healthcare-related sites in the future. The investigated European websites are grouped into Eastern and Western–Northern countries. We compared our results from different perspectives and ascertained that no significant differences can be established between the two groups predicated on their respective economic situations. Equally, no correlations were observed while comparing the sizes of web pages in Kbytes, the number of barriers and their Nibbler accessibility scores. Furthermore, there appears to be no correlation between the results of the software tests and the percentage of the elderly population in the respective country. © 2019, The Author(s). |
| 7 | Al Kilani N., Tailakh R., Hanani A. | Automatic Classification of Apps Reviews for Requirement Engineering: Exploring the Customers Need from Healthcare Applications | 2019 | In one year, more than 6.5 million mobile applications have been listed for download on the application stores. That is, they are used by millions (or billions) of users across the world. Users express their daily experience of applications as reviews on those stores. This experience may include reporting bugs, demanding new features, posting feedback with regards to performance, reporting security issues, demanding user interface enhancements, and other needs. Interestingly, reviews could contain valuable information for the interest of application vendors and developers. However, the volume of such data is as huge, that is, traditional searching algorithms may not be efficient in extracting such useful information. Machine learning and data mining techniques are one of the popularly used algorithms to efficiently extracting significant information for Software Requirement Engineering; a key phase in the Software Engineering Life Cycle. In this paper, we experience machine learning algorithms and natural language processing techniques to classify a set of reviews about healthcare-domain applications into multiple types of categories such as bug reports, new feature requests, application performance, and user interface. For this purpose, we could extract more than 7500 reviews of ten different health-related mobile applications. More importantly, those reviews were annotated manually by software experts. In our experiments, we use the Weka tool employing different machine learning algorithms. We will also show what algorithms and features will perform better; in terms of accuracy using different evaluation metrics, when classifying reviews about mobile apps into various classes; bugs, new features, sentimental, general bug, usability, security, and performance. Moreover, the conducted experiments show that the overall performance improves when we use the data subset with highly confident labeling; when two experts agree on the same class. For the imbalanced-data problem, this research will show the effect of applying resampling techniques on improving classification accuracy as well. © 2019 IEEE. |
| 8 | Värri A., Kranz-Zuppan P., De La Cruz R. | IEC 62304 ed. 2: Software life cycle standard for health software | 2019 | The quality of software is high in medical devices due to the strict regulatory requirements and their implementation in the software development processes through the use of the IEC 62304 standard. The goal of this standard revision project was to extend the scope of the standard to all health software and also to bring the requirements of the 12 year old standard back to the state-of-the-art including provisions for cybersecurity. The joint IEC/SC62A and ISO/TC215 project team revised the standard and adapted its risk management, usability, and security requirements to serve both the medical device industry and the overall health software industry. The resulting second version of the standard has gone through a multistage global voting process to achieve a consensus of the requirements to serve both these communities. The resulting standard has potential to have a major impact on the quality of software used in health care globally. © 2019 International Medical Informatics Association (IMIA) and IOS Press. |
| 9 | Ehrler F., Lovis1 C., Blondon K. | A mobile phone app for bedside nursing care: Design and development using an adapted software development life cycle model | 2019 | Background: Nurses are increasingly spending time on computers, and providing them with a tailored tool to access clinical information and perform documentation at the bedside could help to improve their efficiency. Designing an app to support nurses' work at the bedside is a challenging task, given the complexity of the care process. Objective: This study aimed to present the design, development, and testing of a smartphone app for nurses guided by an adapted software development life cycle model that takes into consideration the complexity and constraints of a health care setting. Methods: The model drives us through an iterative development process intersected by 3 stages of formative evaluation of growing ecological validity. Results: The initial requirements identification stage included 11 participants who helped us select the most important functionalities to integrate into the tool. Starting with a usability evaluation allowed for the identification of design issues that could have caused misuse. Then, making on-site evaluations under the supervision of an investigator helped to understand the adequacy of the tool with limited risks. Finally, the on-site evaluation allowed us to validate the acceptance of the app by caregivers. Conclusions: The interpretation of the collected evaluation confirms the necessary involvement of end users early in the process to help address the heterogeneity of the nursing workflow processes in the different wards. We also highlight the delicate balance between high-security measures to protect access to patient data and maintaining ease of access for efficiency and usability. Although a close collaboration with clinicians throughout the entire project facilitated the development of a tailored solution, it was also important to involve all stakeholders, in particular, the information technology (IT) security officers. © 2019 Journal of Medical Internet Research. All rights reserved. |
| 10 | Pinter C., Lasso A., Fichtinger G. | Polymorph segmentation representation for medical image computing | 2019 | Background and objective: Segmentation is a ubiquitous operation in medical image computing. Various data representations can describe segmentation results, such as labelmap volumes or surface models. Conversions between them are often required, which typically include complex data processing steps. We identified four challenges related to managing multiple representations: conversion method selection, data provenance, data consistency, and coherence of in-memory objects. Methods: A complex data container preserves identity and provenance of the contained representations and ensures data coherence. Conversions are executed automatically on-demand. A graph containing the implemented conversion algorithms determines each execution, ensuring consistency between various representations. The design and implementation of a software library are proposed, in order to provide a readily usable software tool to manage segmentation data in multiple data representations. A low-level core library called PolySeg implemented in the Visualization Toolkit (VTK) manages the data objects and conversions. It is used by a high-level application layer, which has been implemented in the medical image visualization and analysis platform 3D Slicer. The application layer provides advanced visualization, transformation, interoperability, and other functions. Results: The core conversion algorithms comprising the graph were validated. Several applications were implemented based on the library, demonstrating advantages in terms of usability and ease of software development in each case. The Segment Editor application provides fast, comprehensive, and easy-to-use manual and semi-automatic segmentation workflows. Clinical applications for gel dosimetry, external beam planning, and MRI-ultrasound image fusion in brachytherapy were rapidly prototyped resulting robust applications that are already in use in clinical research. The conversion algorithms were found to be accurate and reliable using these applications. Conclusions: A generic software library has been designed and developed for automatic management of multiple data formats in segmentation tasks. It enhances both user and developer experience, enabling fast and convenient manual workflows and quicker and more robust software prototyping. The software's BSD-style open-source license allows complete freedom of use of the library. © 2019 Elsevier B.V. |
| 11 | Oplas A., Rabago M.H., Tormes C.L., Romana C.L.S., Laviste R. | Aeon: A smart medicine delivery and inventory system for cebu city government's long life medical assistance program | 2019 | Cebu City government's Long Life Medical Assistance Program aims to deliver and supply maintenance medicine to its qualifying beneficiaries. The process is done manually resulting to certain problems such as: (1) lack of evidences that the beneficiaries received the medicine intended for them; (2) inventory monitoring of medicines distributed; (3) and shortage of medicine supplies. In line with these problems, a web and mobile application called Aeon is designed in partnership with the Cebu City Government's Long Life Medical Assistance Program. The web application efficiently monitors the medicine supplies complemented with predictive restocking notifications to know if an incoming shortage of medicine will occur. In the study, the mobile application utilizes Facial Recognition and Global Positioning System to track and validate deliveries of medicines. The study used Agile Software Development Method in order to deliver the expected outputs. A usability survey was conducted and majority of the respondents are satisfied with the features of the system. Moreover, 87% of the respondents indicated that they prefer using the system over the manual process and would recommend the use of the system for the Long Life Medical Assistance Program. © 2018 IEEE. |
| 12 | Pilco H., Sanchez-Gordon S., Calle-Jimenez T., Pérez-Medina J.L., Rybarczyk Y., Jadán-Guerrero J., Maldonado C.G., Nunes I.L. | An agile approach to improve the usability of a physical telerehabilitation platform | 2019 | The goal of a telerehabilitation platform is to safely and securely facilitate the rehabilitation of patients through the use of telecommunication technologies complemented with the use of biomedical smart sensors. The purpose of this study was to perform a usability evaluation of a telerehabilitation platform. To improve the level of usability, the researchers developed and proposed an iterative process. The platform uses a digital representation of the patient which duplicates the therapeutic exercise being executed by the patient; this is detected by a Kinect camera and sensors in real time. This study used inspection methods to perform a usability evaluation of an exploratory prototype of a telerehabilitation platform. In addition, a cognitive workload assessment was performed to complement the usability evaluation. Users were involved through all the stages of the iterative refinement process. Usability issues were progressively reduced from the first iteration to the fourth iteration according to improvements which were developed and applied by the experts. Usability issues originally cataloged as catastrophic were reduced to zero, major usability problems were reduced to ten (2.75%) and minor usability problems were decreased to 141 (38.74%). This study also intends to serve as a guide to improve the usability of e-Health systems in alignment with the software development cycle. © 2019 by the authors. |
| 13 | Grüning B.A., Lampa S., Vaudel M., Blankenberg D. | Software engineering for scientific big data analysis | 2019 | The increasing complexity of data and analysis methods has created an environment where scientists, who may not have formal training, are finding themselves playing the impromptu role of software engineer. While several resources are available for introducing scientists to the basics of programming, researchers have been left with little guidance on approaches needed to advance to the next level for the development of robust, large-scale data analysis tools that are amenable to integration into workflow management systems, tools, and frameworks. The integration into such workflow systems necessitates additional requirements on computational tools, such as adherence to standard conventions for robustness, data input, output, logging, and flow control. Here we provide a set of 10 guidelines to steer the creation of command-line computational tools that are usable, reliable, extensible, and in line with standards of modern coding practices. © The Author(s) 2019. Published by Oxford University Press. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited. |
| 14 | Martins A.I., Queirós A., Rocha N.P. | Validation of a usability assessment instrument according to the evaluators’ perspective about the users’ performance | 2019 | Technologies for ageing in place may help older adults in their homes to overcome multiple impairments and to promote their autonomy and independence. When conceptualizing technologies for ageing in place, the International Classification of Functioning, Disability and Health (ICF) is a key element due to its functioning and disability framework with consolidated concepts and terminologies. Based on the ICF conceptual framework, the article presents the ICF based Usability Scale (ICF-US) to evaluate the usability of technologies for ageing in place and reports a study aiming: (1) to validate the ICF-US to evaluate usability according to the evaluators’ perspective about the users’ performance and (2) to evaluate the utility and applicability of the ICF-US. Two observational studies evolving 184 participants were conducted to: (1) assess the validity and reliability of the ICF-US to evaluate usability according to the evaluators’ perspective about the users’ performance and (2) to verify the utility and applicability of the ICF-US. The results suggest that the ICF-US is valid and reliable and can be used in different stages of technological developments without losing its discriminatory capacity. © 2019, Springer-Verlag GmbH Germany, part of Springer Nature. |
| 15 | [No author name available] | 7th International Working Conference on Human-Centered Software Engineering, HCSE 2018 | 2019 | The proceedings contain 23 papers. The special focus in this conference is on Human-Centered Software Engineering. The topics include: A visual tool for analysing IoT trigger/action programming; software support for coherent prototyping of 3D gesture interactions; towards tool-support for robot-assisted product creation in fab labs; usability evaluation of model-driven cross-device web user interfaces; absolute indirect touch interaction: Impact of haptic marks and animated visual feedback on usability and user experience; factors affecting the choice of usability evaluation methods for interactive adaptive systems; towards a model to address the interplay between IoT applications and users in complex heterogeneous contexts; user evaluations of virtually experiencing mount everest; early incremental user testing design approach validation for satellite command center’s application; Get realistic! - UCD course design and evaluation; graphical user interface redefinition addressing users’ diversity; Integrating HCD into BizDevOps by using the subject-oriented approach; Intuitive user-centered interaction design for ATV; trade-Off between system effectiveness and context constraints in the design of an iot system giving access to health care in African rural villages; helping teams to help themselves: An industrial case study on interdependencies during sprints; participatory ideation for gamification: Bringing the user at the heart of the gamification design process; a method for optimizing complex graphical interfaces for fast and correct perception of system states; data-driven usability test scenario creation; MIODMIT: A generic architecture for dynamic multimodal interactive systems; adding measures to task models for usability inspection of the cloud access control services. |
| 16 | da Silva G.C., da Silva L.P.F., Jofilsan N.C., Correia W.F.M., Gomes A.S., Campos Filho A.S. | Satisfaction analysis for using educational serious games for teaching wound treatment | 2019 | This article aims to describe the production process of the educational game “treat well!”, idealized for learning in higher education institutions. Research was done with students of the health courses, which helped to prove the direct effect in the improvement of cognitive functions such as memory, attention, perception, among others. The acquired advantages of technology, when well used are unimaginable, especially when used for education. The barriers encountered by this tool to realize its real application were perceptible, but these were worked on and perfected to find a balance between education and fun. We can infer that this tool, when properly applied, is able to attract and perpetuate information in students in any educational field. In this context, an educational game was developed that serves as a support to the learning process of the students of nursing courses. The goal of this research was to analyze the usability and satisfaction of the educational game “Treat Well!” which teaches the treatment of a simple wound with nursing students. For the development of the project, the methodology used was based on software engineering practices, User Centered Design and Usability and Satisfaction Analysis. The study was also based on a qualitative and quantitative approach with exploratory character and also statistical. The qualitative variable used to capture the perception of users in the study was made in an empirical way of observing the search for relevant and convenient data obtained through experience observed. The quantitative variables used to analyze usability were the effectiveness, time of use and user perception through the Attrakdiff questionnaire. The usability test was performed with high fidelity game prototype with 10 volunteers in a college in Recife Brazil. From the results generated we can understand that improvements can be made to a greater identification and interaction of the user with the proposed game. © 2019, Springer International Publishing AG, part of Springer Nature. |
| 17 | Rybarczyk Y., Medina J.L.P., Leconte L., Jimenes K., González M., Esparza D. | Implementation and assessment of an intelligent motor tele-rehabilitation platform | 2019 | Over the past few years, software applications for medical assistance, including tele-rehabilitation, have known an increasing presence in the health arena. Despite the several therapeutic and economic advantages of this new paradigm, it is important to follow certain guidelines, in order to build a safe, useful, scalable, and ergonomic tool. This work proposes to address all these points, through the case study of a physical tele-rehabilitation platform for patients after hip replacement surgery. The scalability and versatility of the system is handled by the implementation of a modular architecture. The safeness and effectiveness of the tool is ensured by an artificial intelligence module that assesses the quality of the movements performed by the user. The usability of the application is evaluated by a cognitive walkthrough method. Results show that the system (i) is able to properly assess the correctness of the human’s motion through two possible methods (Dynamic Time Warping and Hidden Markov Model), and (ii) provides a good user experience. The discussion addresses (i) the advantages and disadvantages of the main approaches for a gesture recognition of therapeutic movements, and (ii) critical aspects to provide the patient with the best usability of a tele-rehabilitation platform. © 2019 by the authors. Licensee MDPI, Basel, Switzerland. |
| 18 | Chugh R., Chawla N., Gracias R.M., Padda J.S., Li S., Nguyen M.T., Spichkova M., Mantri N. | Automated gathering and analysis of cannabinoids treatment data | 2019 | The paper presents an open source platform to integrate and analyse the cannabinoids research data gathered from academic publications, industrial and clinical trials as well as patients. The project focuses on the analysis of the usability aspects important for the applications collecting the treatment data as well as data on diverse cannabinoids strains. The collected data will be used to estimate the efficiency of cannabinoid treatment of various disorders, which will provide an evidence-based assistance for doctors, researchers and industry to identify the right cannabinoid profiles for various conditions. © 2019 The Author(s). Published by Elsevier B.V. |
| 19 | Ouhbi S., Karampela M., Isomursu M. | Integrating users logic into requirements engineering for connected healthcare co-design | 2019 | The ongoing transformation in healthcare requires the creation of agile systems to meet the growing needs of patients. An approach to develop such systems requires the elicitation of end-users' perspectives to software development life circle. The current requirements development process does not emphasis on the importance of end-users' participation in the requirements elicitation phase. The present study proposes an approach utilizing Service-Dominant (S-D) logic framework to contribute to the co-design of connected health services. Value co-creation practices when combined with requirements engineering best practices can contribute towards the development of usable software for connected healthcare systems. Copyright © 2019 by SCITEPRESS - Science and Technology Publications, Lda. All rights reserved |
| 20 | Gama L.N., Tavares C.M.M. | Development and evaluation of mobile application for the prevention of musculoskeletal risks in nursing work [Desenvolvimento e avaliação de aplicativo móvel na prevenção de riscos osteomusculares no trabalho de enfermagem] [Desarrollo y evaluación de una aplicación móvil en la prevención de riesgos osteomusculares en el trabajo de enfermería] | 2019 | Objective: to develop a multi-platform mobile application for the prevention of musculoskeletal risk factors related to nursing work in a hospital unit and to evaluate the usability criteria with nurses and computer professionals. Method: technological production study for the development of a mobile application, following the phases of software engineering: analysis of requirements, design and specification, construction, internal tests, maintenance and external evaluation. The product was evaluated for usability by nurses from public hospital units in the city of Rio de Janeiro (Brazil). The System Usability Scale instrument was used for the evaluation of the nurses and the instrument of heuristics of compliance of digital interfaces was used with the informational technology professionals. The application development period lasted from November 2017 to March 2018 and the usability assessment from March to May 2018. Results: the evaluation data showed that the application shows agreement and compliance with the principles of usability in the criteria of effectiveness, efficiency and user satisfaction, however, the evaluators suggest that the application’s functionalities should be simplified. Conclusion: the application was designed as a care strategy for the nursing professional, considering the musculoskeletal risks which they are exposed to in their professional activities. The development and evaluation methods were satisfactory and the proposed objectives were achieved. © 2019, Universidade Federal de Santa Catarina. All rights reserved. |
| 21 | Ehrler F., Lovis C., Blondon K. | A mobile phone app for bedside nursing care: Design and development using an adapted software development life cycle model | 2019 | Background: Nurses are increasingly spending time on computers, and providing them with a tailored tool to access clinical information and perform documentation at the bedside could help to improve their efficiency. Designing an app to support nurses’ work at the bedside is a challenging task, given the complexity of the care process. Objective: This study aimed to present the design, development, and testing of a smartphone app for nurses guided by an adapted software development life cycle model that takes into consideration the complexity and constraints of a health care setting. Methods: The model drives us through an iterative development process intersected by 3 stages of formative evaluation of growing ecological validity. Results: The initial requirements identification stage included 11 participants who helped us select the most important functionalities to integrate into the tool. Starting with a usability evaluation allowed for the identification of design issues that could have caused misuse. Then, making on-site evaluations under the supervision of an investigator helped to understand the adequacy of the tool with limited risks. Finally, the on-site evaluation allowed us to validate the acceptance of the app by caregivers. Conclusions: The interpretation of the collected evaluation confirms the necessary involvement of end users early in the process to help address the heterogeneity of the nursing workflow processes in the different wards. We also highlight the delicate balance between high-security measures to protect access to patient data and maintaining ease of access for efficiency and usability. Although a close collaboration with clinicians throughout the entire project facilitated the development of a tailored solution, it was also important to involve all stakeholders, in particular, the information technology (IT) security officers. © Frederic Ehrler, Christian Lovis, Katherine Blondon. |
| 22 | Araujo J.L., Sant’Anna H.C., Lima E.F.A., Fioresi M., Nascimento L.C.N., Primo C.C. | Mobile app for nursing process in a neonatal intensive care unit [Aplicativo móvel para o processo de enfermagem em uma unidade de terapia intensiva neonatal] [Aplicación móvil para el proceso de enfermería en una unidad neonatal de cuidados intensivos] | 2019 | Purpose: to develop and validate a nursing process application in a neonatal intensive care unit. Method: a methodological study, conducted in a university hospital in southeastern Brazil from January 2017 to February 2018, divided into four stages: definition of requirements and elaboration of the conceptual model; generation of implementation and prototyping alternatives; testing and implementation. The app was developed based on Wanda Horta’s Basic Human Needs and International Classification for Nursing Practice and following the User Centered Design method and the standards of the Brazilian Association of Software Engineering Technical Standards for IOS and Android platforms. The product was evaluated and validated by nurses for functional suitability, reliability, usability, performance efficiency, compatibility and safety. Results: the CuidarTech Neo Processo de Enfermagem app has screens that integrate the elements for history, diagnosis and nursing interventions. According to the judges’ evaluation, it has functional adequacy, reliability, usability, performance efficiency, compatibility and safety. Conclusion: the app designed and validated by nurses is a computerized instrument that contains the stages of the nursing process: history, diagnoses and interventions, organized by Basic Human Needs and following the taxonomy of the International Classification for Nursing Practices. It relates information of newborns admitted to Neonatal Intensive Care Units and the nursing process, being able to provide quality, effectiveness, safety and personal satisfaction to the nurse’s care. © 2019, Universidade Federal de Santa Catarina. All rights reserved. |
| 23 | Weldon M., Poyade M., Martin J.L., Sharp L., Martin D. | Using Interactive 3D Visualisations in Neuropsychiatric Education | 2019 | Obsessive compulsive disorder (OCD) is a neuropsychiatric disorder with a global prevalence of 2–3%. OCD can have an enormous impact on the lives of those with the disorder, with some studies suggesting suicidal ideation is present in over 50% of individuals with OCD, and other data showing a significant number of individuals attempt suicide. It is therefore important that individuals with OCD receive the best possible treatment. A greater understanding of the underlying pathophysiology of neuropsychiatric disorders among professionals and future clinicians can lead to improved treatment. However, data suggests that many students and clinicians experience “neurophobia”, a lack of knowledge or confidence in cases involving the nervous system. In addition, research suggests that the relationship many students have with neurological conditions deteriorates over time, and can persist into practice. If individuals living with conditions such as OCD are to receive the best possible treatment, it is crucial that those administering care are equipped with a thorough understanding of such disorders. While research has shown that the use of interactive 3D models can improve anatomy education and more specifically neurology education, the efficacy of using of such models to engage with neuropsychiatric conditions, specifically OCD, has not been assessed. This study seeks to address this gap. In this study an interactive application for Android devices was designed using standardised software engineering methods in order to improve neuropsychiatry literacy by empowering self-pace learning through interactive 3D visualisations and animations of the neural circuitry involved in OCD. A pilot test and a usability assessment were conducted among five postgraduate life science students. Findings relating to user experience were promising, and pre-test vs. post-test evaluation suggested encouraging outcomes regarding the effectiveness of the application in improving the knowledge and understanding of OCD. In short, this study suggests that interactive 3D visualisations can improve neuropsychiatry education. For this reason, more efforts should be made to construct similar applications in order to ensure patients always receive the best possible care. Fig. 2.1 © 2019, Springer Nature Switzerland AG. |
| 24 | de Oliveira M.V.L., Geambastiani P., Lopez G., Cambui M., Ubeda C., Mdletshe S. | The development of a free radiological anatomy software teaching tool [Desarrollo de un software libre de anatomia radiológica como una herramienta de enseñanza] | 2019 | The purpose of this research was to develop a free radiological anatomy software for radiologic anatomy education to assist students and professionals in health science. The study was divided into two phases: image acquisition and software development. The first phase was to obtain plain radiographic images and computed tomographic (CT) scans of an anthropomorphic phantom of head and neck. In addition, plain radiographic images of an anthropomorphic phantom of the chest were obtained. The second phase was the development of the anatomy software as an ImageJ macro. The software was developed through the insertion of the radiologic anatomy landmarks into the images that were obtained and application of multiple choice questions. The software was then tested for usability by getting the professors to answer the multiple choice questions. The software presented radiologic anatomy from 1) Head projections: Waters view, Towne view, Caldwell view, Lateral view, Submentovertex, PA view; 2) Thoracic Spine projections: AP and Lateral View and 3) Chest: PA view, Lateral and Oblique. Tomographic imaging presented one hundred radiologic landmarks of head. In total, there were 354 questions. A final report containing the score of correct answers, as well as the user ID, Date and Time of the test were showed. The test were available in three languages (Spanish, English and Portuguese). A user-friendly and inexpensive software was developed and presented. Students and professionals from several countries are able to practice, repeatedly, the recognition of radiologic anatomical landmarks. © 2019, Universidad de la Frontera. All rights reserved. |
| 25 | Wu N., Gong E., Wang B., Gu W., Ding N., Zhang Z., Chen M., Yan L.L., Oldenburg B., Xu L.-Q. | A smart and multifaceted mobile health system for delivering evidence-based secondary prevention of stroke in rural China: Design, development, and feasibility study | 2019 | Background: Mobile health (mHealth) technologies hold great promise in improving the delivery of high-quality health care services. Yet, there has been little research so far applying mHealth technologies in the context of delivering stroke care in resource-limited rural regions. Objective: This study aimed to introduce the design and development of an mHealth system targeting primary health care providers and to ascertain its feasibility in supporting the delivery of a System-Integrated techNology-Enabled Model of cAre (SINEMA) service for strengthening secondary prevention of stroke in rural China. Methods: The SINEMA mHealth system was designed by a multidisciplinary team comprising public health researchers, neurologists, and information and communication technology experts. The iterative co-design and development of the mHealth system involved the following 5 steps: (1) assessing the needs of relevant end users through in-depth interviews of stakeholders, (2) designing the functional modules and evidence-based care content, (3) designing and building the system and user interface, (4) improving and enhancing the system through a 3-month pilot test in 4 villages, and (5) finalizing the system and deploying it in field trial, and finally, evaluating its feasibility through a survey of the dominant user group. Results: From the in-depth interviews of 49 relevant stakeholders, we found that village doctors had limited capacity in caring for village-dwelling stroke patients in rural areas. Primary health care workers demonstrated real needs in receiving appropriate training and support from the mHealth system as well as great interests in using the mHealth technologies and tools. Using these findings, we designed a multifaceted mHealth system with 7 functional modules by following the iterative user-centered design and software development approach. The mHealth system, aimed at 3 different types of users (village doctors, town physicians, and county managers), was developed and utilized in a cluster-randomized controlled trial by 25 village doctors in a resource-limited county in rural China to manage 637 stroke patients between July 2017 and July 2018. In the end, a survey on the usability and functions of the mHealth system among village doctors (the dominant group of users, response rate=96%, 24/25) revealed that most of them were satisfied with the essential functions provided (71%) and were keen to continue using it (92%) after the study. Conclusions: The mHealth system was feasible for assisting primary health care providers in rural China in delivering the SINEMA service on the secondary prevention of stroke. Further research and initiatives in scaling up the SINEMA approach and this mHealth system to other resource-limited regions in China and beyond will likely enhance the quality and accessibility of essential secondary prevention among stroke patients. © Na Wu, Enying Gong, Bo Wang, Wanbing Gu, Nan Ding, Zhuoran Zhang, Mengyao Chen, Lijing L Yan, Brian Oldenburg, Li-Qun Xu. |
| 26 | Wu N., Gong E., Wang B., Gu W., Ding N., Zhang Z., Chen M., Yan L.L., Oldenburg B., Xu L.-Q. | A smart and multifaceted mobile health system for delivering evidence-based secondary prevention of stroke in rural China: Design, development, and feasibility study | 2019 | Background: Mobile health (mHealth) technologies hold great promise in improving the delivery of high-quality health care services. Yet, there has been little research so far applying mHealth technologies in the context of delivering stroke care in resource-limited rural regions. Objective: This study aimed to introduce the design and development of an mHealth system targeting primary health care providers and to ascertain its feasibility in supporting the delivery of a System-Integrated techNology-Enabled Model of cAre (SINEMA) service for strengthening secondary prevention of stroke in rural China. Methods: The SINEMA mHealth system was designed by a multidisciplinary team comprising public health researchers, neurologists, and information and communication technology experts. The iterative co-design and development of the mHealth system involved the following 5 steps: (1) assessing the needs of relevant end users through in-depth interviews of stakeholders, (2) designing the functional modules and evidence-based care content, (3) designing and building the system and user interface, (4) improving and enhancing the system through a 3-month pilot test in 4 villages, and (5) finalizing the system and deploying it in field trial, and finally, evaluating its feasibility through a survey of the dominant user group. Results: From the in-depth interviews of 49 relevant stakeholders, we found that village doctors had limited capacity in caring for village-dwelling stroke patients in rural areas. Primary health care workers demonstrated real needs in receiving appropriate training and support from the mHealth system as well as great interests in using the mHealth technologies and tools. Using these findings, we designed a multifaceted mHealth system with 7 functional modules by following the iterative user-centered design and software development approach. The mHealth system, aimed at 3 different types of users (village doctors, town physicians, and county managers), was developed and utilized in a cluster-randomized controlled trial by 25 village doctors in a resource-limited county in rural China to manage 637 stroke patients between July 2017 and July 2018. In the end, a survey on the usability and functions of the mHealth system among village doctors (the dominant group of users, response rate=96%, 24/25) revealed that most of them were satisfied with the essential functions provided (71%) and were keen to continue using it (92%) after the study. Conclusions: The mHealth system was feasible for assisting primary health care providers in rural China in delivering the SINEMA service on the secondary prevention of stroke. Further research and initiatives in scaling up the SINEMA approach and this mHealth system to other resource-limited regions in China and beyond will likely enhance the quality and accessibility of essential secondary prevention among stroke patients. © 2019 Geoff McCombe, Aine Harrold, Katherine Brown, Liam Hennessy, Mary Clarke, David Hanlon, Sinead O'Brien, John Lyne, Ciaran Corcoran, Patrick McGorry, Walter Cullen. |
| 27 | De Bernardi S.M. | Application of principles, processes and technologies to design and develop the SkyFlight risk assessment | 2019 | The success of the flight mission is closely related to a wide set of factors that must be taken into consideration. Combining all these elements together, the risk associated to the flight can raise significantly, eventually resulting in a situation in which the flight should be cancelled, unless some mitigation of the risk factors are applied. The aim is the understanding of the expectable human abilities and limitations, in correlation with the aircraft status and all the external elements related to the flight. Following the guidance contained in Ref.1, this knowledge has being applied in the definition of a standardize approach for the design of the risk assessment procedures and software requirements. For the safety of the flight, it is essential that the pilot is able to discern in advance between a low and a high risk flight. With a Flight Risk Analysis Tool (FRAT) the pilot can proactively identify the hazard with a visual representation of the risk, applying an evaluation process and risk mitigation strategies, as described in Ref. 2. Moreover to better support this analysis the tool shall be enough complex to consider all aspects, but at the same time, easy to use and simply accessible (i.e. usable by an application installed on the portable device). SkyFlight has been developed to support the flight planning activities for the rotorcraft mission, being the optimal off-aircraft mean to carry out the evaluation of the flight, ensuring a thorough Safety Assessment. Pilots have SkyFlight application installed on their portable devices to access the service. As presented in Ref.3, SkyFlight gives to the Pilot a deep understanding of the current situation and the involved dynamics, to anticipate changes and future developments, and to clearly understand the consequences related to the flight. The features are designed to positively increase the Pilot Situational Awareness and reduce mission risks. The Safety is spread within all functionalities, starting from simple and common concepts, to a finer level with a deep performance calculations and what-if analysis. To further increase the safety, the latest developed functionality is the Flight Risk Assessment, which has been developed following the EASA and FAA standards, discussed in Ref. 4 and 5, and embedding the EHEST pre-departure Risk Assessment Checklist, provided in Ref. 5. The predefined set of checklist is available to support different types of flight (Training, HEMS, passenger, etc.) and each list is based on the PAVE (Pilot, Aircraft, Environment, External pressure) areas. In addition to the pre-departure Checklists, also In-flight and Post-flight Checklists have been shaped, following the approach discussed in Ref. 6. Through SkyFlight the pilot is able to fill the Risk Assessment Checklist, inserting mitigations where applicable and view the total score. The filled checklist can be saved and shared. It is also possible to export them in a pdf format and to send automatically via email to one or more email addresses. In addition to this, which reflects the state of the art for FRAT, some other peculiar features have been designed. Indeed, to better support the different rotorcraft missions and to meet the process of each operator, the Risk Assessment Checklists will be completely customized by the company safety manager. The functionalities have then being further enhanced with software developments to add value to the tool with both small and big features. For example, the order of the multiple choice answers changes every time the pilot access to the checklist, to guide her/him to read carefully the answers before the selection. More complex functionalities have been inserted to connect the flight planned with SkyFlight to the hazard evaluation, showing the weather data and all the notifications associated to the flight (NOTAMs, Warning/restrictive Airspaces infringements …). AW SkyFlight application can be installed on personal portable devices and the Flight Risk Assessment functionality can be used for free, to let every pilot from the general aviation to access to the safety enhancements above described. The FRAT capabilities, usability and utility have been then tested with the Leonardo Helicopters Division pilots as well as a set of specific customers pilots as representatives of the different types of operations (in the Executive and Private transport, Medical and Rescue services, Offshore operations, Security services and Utility). Copyright © 2019 by the Vertical Flight Society. All rights reserved. |
| 28 | Bowen J., Reeves S. | Engineering interactive systems with model-driven code contracts | 2018 | The use of sound and robust software engineering techniques are essential during the design and development of safety-critical interactive systems. Failure of such systems (such as those found in medical settings or transportation) can lead to serious harm or even fatalities. Model-based development of interactive systems provides a number of benefits which can support correctness of the interface, the interaction and the functional logic of the system. Many different approaches have been proposed which target the models at different aspects of the development process (for example task analysis, interface layouts, functional behaviours etc.) and which can be used in different ways (verification of correctness, usability, testing). Typically these rely on multiple models at differing levels of abstraction. There are challenges in ensuring consistency between the models, and more importantly in ensuring that the final implementation correctly satisfies all of the models. In this paper we propose a method of deriving pre-and post-conditions for both interactive and functional elements of the system from formal models. These are used to generate code contracts within a code framework to support programmers who are implementing the system described in such models. We describe both the process for this and present an initial examination of the applicability of the approach based on a proof-of-concept user study. This small study was intended to examine whether we could correctly derive the code contracts in an automated fashion and whether or not they were usable (and beneficial) for programmers working on a pre-defined task. This initial investigation suggested that such an approach can aid programmers in correctly implementing a specification and that the general approach outlined in the paper is worth developing further. © 2018 IEEE. |
| 29 | Thomsen E.K., Hemingway C., South A., Duda K.A., Dormann C., Farmer R., Coleman M., Coleman M. | ResistanceSim: Development and acceptability study of a serious game to improve understanding of insecticide resistance management in vector control programmes | 2018 | The use of insecticides is the cornerstone of effective malaria vector control. However, the last two decades has seen the ubiquitous use of insecticides, predominantly pyrethroids, causing widespread insecticide resistance and compromising the effectiveness of vector control. Considerable efforts to develop new active ingredients and interventions are underway. However, it is essential to deploy strategies to mitigate the impact of insecticide resistance now, both to maintain the efficacy of currently available tools as well as to ensure the sustainability of new tools as they come to market. Although the World Health Organization disseminated best practice guidelines for insecticide resistance management (IRM), Rollback Malaria's Vector Control Working Group identified the lack of practical knowledge of IRM as the primary gap in the translation of evidence into policy. ResistanceSim is a capacity strengthening tool designed to address this gap. The development process involved frequent stakeholder consultation, including two separate workshops. These workshops defined the learning objectives, target audience, and the role of mathematical models in the game. Software development phases were interspersed with frequent user testing, resulting in an iterative design process. User feedback was evaluated via questionnaires with Likert-scale and open-ended questions. The game was regularly evaluated by subject-area experts through meetings of an external advisory panel. Through these processes, a series of learning domains were identified and a set of specific learning objectives for each domain were defined to be communicated to vector control programme personnel. A simple "game model" was proposed that produces realistic outputs based on player strategy and also runs in real-time. Early testing sessions revealed numerous usability issues that prevented adequate player engagement. After extensive revisions, later testing sessions indicated that the tool would be a valuable addition to IRM training. © 2018 The Author(s). |
| 30 | García M.A.M., Rosales M.S.F., Domínguez E.L., Velázquez Y.H., Isidro S.D. | Telemonitoring system for patients with chronic kidney disease undergoing peritoneal dialysis: Usability assessment based on a case study | 2018 | There are two million people with chronic kidney disease (CKD) worldwide. In Mexico, it is estimated that by 2025, there will be 212 thousand CKD cases. Among the renal replacement treatments, peritoneal dialysis (PD) exists either in the continuous ambulatory (CAPD) or automated (APD) mode, which requires continuous monitoring and strict control. Thus, several software systems have been proposed to perform reliable remote monitoring of patients using PD but also to achieve the goal with effectiveness, efficiency and satisfaction; i.e., in software engineering, this is called usability. However, few studies have addressed usability issues using case studies with patients and medical staff in real domains. In this paper, we present a usability assessment of a telemonitoring system for patients with CKD on peritoneal dialysis treatment through a case study with patients and medical staff of the Mexican Institute of Social Security (IMSS). The usability evaluation was carried out through the application of two satisfaction instruments. These instruments evaluated multiple usability criteria, such as navigability, interactivity, motivation, satisfaction, and applicability. The results obtained from the usability evaluation show that, on average, the services offered by the system have 91.3% acceptance by users (patient-doctors), with the APD and CAPD exchange data registration services having the highest acceptance for patients, with a positive perception of 94.5% and 92.3%, respectively. Meanwhile, for the doctors and nurses, the alarm reception for patients in a risk situation was highest with 95% acceptance. Based on the obtained results, the evaluated telemonitoring system holds wide acceptance, satisfaction, and applicability from patients' and doctors' perspectives. It is also noted that the evaluated system considers and satisfies the requirements and suitable parameters that should be monitored in PD treatment according to studies presented in the literature. © 2018 Martínez García et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. |
| 31 | Ahmad M.A., Ahmed S. | Piezologist: A Novel Wearable Piezoelectric-based Cardiorespiratory Monitoring System | 2018 | In this paper, the design, prototyping and software development of a novel wearable cardiorespiratory parameters monitoring sensor and software applications is illustrated. Piezologist is an unobtrusive chest worn device. It comprises a patch-type sensor and a mobile application. The sensor utilizes piezoelectric material as the cardiorespiratory signal sensing component and MetaWearC board as the signal acquisition unit. The board also comes with Bluetooth Low Energy (BLE) support which is utilized for the raw signal transmission. The novelty aspect of the system rests on the fact that not only using a single cheap piezoelectric sheet common cardiorespiratory parameters (such as heart rate, respiration rate, and cycles) were obtained similar to previous studies but ECG waveform and blood pressure data were also extracted successfully using the same sensor. In addition, sensor packaging design and prototyping and their effect on the acquired signal strength on one hand and the package size (volume and weight) on the other hand were studied and reported. For performance validation purpose, the developed cardiorespiratory monitoring sensor system results were validated against two commercial sensor devices namely 3-lead ECG sensor from eHealth sensor kit and Zephyr belt-type BioHarness sensor, and the results were reported herein. The validation process outcomes confirmed that the cardiorespiratory signals extracted using Piezologist conform with a heartbeat, respiratory cycle and ECG waveform obtained using the commercial sensors. Furthermore, a usability study was conducted to compare the user experience offered by Piezologist against commercially available sensors for measuring cardiorespiratory parameters. The study highlighted the potential that Piezologist will take over the commercial available belt-type, watch-type and 3-lead ECG sensors. © 2018 IEEE. |
| 32 | Børøsund E., Mirkovic J., Clark M.M., Ehlers S.L., Andrykowski M.A., Bergland A., Westeng M., Nes L.S. | A stress management app intervention for cancer survivors: Design, development, and usability testing | 2018 | Background: Distress is prevalent in cancer survivors. Stress management interventions can reduce distress and improve quality of life for cancer patients, but many people with cancer are unfortunately not offered or able to attend such in-person stress management interventions. Objective: The objective of this study was to develop an evidence-based stress management intervention for patients living with cancer that can be delivered electronically with wide reach and dissemination. This paper describes the design and development process of a technology-based stress management intervention for cancer survivors, including the exploration phase, intervention content development, iterative software development (including design, development, and formative evaluation of low- and high-level prototypes), and security and privacy considerations. Methods: Design and development processes were iterative and performed in close collaboration with key stakeholders (N=48). In the exploration phase, identifying needs and requirements for the intervention, 28 participants gave input, including male and female cancer survivors (n=11) representing a wide age range (31-81 years) and cancer diagnoses, healthcare providers (n=8) including psychosocial oncology experts, and eHealth experts (n=9) including information technology design and developers. To ensure user involvement in each phase various user-centered design and service design methods were included, such as interviews, usability testing, and think aloud processes. Overall, participants were involved usability testing in the software development and formative evaluation phase, including cancer survivors (n=6), healthy volunteers (n=7), health care providers (n=2), and eHealth experts (n=5). Intervention content was developed by stress management experts based on well-known cognitive behavioral stress management strategies and adjusted to electronic format through multiple iterations with stakeholders. Privacy and security issues were considered throughout. Results: The design and development process identified a variety of stakeholder requirements. Cancer survivors preferred stress management through a mobile app rather than through a personal computer (PC) and identified usefulness, easy access, user friendliness, use of easily understandable language, and many brief sections rather than longer ones as important components of the intervention. These requirements were also supported by recommendations from health care providers and eHealth experts. The final intervention was named StressProffen and the hospital Privacy and Security Protection Committee was part of the final intervention approval to also ensure anchoring in the hospital organization. Conclusions: Interventions, even evidence-based, have little impact if not actively used. This study illustrates how user-centered design and service design can be applied to identify and incorporate essential stakeholder aspects in the entire design and development process. In combination with evidence-based concepts, this process facilitated development of a stress management intervention truly designed for the end users, in this case, cancer survivors. © Elin Børøsund, Jelena Mirkovic, Matthew M Clark, Shawna L Ehlers, Michael A Andrykowski, Anne Bergland, Marianne Westeng, Lise Solberg Nes. Originally published in JMIR Formative Research (http://formative.jmir.org), 06.09.2018. This is an open-access article distributed under the terms of the Creative Commons Attribution License. |
| 33 | Leightley D., Puddephatt J.-A., Jones N., Mahmoodi T., Chui Z., Field M., Drummond C., Rona R.J., Fear N.T., Goodwin L. | A smartphone app and personalized text messaging framework (InDex) to monitor and reduce alcohol use in ex-serving personnel: Development and feasibility study | 2018 | Background: Self-reported alcohol misuse remains high in armed forces personnel even after they have left service. More than 50% of ex-serving personnel meet the criteria for hazardous alcohol use; however, many fail to acknowledge that they have a problem. Previous research indicates that interventions delivered via smartphone apps are suitable in promoting self-monitoring of alcohol use, have a broad reach, and may be more cost-effective than other types of brief interventions. There is currently no such intervention specifically designed for the armed forces.Objective: This study sought to describe the development of a tailored smartphone app and personalized text messaging (short message service, SMS) framework and to test the usability and feasibility (measured and reported as user engagement) of this app in a hard-to-engage ex-serving population.Methods: App development used Agile methodology (an incremental, iterative approach used in software development) and was informed by behavior change theory, participant feedback, and focus groups. Participants were recruited between May 2017 and June 2017 from an existing United Kingdom longitudinal military health and well-being cohort study, prescreened for eligibility, and directed to download either Android or iOS versions of the ”Information about Drinking for Ex-serving personnel” (InDEx) app. Through the app, participants were asked to record alcohol consumption, complete a range of self-report measures, and set goals using implementation intentions (if-then plans). Alongside the app, participants received daily automated personalized text messages (SMS) corresponding to specific behavior change techniques with content informed by the health action process approach with the intended purpose of promoting the use of the drinks diary, suggesting alternative behaviors, and providing feedback on goals setting. Results: Invitations to take part in the study were sent to ex-serving personnel, 22.6% (31/137) of whom accepted and downloaded the app. Participants opened the InDEx app a median of 15.0 (interquartile range [IQR] 8.5-19.0) times during the 4 week period (28 days), received an average of 36.1 (SD 3.2) text messages (SMS), consumed alcohol on a median of 13.0 (IQR 11.0-15.0) days, and consumed a median of 5.6 (IQR 3.3-11.8) units per drinking day in the first week, which decreased to 4.7 (IQR 2.0-6.9) units by the last week and remained active for 4.0 (IQR 3.0-4.0) weeks. Conclusions: Personnel engaged and used the app regularly as demonstrated by the number of initializations, interactions, and time spent using InDEx. Future research is needed to evaluate the engagement with and efficacy of InDEx for the reduction of alcohol consumption and binge drinking in an armed forces population. © Daniel Leightley, Jo-Anne Puddephatt, Norman Jones, Toktam Mahmoodi, Zoe Chui, Matt Field, Colin Drummond, Roberto J Rona, Nicola T Fear, Laura Goodwin. |
| 34 | Leightley D., Puddephatt J.-A., Jones N., Mahmoodi T., Chui Z., Field M., Drummond C., Rona R.J., Fear N.T., Goodwin L. | A smartphone app and personalized text messaging framework (InDEx) to monitor and reduce alcohol use in ex-serving personnel: Development and feasibility study | 2018 | Background: Self-reported alcohol misuse remains high in armed forces personnel even after they have left service. More than 50% of ex-serving personnel meet the criteria for hazardous alcohol use; however, many fail to acknowledge that they have a problem. Previous research indicates that interventions delivered via smartphone apps are suitable in promoting self-monitoring of alcohol use, have a broad reach, and may be more cost-effective than other types of brief interventions. There is currently no such intervention specifically designed for the armed forces. Objective: This study sought to describe the development of a tailored smartphone app and personalized text messaging (short message service, SMS) framework and to test the usability and feasibility (measured and reported as user engagement) of this app in a hard-to-engage ex-serving population. Methods: App development used Agile methodology (an incremental, iterative approach used in software development) and was informed by behavior change theory, participant feedback, and focus groups. Participants were recruited between May 2017 and June 2017 from an existing United Kingdom longitudinal military health and well-being cohort study, prescreened for eligibility, and directed to download either Android or iOS versions of the”Information about Drinking for Ex-serving personnel” (InDEx) app. Through the app, participants were asked to record alcohol consumption, complete a range of self-report measures, and set goals using implementation intentions (if-then plans). Alongside the app, participants received daily automated personalized text messages (SMS) corresponding to specific behavior change techniques with content informed by the health action process approach with the intended purpose of promoting the use of the drinks diary, suggesting alternative behaviors, and providing feedback on goals setting. Results: Invitations to take part in the study were sent to ex-serving personnel, 22.6% (31/137) of whom accepted and downloaded the app. Participants opened the InDEx app a median of 15.0 (interquartile range [IQR] 8.5-19.0) times during the 4 week period (28 days), received an average of 36.1 (SD 3.2) text messages (SMS), consumed alcohol on a median of 13.0 (IQR 11.0-15.0) days, and consumed a median of 5.6 (IQR 3.3-11.8) units per drinking day in the first week, which decreased to 4.7 (IQR 2.0-6.9) units by the last week and remained active for 4.0 (IQR 3.0-4.0) weeks. Conclusions: Personnel engaged and used the app regularly as demonstrated by the number of initializations, interactions, and time spent using InDEx. Future research is needed to evaluate the engagement with and efficacy of InDEx for the reduction of alcohol consumption and binge drinking in an armed forces population. © Daniel Leightley, Jo-Anne Puddephatt, Norman Jones, Toktam Mahmoodi, Zoe Chui, Matt Field, Colin Drummond, Roberto J Rona, Nicola T Fear, Laura Goodwin. Originally published in JMIR Mhealth and Uhealth (http://mhealth.jmir.org), 11.09.2018. This is an open-access article distributed under the terms of the Creative Commons Attribution License. |
| 35 | Özcan-Top Ö., McCaffery F. | A hybrid assessment approach for medical device software development companies | 2018 | Medical device software development organizations are bound by regulatory requirements and constraints to ensure that developed medical devices will not harm patients. Medical devices have to be treated as complete systems and be evaluated in this manner. Instead of manufacturers having to ensure compliance to various regulatory standards individually, the authors previously developed a medical device software process assessment framework called MDevSPICE® that integrates the regulatory requirements from all the relevant medical device software standards. The MDevSPICE® was developed in a manner that suits plan-driven software development. To improve the usability of MDevSPICE® in agile settings, we extended the assessment approach. The hybrid assessment approach described here combines the MDevSPICE®-based process assessment method with steps for prioritization of improvement needs through value stream mapping and enabling process improvement through the use of KATA technique. This approach integrates agile methods into the medical device software development process while adhering to the requirements of the regulatory standards. This paper describes the implementation of the approach within 4 organizations that develop software in line with medical device regulations. Copyright © 2017 John Wiley & Sons, Ltd. |
| 36 | Rezaei-hachesu P., Samad-Soltani T., Yaghoubi S., GhaziSaeedi M., Mirnia K., Masoumi-Asl H., Safdari R. | The design and evaluation of an antimicrobial resistance surveillance system for neonatal intensive care units in Iran | 2018 | Introduction: Neonatal intensive care units (NICUs) have complex patients in terms of their diagnoses and required treatments. Antimicrobial treatment is a common therapy for patients in NICUs. To solve problems pertaining to empirical therapy, antimicrobial stewardship programs have recently been introduced. Despite the success of these programs in terms of data collection, there is still inefficiency in terms of analyzing and reporting the data. Thus, to successfully implement these stewardship programs, the design of antimicrobial resistance (AMR) surveillance systems is recommended as a first step. As a result, this study aimed to design an AMR surveillance system for use in the NICUs in northwestern Iranian hospitals to cover these information gaps. Methods: The recommended system is compatible with the World Health Organization (WHO) guidelines. The business intelligence (BI) requirements were extracted in an interview with a product owner (PO) using a valid and reliable checklist. Following this, an AMR surveillance system was designed and evaluated in relation to user experiences via a user experience questionnaire (UEQ). Finally, an association analysis was performed on the database, and the results were reported by identifying the important multidrug resistances in the database. Results: A customized software development methodology was proposed. The three major modules of the AMR surveillance are the data registry, dashboard, and decision support modules. The data registry module was implemented based on a three-tier architecture, and the Clinical Decision Support System (CDSS) and dashboard modules were designed based on the BI requirements of the Scrum product owner (PO). The mean values of UEQ measures were in a good range. This measures showed the suitable usability of the AMR surveillance system. Conclusion: Applying efficient software development methodologies allows for the systems’ compatibility with users’ opinions and requirements. In addition, the construction of interdisciplinary communication models for research and software engineering allows for research and development concepts to be used in operational environments. © 2018 Elsevier B.V. |
| 37 | Crepaldi N.Y., de Lima I.B., Vicentine F.B., Rodrigues L.M.L., Sanches T.L.M., Ruffino-Netto A., Alves D., Rijo R.P.C.L. | Towards a Clinical Trial Protocol to Evaluate Health Information Systems: Evaluation of a Computerized System for Monitoring Tuberculosis from a Patient Perspective in Brazil | 2018 | Assessment of health information systems consider different aspects of the system itself. They focus or on the professional who will use the software or on its usability or on the software engineering metrics or on financial and managerial issues. The existent approaches are very resources consuming, disconnected, and not standardized. As the software becomes more critical in the health organizations and in patients, becoming used as a medical device or a medicine, there is an urgency to identify tools and methods that can be applied in the development process. The present work is one of the steps of a broader study to identify standardized protocols to evaluate the health information systems as medicines and medical devices are evaluated by clinical trials. The goal of the present work was to evaluate the effect of the introduction of an information system for monitoring tuberculosis treatment (SISTB) in a Brazilian municipality from the patients’ perspective. The Patient Satisfaction Questionnaire and the Hospital Consumer Assessment of Healthcare Providers and Systems were answered by the patients before and after the SISTB introduction, for comparison. Patients from an outpatient clinic, formed the control group, that is, at this site was not implanted the SISTB. Descriptive statistics and mixed effects model were used for data analysis. Eighty-eight interviews were conducted in the study. The questionnaire’s results presented better averages after the system introduction but were not considered statistically significant. Therefore, it was not possible to associate system implantation with improved patient satisfaction. The HIS evaluation need be complete, the technical and managerial evaluation, the safety, the impact on the professionals and direct and/or indirect impact on patients are important. Developing the right tools and methods that can evaluate the software in its entirety, from the beginning of the development cycle with a normalized scale, are needed. © 2018, Springer Science+Business Media, LLC, part of Springer Nature. |
| 38 | Yang Y., Zu Q., Liu P., Ouyang D., Li X. | Microshare: Privacy-preserved medical resource sharing through microService architecture | 2018 | This paper takes up the problem of medical resource sharing through MicroService architecture without compromising patient privacy. To achieve this goal, we suggest refactoring the legacy EHR systems into autonomous MicroServices communicating by the unified techniques such as RESTFul web service. This lets us handle clinical data queries directly and far more efficiently for both internal and external queries. The novelty of the proposed approach lies in avoiding the data de-identification process often used as a means of preserving patient privacy. The implemented toolkit combines software engineering technologies such as Java EE, RESTful web services, JSON Web Tokens to allow exchanging medical data in an unidentifiable XML and JSON format as well as restricting users to the need-to-know principle. Our technique also inhibits retrospective processing of data such as attacks by an adversary on a medical dataset using advanced computational methods to reveal Protected Health Information (PHI). The approach is validated on an endoscopic reporting application based on openEHR and MST standards. From the usability perspective, the approach can be used to query datasets by clinical researchers, governmental or non-governmental organizations in monitoring health care and medical record services to improve quality of care and treatment. © Ivyspring International Publisher. |
| 39 | Wayan Pulantara I., Parmanto B., Germain A. | Development of a just-in-time adaptive mhealth intervention for insomnia: Usability study | 2018 | Background: Healthy sleep is a fundamental component of physical and brain health. Insomnia, however, is a prevalent sleep disorder that compromises functioning, productivity, and health. Therefore, developing efficient treatment delivery methods for insomnia can have significant societal and personal health impacts. Cognitive behavioral therapy for insomnia (CBTI) is the recommended first-line treatment of insomnia but access is currently limited for patients, since treatment must occur in specialty sleep clinics, which suffer from an insufficient number of trained clinicians. Smartphone-based interventions offer a promising means for improving the delivery of CBTI. Furthermore, novel features such as real-time monitoring and assessment, personalization, dynamic adaptations of the intervention, and context awareness can enhance treatment personalization and effectiveness, and reduce associated costs. Ultimately, this “Just in Time Adaptive Intervention” for insomnia-an intervention approach that is acceptable to patients and clinicians, and is based on mobile health (mHealth) platform and tools-can significantly improve patient access and clinician delivery of evidence-based insomnia treatments. Objective: This study aims to develop and assess the usability of a Just in Time Adaptive Intervention application platform called iREST (“interactive Resilience Enhancing Sleep Tactics”) for use in behavioral insomnia interventions. iREST can be used by both patients and clinicians. Methods: The development of iREST was based on the Iterative and Incremental Development software development model. Requirement analysis was based on the case study's description, workflow and needs, clinician inputs, and a previously conducted BBTI military study/implementation of the Just in Time Adaptive Intervention architecture. To evaluate the usability of the iREST mHealth tool, a pilot usability study was conducted. Additionally, this study explores the feasibility of using an off-the-shelf wearable device to supplement the subjective assessment of patient sleep patterns. Results: The iREST app was developed from the mobile logical architecture of Just in Time Adaptive Intervention. It consists of a cross-platform smartphone app, a clinician portal, and secure 2-way communications platform between the app and the portal. The usability study comprised 19 Active Duty Service Members and Veterans between the ages of 18 and 60. Descriptive statistics based on in-app questionnaires indicate that on average, 12 (mean 12.23, SD 8.96) unique devices accessed the clinician portal per day for more than two years, while the app was rated as “highly usable”, achieving a mean System Usability Score score of 85.74 (SD 12.37), which translates to an adjective rating of “Excellent”. The participants also gave high scores on “ease of use and learnability” with an average score of 4.33 (SD 0.65) on a scale of 1 to 5. Conclusions: iREST provides a feasible platform for the implementation of Just in Time Adaptive Intervention in mHealth-based and remote intervention settings. The system was rated highly usable and its cross-platformness made it readily implemented within the heavily segregated smartphone market. The use of wearables to track sleep is promising; yet the accuracy of this technology needs further improvement. Ultimately, iREST demonstrates that mHealth-based Just in Time Adaptive Intervention is not only feasible, but also works effectively. © I Wayan Pulantara, Bambang Parmanto, Anne Germain. |
| 40 | Li B., Li J., Lan X., An Y., Gao W., Jiang Y. | Experiences of building a medical data acquisition system based on two-level modeling | 2018 | Background and purpose: Compared to traditional software development strategies, the two-level modeling approach is more flexible and applicable to build an information system in the medical domain. However, the standards of two-level modeling such as openEHR appear complex to medical professionals. This study aims to investigate, implement, and improve the two-level modeling approach, and discusses the experience of building a unified data acquisition system for four affiliated university hospitals based on this approach. Method: After the investigation, we simplified the approach of archetype modeling and developed a medical data acquisition system where medical experts can define the metadata for their own specialties by using a visual easy-to-use tool. Result: The medical data acquisition system for multiple centers, clinical specialties, and diseases has been developed, and integrates the functions of metadata modeling, form design, and data acquisition. To date, 93,353 data items and 6,017 categories for 285 specific diseases have been created by medical experts, and over 25,000 patients’ information has been collected. Discussion and conclusion: OpenEHR is an advanced two-level modeling method for medical data, but its idea to separate domain knowledge and technical concern is not easy to realize. Moreover, it is difficult to reach an agreement on archetype definition. Therefore, we adopted simpler metadata modeling, and employed What-You-See-Is-What-You-Get (WYSIWYG) tools to further improve the usability of the system. Compared with the archetype definition, our approach lowers the difficulty. Nevertheless, to build such a system, every participant should have some knowledge in both medicine and information technology domains, as these interdisciplinary talents are necessary. © 2018 Elsevier B.V. |
| 41 | Cao H., Van de Perre G., Kennedy J., Senft E., Esteban P.G., De Beir A., Simut R., Belpaeme T., Lefeber D., Vanderborght B. | A personalized and platform-independent behavior control system for social robots in therapy: development and applications | 2018 | Social robots have been proven beneficial in different types of healthcare interventions. An ongoing trend is to develop (semi-)autonomous socially assistive robotic systems in healthcare context to improve the level of autonomy and reduce human workload. This paper presents a behavior control system for social robots in therapies with a focus on personalization and platform-independence. This system architecture provides the robot an ability to behave as a personable character, which behaviors are adapted to user profiles and responses during the human-robot interaction. Robot behaviors are designed at abstract levels and can be transferred to different social robot platforms. We adopt the component-based software engineering approach to implement our proposed architecture to allow for the replaceability and reusability of the developed components. We introduce three different experimental scenarios to validate the usability of our system. Results show that the system is potentially applicable to different therapies and social robots. With the component-based approach, the system can serve as a basic framework for researchers to customize and expand the system for their targeted healthcare applications. IEEE |
| 42 | Min Q., Liu N., Chen Y. | A web-based medical image viewer for 2D and 3D visualization | 2018 | With the development of Internet technology, telemedicine technology has become one of the hottest research topics. In this paper, a Web-based medical image viewer application is presented in order to facilitate timely and accurate diagnoses in a telemedicine system. The application can access the remote medical image database and display image over the network. This application implements the basic functions of the two-dimensional image processing. Besides, 3D functions, e.g, volume rendering and surface rendering of region of interest, fly through, can be also implemented by the proposed viewer. Medical staff can perform some basic operations via the mouse to make more effective diagnosis. Experimental results show that the basic image processing functions and advanced 3D functions can be achieved by this application and it presents a high level of usability, functionality and performance. © 2018 Association for Computing Machinery. |
| 43 | [No author name available] | CEUR Workshop Proceedings | 2018 | The proceedings contain 22 papers. The topics discussed include: on software complexity of agent-oriented logic programs: an empirical analysis; impact of code smells on the rate of defects in software: a literature review; lessons learned from developing prototypes for customer complaint validation; using games to understand and create randomness; usability and quality parameters for e-learning environments and systems; expanding on the process perspective in software process improvement practices; reducing combinatorial testing requirements based on equivalences with respect to the code under test; quantitative quality analysis of scientific software case study; utilize syntax tree transformations as a C/C++ test seam; using threshold derivation of software metrics for building classifiers in defect prediction; process quality monitoring and optimization: a case study for a smart city health domain; the overview on information system acceptance in Serbian primary care the case of regional center; a case-control study on the server-side bandages against XSS; evaluating fitness functions for automated code transformations; establishing software product lines from existing products based on feature model recovery and merging; and replication of quantitative analysis of fault distributions on open source complex software systems. |
| 44 | Farinango C.D., Benavides J.S., Cerón J.D., López D.M., Álvarez R.E. | Human-centered design of a personal health record system for metabolic syndrome management based on the ISO 9241-210:2010 standard | 2018 | Background: Previous studies have demonstrated the effectiveness of information and communication technologies to support healthy lifestyle interventions. In particular, personal health record systems (PHR-Ss) empower self-care, essential to support lifestyle changes. Approaches such as the user-centered design (UCD), which is already a standard within the software industry (ISO 9241-210:2010), provide specifications and guidelines to guarantee user acceptance and quality of eHealth systems. However, no single PHR-S for metabolic syndrome (MS) developed following the recommendations of the ISO 9241-210:2010 specification has been found in the literature. Objective: The aim of this study was to describe the development of a PHR-S for the management of MS according to the principles and recommendations of the ISO 9241-210 standard. Methods: The proposed PHR-S was developed using a formal software development process which, in addition to the traditional activities of any software process, included the principles and recommendations of the ISO 9241-210 standard. To gather user information, a survey sample of 1,187 individuals, eight interviews, and a focus group with seven people were performed. Throughout five iterations, three prototypes were built. Potential users of each system evaluated each prototype. The quality attributes of efficiency, effectiveness, and user satisfaction were assessed using metrics defined in the ISO/IEC 25022 standard. Results: The following results were obtained: 1) a technology profile from 1,187 individuals at risk for MS from the city of Popayan, Colombia, identifying that 75.2% of the people use the Internet and 51% had a smartphone; 2) a PHR-S to manage MS developed (the PHR-S has the following five main functionalities: record the five MS risk factors, share these measures with health care professionals, and three educational modules on nutrition, stress management, and a physical activity); and 3) usability tests on each prototype obtaining the following results: 100% effectiveness, 100% efficiency, and 84.2 points in the system usability scale. Conclusion: The software development methodology used was based on the ISO 9241-210 standard, which allowed the development team to maintain a focus on user’s needs and requirements throughout the project, which resulted in an increased satisfaction and acceptance of the system. Additionally, the establishment of a multidisciplinary team allowed the application of considerations not only from the disciplines of software engineering and health sciences but also from other disciplines such as graphical design and media communication. Finally, usability testing allowed the observation of flaws in the designs, which helped to improve the solution. © 2018 Farinango et al. |
| 45 | Green R., Brandt R., Miller A. | A framework for integrating safety in usability engineering for electronic health records | 2018 | Usability engineering approaches, borrowed from commercial software development, rarely hold safety as a significant design priority. This paper presents our approach for integrating safety into EHR usability testing and reporting. We present five insights gained in our attempts to better integrate safety into EHR usability testing and we present the Usability FMEA as a framework for more effectively integrating safety into usability testing. Takeaways from this presentation include 1): Usability testing has evolved out of non-safety critical environments; 2) Safety must be designed into test scenarios and scripts, and tested for explicitly; 3) The Usability FMEA with the SEIPS model can help to identify factors that may be affected by the implementation of a new technology; 4) Usability testing and evaluations should be extended into the post-implementation phase in client sites. © 2018 Human Factors an Ergonomics Society Inc.. All rights reserved. |
| 46 | Aljaber T., Gordon N. | A hybrid evaluation approach and guidance for mHealth education applications | 2018 | Mobile health education applications (MHEAs) are used to support different users. However, although these applications are increasing in number, there is no effective evaluation framework to measure their usability and thus save effort and time for their many user groups. This paper outlines a useful framework for evaluating MHEAs, together with particular evaluation metrics: an efficient hybrid of selected heuristic evaluation (HE) and usability evaluation (UE) factors to enable the determination of the usefulness and usability of MHEAs. We also propose a guidance tool to help stakeholders choose the most suitable MHEA. The outcome of this framework is envisioned as meeting the requirements of different users, in addition to enhancing the development of MHEAs using software engineering approaches by creating new and more effective evaluation techniques. Finally, we present qualitative and quantitative results for the framework when used with MHEAs. © Springer International Publishing AG 2018. |
| 47 | Scherer D., Gouveia Filho F.F. | Documentation template for the usability engineering process for medical devices | 2018 | Introduction: Medical device regulatory processes are currently based on technical (ISO IEC 62366:2015) and regulatory standards (IEC ISO 60601-1-6:2015), which provide an international standard to be applied in evaluating devices and their documentation. However, the lack of standardization in the usability engineering processes used by the manufacturers, and the absence of pre-established metrics for such processes are constant problems in the medical device universe, particularly hindering the evaluation processes. It was verified that the current norms are insufficient to guarantee good usability engineering processes, even with the existence of good usability practices in the literature. Objective: This paper presents an analysis of the requirements contained in current standards and proposes a documentation model for usability engineering of medical devices, from the presentation of some techniques that are used in the process of device development. Method: This work is based on literature reviews to identify the state of the art in usability engineering; analysis of current standards, to verify what the regulatory requirements are, and how to comply with them; comparative studies with existing documentation to identify strengths and weaknesses in documentation processes; and elaboration of documentation prototypes. Results: From these results, it was possible to prepare a template document with all the points required by the current norms. Appropriate techniques were also listed for the accomplishment of some stages of the process, creating greater rigidity in the definition of the parameters of the documentation. © Springer Nature Singapore Pte Ltd. 2019. |
| 48 | De Medeiros Matos J., Rendeiro M.M.P. | HemoApp: Applicative to support the care of patients with hereditary coagulopathies | 2018 | The increase in the use of mobile devices has also affected the health area, taking advantage of this context is increasing the number of applicatives specially developed to make the health professionals’ daily routine easier with the patient. Targeting to provide care support to the patient with hereditary coagulopathy, this paper aims to present the applicative developed during the Masters Degree course in e-health and e-medicine from UERJ. The applicative is able to provide, besides the support with scientific evidence for evaluation and classification of the patient, the qualification of the professionals in health care, which will allow the assistance of these patients in the primary care with quality and safety, avoiding unnecessary displacements by the patient and the overcrowding of the blood centers. The application was developed in 2 phases: elaboration of the prototype and pre-test. The software engineering methodology chosen for the elaboration of the applicative was Agile Methodologies. The applicative was developed for Android platform, using the JAVAScript language with Reactive-Native framework. The application was divided into 2 modules: Hemophilia module and Von Willebrand module. The application was named "Hemoapp" and 44 screens were created. In the pre-test the ergonomic and usability criteria were evaluated, obtaining a positive result from the evaluators, showing that it is feasible to use this tool in the permanent education and support to the management of the patient with hereditary coagulopathies. © 2018 IADIS Press. All Rights Reserved. |
| 49 | Vilardaga R., Rizo J., Zeng E., Kientz J.A., Ries R., Otis C., Hernandez K. | User-centered design of learn to quit, a smoking cessation smartphone app for people with serious mental illness | 2018 | Background: Smoking rates in the United States have been reduced in the past decades to 15% of the general population. However, up to 88% of people with psychiatric symptoms still smoke, leading to high rates of disease and mortality. Therefore, there is a great need to develop smoking cessation interventions that have adequate levels of usability and can reach this population. Objective: The objective of this study was to report the rationale, ideation, design, user research, and final specifications of a novel smoking cessation app for people with serious mental illness (SMI) that will be tested in a feasibility trial. Methods: We used a variety of user-centered design methods and materials to develop the tailored smoking cessation app. This included expert panel guidance, a set of design principles and theory-based smoking cessation content, development of personas and paper prototyping, usability testing of the app prototype, establishment of app's core vision and design specification, and collaboration with a software development company. Results: We developed Learn to Quit, a smoking cessation app designed and tailored to individuals with SMI that incorporates the following: (1) evidence-based smoking cessation content from Acceptance and Commitment Therapy and US Clinical Practice Guidelines for smoking cessation aimed at providing skills for quitting while addressing mental health symptoms, (2) a set of behavioral principles to increase retention and comprehension of smoking cessation content, (3) a gamification component to encourage and sustain app engagement during a 14-day period, (4) an app structure and layout designed to minimize usability errors in people with SMI, and (5) a set of stories and visuals that communicate smoking cessation concepts and skills in simple terms. Conclusions: Despite its increasing importance, the design and development of mHealth technology is typically underreported, hampering scientific innovation. This report describes the systematic development of the first smoking cessation app tailored to people with SMI, a population with very high rates of nicotine addiction, and offers new design strategies to engage this population. mHealth developers in smoking cessation and related fields could benefit from a design strategy that capitalizes on the role visual engagement, storytelling, and the systematic application of behavior analytic principles to deliver evidence-based content. |
| 50 | Tamargo R.S., Ngipol D.P., Palaoag T.D. | Multidimensional application grade of interconnected and locally administered services (MAGILAS): A management information system of Ifugao State University | 2017 | Integrated system is currently embraced by most organizations which supports efficiency, effectiveness and reduces cost. It significantly promotes transparency, process reliability and reduces the proneness to errors. It also magnifies basic information by uniting functional or technical elements of one information system in an organized approach. Various organizations including universities encountered difficulties in managing a continually expanding volume of data concerning employees, students or its clienteles. This system provides an avenue for off-campus and distant offices to all educational resources and significant information connected through wireless network allowing to store necessary data in a reliable storage or information system for easier access to relevant data. The Multidimensional Application Grade of Interconnected and Locally Administered Services (MAGILAS) helps in interconnecting different offices for the delivery of necessary services to nominated stakeholders. It covers services of the following Service Departments and Offices: Registrar Services; Finance Services; Student Services and Development; Library Services; Research Development and Extension Training Services; Health Services; and Office of the Deans. Generally, the developed system met the objective of the university to produce and disseminate innovations and technologies in promoting sustainable development and streamlining its services. Essential data were gather by means of survey questionnaires given to the head of service units and selected students of the different colleges and department of the campus. The majority of the respondents were strongly agreed on usability level based from the result of System Usability Scale survey due to its respectable rating interpreted as “Excellent”. The outcomes of the management information system were increased in data availability, productivity and reliability. Hence, MAGILAS shows the dynamically inspired integrated software development. © 2017 Association for Computing Machinery. |
| 51 | Mohsen W., Aref M., ElBahnasy K. | Software metrics for cooperative scrum based ontology analysis | 2017 | One can only control what he can measure. Measuring ontologies in general and inter-organizational ontologies in special is necessary to evaluate ontologies during cooperative development and evolution processes. A software metric is a standard of measuring the degree to which a software system and process possess some property. Metrics help to estimate the progress, quality, and health of a software and its development process. The availability of robust metrics in the early phases of the software development allows the better management of the later steps and a more efficient quality assessment when preventive or corrective actions can easily enhance quality. In this paper, we propose a set of cooperative Scrum based software metrics and architectural metrics that can be applied to cooperative ontology development and evolution process using Scrum framework. These metrics help improve cooperative teams' performance and improve the quality of development and evolution process of inter-organizational ontologies. Furthermore, most of these metrics can be applied easily to any daily ontology activities to ensure ontology reliability, maintainability, and usability. © 2017 IEEE. |
| 52 | Schmidt J.D.E., De Marchi A.C.B. | Usability evaluation methods for mobile serious games applied to health: a systematic review | 2017 | This paper aims to present the results of a systematic review focused on usability evaluation methods for serious games (SG) of mobile devices applicable to health care. The research questioned which usability evaluation methods have been available for mobile serious games. The research was conducted into four databases (ACM, IEEE, Science Direct and Springer) in two periods (23–30 March, 2015, and 01–07 June, 2016). After evaluating 2191 papers, the researchers considered that 9 met the eligibility criteria. As a result, similarities between some methodologies used have been found, however a specific methodology for SGs usability evaluation applicable to health has not been encountered. © 2016, Springer-Verlag Berlin Heidelberg. |
| 53 | Lian X., Cleland-Huang J., Zhang L. | Mining Associations between Quality Concerns and Functional Requirements | 2017 | The cost and effort of developing software systems in a new technical area can be extensive. An organization must perform a domain analysis to discover competing products, analyze their architectures and features, and ultimately discover and specify product requirements. However, delivering high quality products, depends not only on gaining an understanding of functional requirements, but also of qualities such as performance, reliability, security, and usability. Discovering such concerns early in the requirements process drives architectural design decisions. This paper extends our prior work on mining functional requirements from large collections of domain documents, by proposing and evaluating a new technique for discovering and specifying quality concerns related to specific functional components. We evaluate our approach against three domains of Positive Train Control, Electronic Health Records, and Medical Infusion Pumps, and show that it significantly outperforms a basic information retrieval approach. Finally we classified the forms of retrieved information, discussed the utility of different types, and conducted a small study with an experienced engineer to investigate the quality of requirements produced using our approach. © 2017 IEEE. |
| 54 | [No author name available] | Proceedings - 2017 IEEE 25th International Requirements Engineering Conference, RE 2017 | 2017 | The proceedings contain 81 papers. The topics discussed include: a little bird told me: mining tweets for requirements and software evolution; SAFE: a simple approach for feature extraction from app descriptions and app reviews; a framework for improving the verifiability of visual notation design grounded in the physics of notations; feedback gathering from an industrial point of view; users � the hidden software product quality experts?: a study on how app users report quality aspects in online reviews; what requirements knowledge do developers need to manage change in safety-critical systems?; datasets from fifteen years of automated requirements traceability research: current state, characteristics, and quality; safety-focused security requirements elicitation for medical device software; reinforcing security requirements with multifactor quality measurement; modeling and reasoning with changing intentions: an experiment; how much undocumented knowledge is there in agile software development?: case study on industrial project using issue tracking system and version control system; software requirements analyst profile: a descriptive study of Brazil and Mexico; improving the identification of hedonic quality in user requirements � a controlled experiment; usability insights for requirements engineering tools: a user study with practitioners in aeronautics; a case study on evaluating the relevance of some rules for writing requirements through an online survey; and a formalization method to process structured natural language to logic expressions to detect redundant specification and test statements. |
| 55 | Mattson D.C. | Usability evaluation of the digital anger thermometer app | 2017 | The digital anger thermometer is a prototype for a mobile application (app) for use with adults in anger management treatment. The digital anger thermometer incorporates standards of software development in addition to anger management resources from the Substance Abuse and Mental Health Services Administration. The digital anger thermometer underwent a usability study conducted by five expert reviewers. The results indicate that it is easy to learn, efficient, and ergonomically sound. However, it does not offer support features or user-error tolerance. The digital anger thermometer prototype requires additional usability studies and comparative research in order for it to become an actual mental health app. © The Author(s) 2016. |
| 56 | Geri F., Cainelli O., Salogni G., Zatelli P., Ciolli M. | Screening of environmental impact of pollution with the qgis plugin envifate | 2017 | Public and academic interest in environmental pollution caused by toxic substances and other sources, like noise, is constantly raising. To protect public health and ecosystems it is necessary to maintain the concentrations of pollutants below a safety threshold. In this context the development of models able to assess environmental pollution impact has been identified as a priority for future research. Scientific community has therefore produced many predictive models in the field. The vast majority of them needs to be run by specialists with a deep technical knowledge of the modeled phenomena in order to process the data and understand the results and it is not feasible to use this models for simple prescreening activities. Planners, evaluators and technical operators need reliable, usable and simple tools in order to carry out screening analysis of impact assessment. The ENVIFATE software is currently under development by the Department of Civil, environmental and mechanical engineering of the University of Trento, Italy, in the frame of a project funded by the Italian Veneto Region with the aim to make available to non-specialists screening analysis to assess the risks of a set of possible environmental pollution sources in protected areas. The development of ENVIFATE follows these basic requirements: i) Open-Source ii) multiplatform iii) user friendly iv) GIS oriented. In order to respect these principles we have chosen to develop a plugin of QGIS, using python as a development language and creating a module for each environmental compartment analyzed: rivers, lakes, atmospheric dispersion, dispersion in groundwater and noise. The plugin architecture is composed of a series of core functions characterized by command line interfaces that can be called from third-party applications (such as Grass GIS), connectable in custom data flows and with a high level of modularity and scalability. The base of the different models are highly tested and reliable algorithms adopted by the Italian Institute for Protection and Environmental Research (Istituto Superiore per la Protezione e la Ricerca Ambientale - ISPRA). Due to their simplicity, and for safety reasons, the structure of these models is constrained to provide conservative results, so to overestimate actual risk. This approach allows to provide statistically validated instruments to be used in different environmental contexts. All modules of the plugin provide numerical and cartographical results: in particular the command-line interface provides "static" results, or linked to a particular spatial and temporal state, while the Qgis plugins iterate the single analysis along space and time in order to provide geo-referenced maps and time distributed results. © Authors 2017. |
| 57 | Huang M.E. | IT Is From Mars and Physicians From Venus: Bridging the Gap | 2017 | With increasing adoption of electronic health records (EHRs) and legislative mandates for its use within the United States, collaboration between physicians and information technology (IT) staff is essential. Current challenges that physicians face include addressing EHR usability, system performance, adequate training, issue resolution, regulatory compliance, and lack of awareness of IT roles. These challenges lead to gaps in communication between clinicians and IT staff. Strategies to improve collaboration between physicians and IT staff include increasing physician involvement with health information technology software development, involvement with legislative regulations and standards, IT project implementation, as well as system stabilization and optimization. Other key strategies to improve collaboration are also addressed, including proper leadership support, proper training, and proper issue triage. Improved collaboration can result in more effective EHR design and implementation which in turn can enhance the end user experience and patient care. © 2017 American Academy of Physical Medicine and Rehabilitation |
| 58 | Nogueira T.C., Ferreira D.J., Carvalho S.T., Berreta L.O. | Evaluating Responsive Web Design's Impact on Blind Users | 2017 | Recent studies show that websites complying with accessibility guidelines can still be ineffective, inefficient, and unpleasant. Compliance with accessibility guidelines does not guarantee blind users' satisfaction when accessing websites. Meanwhile, in recent years, websites have undergone radical changes regarding design, development, and construction. Responsive design is a new trend that has a strong impact on web design. To determine blind users' experience with responsive design, the authors performed empirical tests to investigate the impact of responsive design on the emotions of blind users during web interactions. They measured user emotions by applying the Positive and Negative Affect Schedule (PANAS) instrument. Results show that although the responsive websites investigated had acceptable levels of accessibility, they posed numerous usability barriers and triggered intense, negative user emotions. Furthermore, the average number of negative emotional reactions for blind users was higher in the case of responsive web design than in the case of nonresponsive web design. © 1994-2012 IEEE. |
| 59 | Smaradottir B.F. | The steps of user-centered design in health information technology development: Recommendations from a PhD research study | 2017 | This study was carried out to explore the steps of User-centered Design in development of health information technology. The technology was developed in two research projects: the European Union project United4Health that created a collaborative telemedicine system for remote monitoring of Chronic Obstructive Pulmonary Disease and the Southern Norway regional project eHealth-extended Care Coordination that built an information system for coordination in inter-municipal health care teams. In both projects, the end-users were involved as active contributors in a User-centered Design process spanning from idea-generation until final deployment stages. This paper presents the steps in the User-centered Design process, based on the results of an empirical PhD research study. © 2016 IEEE. |
| 60 | Gray J., Banhazi T.M., Kist A.A. | Wireless data management system for environmental monitoring in livestock buildings | 2017 | The impact of air quality on the health, welfare and productivity of livestock needs to be considered, especially when livestock are kept in enclosed buildings. The monitoring of such environmental factors allows for the development of appropriate strategies to reduce detrimental effects of sub-optimal air quality on the respiratory health of both livestock and farmers. In 2009, an environmental monitoring system was designed, developed and tested that allowed for the monitoring of a number of airborne pollutants. One limitation of the system was the manual collection of logged data from each unit. This paper identifies limitations of the current environmental monitoring system and suggests a range of networking technologies that can be used to increase usability. Consideration is taken for the networking of environmental monitoring units, as well as the collection of recorded data. Furthermore, the design and development of a software system that is used to collate and store recorded environmental data from multiple farms is explored. In order to design such a system, simplified software engineering processes and methodologies have been utilised. The main steps taken in order to complete the project were requirements elicitation with clients, requirements analysis, system design, implementation and finally testing. The outcome of the project provided a potential prototype for improving the environmental monitoring system and analysis informing the benefit of the implementation. © 2017 China Agricultural University |
| 61 | Luna D.R., Rizzato Lede D.A., Otero C.M., Risk M.R., González Bernaldo de Quirós F. | User-centered design improves the usability of drug-drug interaction alerts: Experimental comparison of interfaces | 2017 | Clinical Decision Support Systems can alert health professionals about drug interactions when they prescribe medications. The Hospital Italiano de Buenos Aires in Argentina developed an electronic health record with drug-drug interaction alerts, using traditional software engineering techniques and requirements. Despite enhancing the drug-drug interaction knowledge database, the alert override rate of this system was very high. We redesigned the alert system using user-centered design (UCD) and participatory design techniques to enhance the drug-drug interaction alert interface. This paper describes the methodology of our UCD. We used crossover method with realistic, clinical vignettes to compare usability of the standard and new software versions in terms of efficiency, effectiveness, and user satisfaction. Our study showed that, compared to the traditional alert system, the UCD alert system was more efficient (alerts faster resolution), more effective (tasks completed with fewer errors), and more satisfying. These results indicate that UCD techniques that follow ISO 9241-210 can generate more usable alerts than traditional design. © 2017 Elsevier Inc. |
| 62 | Abdalla R., Mishra A. | Application of agent methodology in healthcare information systems | 2017 | This paper presents a case study to describe the features and the phases of the two agent methodologies. The Gaia methodology for agent oriented analysis and design, Tropos is a detailed agent oriented software engineering methodology to explore each methodology's ability to present solutions for small problems. Also we provide an attempt to discover whether the methodology is in fact understandable and usable. In addition we were collecting and taking notes of the advantages and weaknesses of these methodologies during the study analysis for each methodology and the relationships among their models. The Guardian Angle: Patient-Centered Health Information System (GA: PCHIS) is the personal system to help track, manage, and interpret the subject's health history, and give advice to both patient and provider is used as the case study throughout the paper. © 2017 Reem Abdalla, Alok Mishra. |
| 63 | Aljaber T., Gordon N. | A guidance and evaluation approach for mHealth education applications | 2017 | A growing number of mobile applications for health education are being utilized to support different stakeholders, from health professionals to software developers to patients and more general users. There is a lack of a critical evaluation framework to ensure the usability and reliability of these mobile health education applications (MHEAs). Such a framework would facilitate the saving of time and effort for the different user groups. This paper describes a framework for evaluating mobile applications for health education, including a guidance tool to help different stakeholders select the one most suitable for them. The framework is intended to meet the needs and requirements of the different user categories, as well as improving the development of MHEAs through software engineering approaches. A description of the evaluation framework is provided, with its efficient hybrid of selected heuristic evaluation (HE) and usability evaluation (UE) factors. Lastly, an account of the quantitative and qualitative results for the framework applied to the Medscape and other mobile apps is given. This proposed framework - an Evaluation Framework for Mobile Health Education Apps - consists of a hybrid of five metrics selected from a larger set during heuristic and usability evaluation, the choice being based on interviews with patients, software developers and health professionals. © Springer International Publishing AG 2017. |
| 64 | Batarseh F.A., Pithadia J. | Context-aware user interfaces for intelligent emergency applications | 2017 | The importance of context in many recent software engineering research studies has been rising significantly. Injecting context awareness into software systems has facilitated multiple facets of modelling, increasing user satisfaction, and increased the level of User Interface (UI) intelligence. Context has been a major part of traditional Artificial Intelligence (AI), lately however, it is being deployed to a wider spectrum of research topics such as human cognition, the internet of things, software usability and many others. In this paper, a new context-aware method for emergency applications is introduced. An emergency is a situation that poses an immediate risk to life, health, property or environment. There is an obvious gap in applying context to such critical cases; this paper shows that context awareness in user interfaces can play an important role with notifications and improving human reactions during such unfortunate and unforeseen incidents. The proposed method is evaluated through live emergency drills and simulations, the experimental results are presented. © Springer International Publishing AG 2017. |
| 65 | Egyedi A.L., O’Connor M.J., Martínez-Romero M., Willrett D., Hardi J., Graybeal J., Musen M.A. | Embracing Semantic Technology for Better Metadata Authoring in Biomedicine | 2017 | The Center for Expanded Data Annotation and Retrieval (CEDAR) has developed a suite of tools and services that allow scientists to create and publish metadata describing scientific experiments. Using these tools and services—referred to collectively as the CEDAR Workbench—scientists can collaboratively author metadata and submit them to public repositories. A key focus of our software is semantically enriching metadata with ontology terms. The system combines emerging technologies, such as JSON-LD and graph databases, with modern software development technologies, such as microservices and container platforms. The result is a suite of user-friendly, Web-based tools and REST APIs that provide a versatile end-to-end solution to the problems of metadata authoring and management. This paper presents the architecture of the CEDAR Workbench and focuses on the technology choices made to construct an easily usable, open system that allows users to create and publish semantically enriched metadata in standard Web formats. |
| 66 | Núñez-Nava J., Orozco-Sánchez P.A., López D.M., Ceron J.D., Alvarez-Rosero R.E. | Human-centered development of an online social network for metabolic syndrome management | 2017 | Problem: According to the International Diabetes Federation (IDF), a quarter of the world's population has Metabolic Syndrome (MS). Objective: To develop (and assess the users' degree of satisfaction of) an online social network for patients who suffer from Metabolic Syndrome, based on the recommendations and requirements of the Human-Centered Design. Results: Following the recommendations of the ISO 9241-210 for Human-Centered Design (HCD), an online social network was designed to promote physical activity and healthy nutrition. In order to guarantee the active participation of the users during the development of the social network, a survey, an in-depth interview, a focal group, and usability tests were carried out with people suffering from MS. Conclusions: The study demonstrated how the different activities, recommendations, and requirements of the ISO 9241-210 are integrated into a traditional software development process. Early usability tests demonstrated that the user's acceptance and the effectiveness and efficiency of the social network are satisfactory. © 2016 European Federation for Medical Informatics (EFMI) and IOS Press. |
| 67 | Lee K., Jung S.Y., Hwang H., Yoo S., Baek H.Y., Baek R.-M., Kim S. | A novel concept for integrating and delivering health information using a comprehensive digital dashboard: An analysis of healthcare professionals’ intention to adopt a new system and the trend of its real usage | 2017 | Objective To introduce a new concept of medical dashboard system called BESTBoard. Such a system was implemented in all wards in a tertiary academic hospital to explore the development process, core designs, functions, usability and feasibility. Methods The task-force team made user interface designs for 6 months based on a need analysis. Hardware configuration and software development was carried out for 3 months. We conducted a survey of 383 physicians and nurses to determine the usability and feasibility of the system. Results In March 2012, the system was installed in all wards, including the intensive care units, emergency rooms, operation rooms, and even delivery rooms. Healthcare professionals had access to all information of EHRs optimized for a large 55-inch touchscreen. The satisfaction rate of BESTBoard users was high, with a mean of 3.3 points. Voluntary users tended to consider BESTBoard as a good system that is useful for team round visits, interdisciplinary team approach, and collecting the status of the hospital rooms. Elderly users didn't tend to think of BESTBoard as a useful tool for interdisciplinary team approach and collecting the status of the hospital rooms. Greater expectations regarding work performance affected the users' attitudes positively. A positive attitude toward using the system resulted in consistent real usage and health care professionals' satisfaction with the new dashboard system. Conclusions A new concept of hospital dashboard system proved to be feasible and useful in delivering health information to healthcare professionals. A positive attitude and an expectation regarding work performance were important factors for intention to use the system. This finding can serve for developing new systems to present health information effectively. Further studies will be needed to evaluate the extent to which BESTBoard can have a positive impact on clinical care outcomes and work performance. © 2016 |
| 68 | Llerena L., Rodríguez N., Gómez-Abajo P., Castro J.W. | How to apply the user profile usability technique in the user modelling activity for an adaptive food recommendation system for people on special diets | 2017 | Interest among software professionals in the possibility of adapting software to user requirements has grown as a result of the evolution of software analysis, design and implementation thinking and the growth in the number of software systems users. Moving away from the traditional approach where the user has to settle for the options offered by software systems, different factors, like user needs, aspirations, preferences, knowledge level, goals and other distinguishing features, have to be taken into account for this purpose. Technically, this possibility is referred to as adaptiveness, and it requires user data. It is these data (user model) that determine the adaptiveness conditions. Our aim is to build a user model for adaptive systems applied to nutritional requirements, modelling user characteristics that affect their diets and help to improve their health. To build the user model, we apply the user profile usability technique. In order to validate our proposal, we analyse and design a preliminary prototype of an adaptive system capable of making food recommendations to satisfy specific user needs. This study revealed that diet is a propitious field for the development of adaptive systems and that user modelling is a good choice for design of this type of systems. |
| 69 | Namías R., D'Amato J.P., Del Fresno M. | Open-source software platform for medical image segmentation applications | 2017 | Segmenting 2D and 3D images is a crucial and challenging problem in medical image analysis. Although several image segmentation algorithms have been proposed for different applications, no universal method currently exists. Moreover, their use is usually limited when detection of complex and multiple adjacent objects of interest is needed. In addition, the continually increasing volumes of medical imaging scans require more efficient segmentation software design and highly usable applications. In this context, we present an extension of our previous segmentation framework which allows the combination of existing explicit deformable models in an efficient and transparent way, handling simultaneously different segmentation strategies and interacting with a graphic user interface (GUI). We present the object-oriented design and the general architecture which consist of two layers: the GUI at the top layer, and the processing core filters at the bottom layer. We apply the framework for segmenting different real-case medical image scenarios on public available datasets including bladder and prostate segmentation from 2D MRI, and heart segmentation in 3D CT. Our experiments on these concrete problems show that this framework facilitates complex and multi-object segmentation goals while providing a fast prototyping open-source segmentation tool. © 2017 SPIE. |
| 70 | Pezzuol J.L., Abreu F.D.L., Silva S.M., Tendolini A., Bissaco M.A.S., Rodrigues S.C.M. | Virtual setting for training in interpreting mammography images | 2017 | This work presents a web system for the training of students or residents (users) interested in the detection of breast density in mammography images. The system consists of a breast imaging database with breast density types classified and demarcated by the specialist (tutor) or online database. The planning was based on ISO / IEC 12207. Through the browser (desktop or notebook), the user will visualize the breast images and in them will realize the markings of the density region and even classify them per the BI-RADS protocol. After marking, this will be compared to the gold standard already existing in the image base, and then the system will inform if the area demarcation has been set or not. The shape of this marking is similar to the paint brush. The evaluation was based on ISO / IEC 1926 or 25010: 2011 by 3 software development specialists and 3 in mammary radiology, evaluating usability, configuration, performance and System interface through the Likert scale-based questionnaire. Where they have totally agreed on usability, configuration, performance and partially on the interface. And as a good thing: the system is able to be accessed anywhere and at any time, the hit or error response is in real time, it can be used in the educational area, the limit of the amount of images will depend on the size of the computer memory, At the end the system sends the results achieved by e-mail to the user, reproduction of the system on any type of screen, complementation of the system with other types of breast structures. Negative points are the need for internet. © 2017 SPIE. |
| 71 | Masci P., Zhang Y., Jones P., Campos J.C. | A hazard analysis method for systematic identification of safety requirements for user interface software in medical devices | 2017 | Formal methods technologies have the potential to verify the usability and safety of user interface (UI) software design in medical devices, enabling significant reductions in use errors and consequential safety incidents with such devices. This however depends on comprehensive and verifiable safety requirements to leverage these techniques for detecting and preventing flaws in UI software that can induce use errors. This paper presents a hazard analysis method that extends Leveson’s System Theoretic Process Analysis (STPA) with a comprehensive set of causal factor categories, so as to provide developers with clear guidelines for systematic identification of use-related hazards associated with medical devices, their causes embedded in UI software design, and safety requirements for mitigating such hazards. The method is evaluated with a case study on the Gantry-2 radiation therapy system, which demonstrates that (1) as compared to standard STPA, our method allowed us to identify more UI software design issues likely to cause use-related hazards; and (2) the identified UI software design issues facilitated the definition of precise, verifiable safety requirements for UI software, which could be readily formalized in verification tools such as Prototype Verification System (PVS). © Springer International Publishing AG (outside the US) 2017. |
| 72 | Chittaro L., Vianello A. | Mobile mindfulness and user's worry: A qualitative study of using a smartphone app for distancing from negative thoughts | 2016 | Mindfulness is attracting an increasing interest due to its health and well-being benefits, but its practice can be difficult for people with no or minimal experience with meditation. In this study, we aim at thoroughly investigating participants' user experience with a mobile mindfulness app (AEON). In particular, we focus on perceptions in using the app for ameliorating worry, as well as on understanding in situ usage. We employ thematic analysis to qualitatively analyze participants' interviews at the end of a 5-week study period. Results indicate that several participants experienced decentering from their worries when using the app. Moreover, AEON was perceived as easy and pleasant to use. However, results also highlight that some participants did not experience decentering from all or some of their worries, and we discuss the possible reasons. Finally, unexpected patterns of use, user's suggestions and some usability problems emerged from the study, allowing us to identify some design opportunities for mindfulness apps. © 2016 The Author 2016. Published by Oxford University Press on behalf of The British Computer Society. |
| 73 | Trauzettel F., Minge M. | Usability in the lifecycle of medical software development | 2016 | A close cooperation with users is necessary to ensure that interactive systems are robust, easy to use and accepted. Therefore, in medical technology, standards for usability are of fundamental importance. We investigated with the presented study how the concept of usability is currently understood and implemented in medical software companies. Interviews were conducted with 21 employees of German enterprises. Furthermore we extended an already existing quantitative online survey where 53 companies (including 24 from the health industry sector) participated in. Results show that the importance of usability is recognized by most of the respondents. Moreover, a wide variety of methods and approaches is known and implemented for exploring user needs and evaluating system prototypes. However, it was observed that human-centered design activities mainly focus on functionality, risk prevention and accessibility. Hedonic user needs and subjective perceptions (“user experience”) still play a minor role. Based on the results, practical requirements are derived and a “best case” for methodological approach is introduced. © 2016 Franziska Trauzettel et al., licensee De Gruyter. |
| 74 | Hussain A., Mkpojiogu E.O.C., Nawi M.N.M. | Requirements model for an e-Health awareness portal | 2016 | Requirements engineering is at the heart and foundation of software engineering process. Poor quality requirements inevitably lead to poor quality software solutions. Also, poor requirement modeling is tantamount to designing a poor quality product. So, quality assured requirements development collaborates fine with usable products in giving the software product the needed quality it demands. In the light of the foregoing, the requirements for an e-Ebola Awareness Portal were modeled with a good attention given to these software engineering concerns. The requirements for the e-Health Awareness Portal are modeled as a contribution to the fight against Ebola and helps in the fulfillment of the United Nation's Millennium Development Goal No. 6. In this study requirements were modeled using UML 2.0 modeling technique. © 2016 Author(s). |
| 75 | Shi G., Zhang S., Liu X., Zhou B. | A mobile medical application design model in social perspective | 2016 | Medical applications on the market showed the following deficiencies: main function is too single, social function and medical file function is not perfect, poor social attributes, simple transplantation of traditional medical mode can't satisfy the user's multi-level and in-depth continued demand for health care. We put forward SMA social medical applications, combined with social and medical organic as a whole, the health record as a bridge to connect mobile health care and general health. With the idea of social medical treatment to narrow the doctor-patient relationship as a friend, to simplify the dual business logic. Task completion experiments verify the usability of the SMA model for social medical treatment, using the User Experience Cellular Model proposed by Peter Morville to evaluate the experimental validation of the SMA model can achieve a better user experience. © 2016 IEEE. |
| 76 | Regan G., Flood D., Mc Caffery F. | Research findings from an industrial trial of a traceability assessment and implementation framework | 2016 | Software systems are becoming increasingly complex. Within safety critical domains such as medical device software, this increasing complexity is placing growing demands on manufacturers who must ensure their software not only meets functional requirements but is also safe and reliable. However, the Food and Drugs Administration who regulate medical device software in the United States report a significant increase in recalls between years 2003 and 2012 and have cited software difficulties as one of the frequent causes of recalls. Furthermore a recent analysis of traceability documentation submitted to the Administration has revealed that the traceability data was incomplete, incorrect, and conflicting in many cases. This is problematic as traceability plays an important role in the development of safe and reliable software. In this paper we present the validation, through industry trial, of a traceability assessment and implementation framework which we have developed to assist medical device organizations implement traceability in an efficient and regulatory compliant manner. Our findings show that implementation of the framework within two organizations improved their traceability process and that both organizations found the framework to be both useful and usable. © 2016, Association for Computing Machinery, Inc. All rights reserved. |
| 77 | Feary M., Martinie C., Palanque P., Tscheligi M. | Multiple views on safety-critical automation: Aircrafts, autonomous vehicles, air traffic management and satellite ground segments perspectives | 2016 | This SIG focuses on the engineering of automation in interactive critical systems. Automation has already been studied in a number of (sub-) disciplines and application fields: design, human factors, psychology, (software) engineering, aviation, health care, games. One distinguishing feature of the area we are focusing on is that in the field of interactive critical systems properties such as reliability, dependability, faulttolerance are as important as usability, user experience or overall acceptance issues. The SIG targets at two problem areas: first the engineering of the user interaction with (partly-) autonomous systems: how to design, build and assess autonomous behavior, especially in cases where there is a need to represent on the user interface both autonomous and interactive objects. An example of such integration is the representation of an unmanned aerial vehicle (UAV) (where no direct interaction is possible), together with aircrafts (that have to be instructed by an air traffic controller to avoid the UAV). Second the design and engineering of user interaction in general for autonomous objects/systems (for example a cruise control in a car or an autopilot in an aircraft). The goal of the SIG is to raise interest in the CHI community on the general aspects of automation and to identify a community of researchers and practitioners interested in those increasingly prominent issues of interfaces towards (semi)-autonomous systems. The expected audience should be interested in addressing the issues of integration of mainly unconnected research domains to formulate a new joint research agenda. © 2016 Authors. |
| 78 | Milicchio F., Rose R., Bian J., Min J., Prosperi M. | Visual programming for next-generation sequencing data analytics | 2016 | Background: High-throughput or next-generation sequencing (NGS) technologies have become an established and affordable experimental framework in biological and medical sciences for all basic and translational research. Processing and analyzing NGS data is challenging. NGS data are big, heterogeneous, sparse, and error prone. Although a plethora of tools for NGS data analysis has emerged in the past decade, (i) software development is still lagging behind data generation capabilities, and (ii) there is a 'cultural' gap between the end user and the developer. Text: Generic software template libraries specifically developed for NGS can help in dealing with the former problem, whilst coupling template libraries with visual programming may help with the latter. Here we scrutinize the state-of-the-art low-level software libraries implemented specifically for NGS and graphical tools for NGS analytics. An ideal developing environment for NGS should be modular (with a native library interface), scalable in computational methods (i.e. serial, multithread, distributed), transparent (platform-independent), interoperable (with external software interface), and usable (via an intuitive graphical user interface). These characteristics should facilitate both the run of standardized NGS pipelines and the development of new workflows based on technological advancements or users' needs. We discuss in detail the potential of a computational framework blending generic template programming and visual programming that addresses all of the current limitations. Conclusion: In the long term, a proper, well-developed (although not necessarily unique) software framework will bridge the current gap between data generation and hypothesis testing. This will eventually facilitate the development of novel diagnostic tools embedded in routine healthcare. © 2016 Milicchio et al. |
| 79 | Militello L.G., Saleem J.J., Borders M.R., Sushereba C.E., Haverkamp D., Wolf S.P., Doebbeling B.N. | Designing Colorectal Cancer Screening Decision Support: A Cognitive Engineering Enterprise | 2016 | Adoption of clinical decision support has been limited. Important barriers include an emphasis on algorithmic approaches to decision support that do not align well with clinical work flow and human decision strategies, and the expense and challenge of developing, implementing, and refining decision support features in existing electronic health records (EHRs). We applied decision-centered design to create a modular software application to support physicians in managing and tracking colorectal cancer screening. Using decision-centered design facilitates a thorough understanding of cognitive support requirements from an end user perspective as a foundation for design. In this project, we used an iterative design process, including ethnographic observation and cognitive task analysis, to move from an initial design concept to a working modular software application called the Screening & Surveillance App. The beta version is tailored to work with the Veterans Health Administration's EHR Computerized Patient Record System (CPRS). Primary care providers using the beta version Screening & Surveillance App more accurately answered questions about patients and found relevant information more quickly compared to those using CPRS alone. Primary care providers also reported reduced mental effort and rated the Screening & Surveillance App positively for usability. © 2016, Human Factors and Ergonomics Society. |
| 80 | Aljaber T., Gordon N. | Evaluation of mobile health education applications for health professionals and patients | 2016 | Mobile applications for health education are commonly utilized to support patients and health professionals. A critical evaluation framework is required to ensure the usability and reliability of mobile health education applications in order to facilitate the saving of time and effort for the various user groups; thus, the aim of this paper is to describe a framework for evaluating mobile applications for health education. The intended outcome of this framework is to meet the needs and requirements of the different user categories and to improve the development of mobile health education applications with software engineering approaches, by creating new and more effective techniques to evaluate such software. This paper first highlights the importance of mobile health education apps, then explains the need to establish an evaluation framework for these apps. The paper provides a description of the evaluation framework, along with some specific evaluation metrics: an efficient hybrid of selected heuristic evaluation (HE) and usability evaluation (UE) factors to enable the determination of the usefulness and usability of health education mobile apps. Finally, an explanation of the initial results for the framework was obtained using a Medscape mobile app. The proposed framework - An Evaluation Framework for Mobile Health Education Apps - is a hybrid of five metrics selected from a larger set in heuristic and usability evaluation, filtered based on interviews from patients and health professionals. These five metrics correspond to specific facets of usability identified through a requirements analysis of typical users of mobile health apps. These metrics were decomposed into 21 specific questionnaire questions, which are available on request from first author. © 2016. |
| 81 | Paz F., Pow-Sang J.A. | A systematic mapping review of usability evaluation methods for software development process | 2016 | Given that usability is one of the most important aspects of software quality, several methods have been developed in order to establish techniques capable of evaluating this attribute from early phases of the software development process. However, the choice of the most appropriate method for a particular scenario is still a difficult decision, due to the existence of a vast number of approaches that are described in the literature for this purpose. Therefore, a systematic mapping review was conducted in order to identify the most commonly used usability evaluation techniques in software developments. A total of 1169 studies were identified, of which only 215 studies were selected for this review. According to the analysis, most cases studies establish the use of usability questionnaires as assessment tool. In addition, health informatics and Web applications are the software domain and type of application that are frequently reported in these evaluations. This work has allowed to reach promising results in this area. It is intended to be a guide for specialists to support the choice of the most suitable method for a particular scenario. © 2016 SERSC. |
| 82 | Horsky J. | Errors related to CPOE | 2016 | Electronic health records (EHRs) and computer-based provider order entry (CPOE) systems were developed in part to reduce the risk of injury to patients. Their potential to increase the quality and safety of care is well documented but concerns remain about the consequences of poor design, implementation or inadequate adaptation to established practices and realities of clinical work. This case study describes a potassium chloride overdose in a hospitalized patient that occurred despite the use of electronic ordering. Several important aspects of the serious adverse event were in fact attributable to failures in interaction with a system that had many design and functional characteristics inconsistent with common usability conventions and principles of cognitive engineering. Cognitive errors with the potential to engender adverse events may occur relatively frequently when complex information technology is used routinely in safety-critical work environments. The risk of a certain type of error can be effectively reduced by employing safe design practices during software development, while others can be addressed during implementation and by monitoring and periodic evaluation of critical processes under normal working conditions. © Springer International Publishing Switzerland 2016. |
| 83 | Konstantinidis E.I., Billis A.S., Mouzakidis C.A., Zilidou V.I., Antoniou P.E., Bamidis P.D. | Design, implementation, and wide pilot deployment of FitForAll: An Easy to use exergaming platform improving physical fitness and life quality of senior citizens | 2016 | Many platforms have emerged as response to the call for technology supporting active and healthy aging. Key requirements for any such e-health systems and any subsequent business exploitation are tailor-made design and proper evaluation. This paper presents the design, implementation, wide deployment, and evaluation of the low cost, physical exercise, and gaming (exergaming) FitForAll (FFA) platform system usability, user adherence to exercise, and efficacy are explored. The design of FFA is tailored to elderly populations, distilling literature guidelines and recommendations. The FFA architecture introduces standard physical exercise protocols in exergaming software engineering, as well as, standard physical assessment tests for augmented adaptability through adjustable exercise intensity. This opens up the way to next generation exergaming software, which may be more automatically/smartly adaptive. 116 elderly users piloted FFA five times/week, during an eight-week controlled intervention. Usability evaluation was formally conducted (SUS, SUMI questionnaires). Control group consisted of a size-matched elderly group following cognitive training. Efficacy was assessed objectively through the senior fitness (Fullerton) test, and subjectively, through WHOQoL-BREF comparisons of pre-postintervention between groups. Adherence to schedule was measured by attendance logs. The global SUMI score was 68.33±5.85%, while SUS was 77.7. Good usability perception is reflected in relatively high adherence of 82% for a daily two months pilot schedule. Compared to control group, elderly using FFA improved significantly strength, flexibility, endurance, and balance while presenting a significant trend in quality of life improvements. This is the first elderly focused exergaming platform intensively evaluated with more than 100 participants. The use of formal tools makes the findings comparable to other studies and forms an elderly exergaming corpus. © 2014 IEEE. |
| 84 | García-Magariño I., Palacios-Navarro G. | A model-driven approach for constructing ambient assisted-living multi-agent systems customized for Parkinson patients | 2016 | The Parkinson disease affects some people, especially in the last years of their lives. Ambient assisted living systems can support them, especially in the middle stages of the disease. However, these systems usually need to be customized for each Parkinson patient. In this context, the current work follows the model-driven engineering principles to achieve this customized development. It represents each patient with a model. This is transformed into an agent-based model, from which a skeleton of programming code is generated. A case study illustrates this approach. Moreover, 24 engineers expert in model-driven engineering, multi-agent systems and/or health experienced the current approach alongside the three most similar works, by implementing actual systems. Some of these systems were tested by Parkinson patients. The results showed that (1) the current approach reduced the development time, (2) the developed system satisfied a higher percentage of the requirements established for certain Parkinson patients, (3) the usability increased, (4) the performance of the systems improved taking response time into account, and (5) the developers considered that the underlying metamodel is more appropriate for the current goal. © 2015 Elsevier Inc. All rights reserved. |
| 85 | Nelson S.D., Del Fiol G., Hanseler H., Crouch B.I., Cummins M.R. | A case report of refining user requirements for a health information exchange dashboard | 2016 | Background: Health information exchange (HIE) between Poison Control Centers (PCCs) and Emergency Departments (EDs) could improve care of poisoned patients. However, PCC information systems are not designed to facilitate HIE with EDs; therefore, we are developing specialized software to support HIE within the normal workflow of the PCC using user-centered design and rapid prototyping. Objective: To describe the design of an HIE dashboard and the refinement of user requirements through rapid prototyping. Methods: Using previously elicited user requirements, we designed low-fidelity sketches of designs on paper with iterative refinement. Next, we designed an interactive high-fidelity prototype and conducted scenario-based usability tests with end users. Users were asked to think aloud while accomplishing tasks related to a case vignette. After testing, the users provided feedback and evaluated the prototype using the System Usability Scale (SUS). Results: Survey results from three users provided useful feedback that was then incorporated into the design. After achieving a stable design, we used the prototype itself as the specification for development of the actual software. Benefits of prototyping included having 1) subject-matter experts heavily involved with the design; 2) flexibility to make rapid changes, 3) the ability to minimize software development efforts early in the design stage; 4) rapid finalization of requirements; 5) early visualization of designs; 6) and a powerful vehicle for communication of the design to the programmers. Challenges included 1) time and effort to develop the prototypes and case scenarios; 2) no simulation of system performance; 3) not having all proposed functionality available in the final product; and 4) missing needed data elements in the PCC information system. © Schattauer 2016. |
| 86 | Von Frankenberg und Ludwigsdorff N., Peters S., Brügge B., Loftness V., Aziz A. | Effective visualization and control of the indoor environmental quality in smart buildings | 2016 | Smart environments collect huge amounts of low-level data, but tend to fail to provide this data in an accessible, user-friendly, and meaningful way. Given the amount of time we spend inside buildings, the indoor environmental quality has a strong influence on our productivity and health. We developed the system SmartSpaces that aggregates and visualizes environmental data in a smartphone application. The goal is to provide access to this data such that users can understand and improve the factors that influence their well-being. User interface guidelines for visualizing the environmental quality are proposed. We describe a case study of occupants in a smart building that allows them to access the data. The findings show that usability and transparency increase the users' awareness of the environmental quality. This can lead to a behavioral change and therefore improve the users' health and productivity, and optimize the energy consumption of buildings. © Copyright 2016 for the individual papers by the papers' authors. |
| 87 | [No author name available] | CEUR Workshop Proceedings | 2016 | The proceedings contain 40 papers. The topics discussed include: a review on integration of usability and agile methods in software development practice; enhanced select and test (eST) algorithm: framework for diagnosing and monitoring related ailments; competencies needed by automobile technology teachers towards the development of ICT for teaching-learning purposes; students' perception of online student evaluation of teaching (SET) in Nigeria; development of an Android app for monitoring PMS in gas stations; a framework for pre and post vote cast audit to enhanced electronic voting systems' credibility (PsVCF); big data: a computing model for knowledge extraction on insurgency management; a multilingual translation system for enhancing agricultural eExtension services delivery; SIM cards forensic capability and evaluation of extraction tools; threat modeling of electronic health systems and mitigating countermeasures; securing file on cloud computing system using encryption software: a comparative analysis; a secure method to hide confidential data using cryptography and steganography; an infallible technique for hiding confidential data in compressed video using LSB and RSA algorithm; and online social networks: a survey of usage and risks experience among university students in north-central Nigeria. |
| 88 | Lindholm C. | Involving user perspective in a software risk management process | 2015 | More and more user groups are using medical devices. Heart starters are, for example, available in public places and used by non-professionals. Different mobile medical applications, designed to help people manage their own health, are now being added to the medical device spectra. Users handling medical devices make errors, but by involving users in the risk management process, it is possible to lower the risk of these errors. This paper presents an evaluation of the value of complementing a traditional risk management process with an emphasised user perspective. A medical device software risk management framework is being designed, and the risk management process should be regarded as the first part of the framework. The main goal of the evaluated risk management process is to integrate users and user perspective into the risk management process. The results indicate that the use of use cases as input at risk meetings makes the discussions more focused, saving effort and time. When users attend the risk meetings, user perspective and domain knowledge are brought into the process, affecting risk identification and risk assessment. The results also show that the use of usability testing gives valuable input to the risk management process. Copyright © 2015 John Wiley & Sons, Ltd. |
| 89 | Tripp O., Pistoia M., Centonze P. | Application- and User-Sensitive Privacy Enforcement in Mobile Systems | 2015 | The mobile era is marked by exciting opportunities for utilization of contextual information in computing. Applications from different categories - including commercial and enterprise email, instant messaging, social, banking, insurance and retail - access, process and transmit over the network numerous pieces of sensitive information, such as the user's geographical location, device ID, contacts, calendar events, passwords, and health records, as well as credit-card, social-security, and bank-account numbers. Understanding and managing how an application handles private data is a significant challenge. There are not only multiple sources of such data (including primarily social accounts, user inputs and platform libraries), but also different release targets (such as advertising companies and application servers) and different forms of release (for example, passwords transmitted in the clear, hashed or encrypted). To the end users, and particularly those who are not tech savvy, it is nontrivial to manage these complexities. In response, we have designed Labyrinth, a system for privacy enforcement. The unique features of Labyrinth are (i) an intuitive visual interface for configuration of the privacy policy, which consists of enriched app screen captures annotated with privacy-related information, combined with (ii) a lightweight mechanism to detect and suppress privacy threats that is completely decoupled from the host platform. Labyrinth supports both Android and iOS. In this paper, we describe the Labyrinth architecture and illustrate its flow steps. © 2015 IEEE. |
| 90 | Pistoia M., Tripp O., Centonze P., Ligman J.W. | Labyrinth: Visually Configurable Data-Leakage Detection in Mobile Applications | 2015 | Mobile devices have revolutionized many aspects of our lives. We use smartphones and tablets as portable computers and, often without realizing it, we run various types of security-sensitive programs on them, such as personal and enterprise email and instant-messaging applications, as well as social, banking, insurance and retail programs. These applications access and transmit over the network numerous pieces of private information, including our geographical location, device ID, contacts, calendar events, passwords, and health records, as well as credit-card, social-security, and bank-account numbers. Guaranteeing that no private information is exposed to unauthorized observers is very challenging given the level of complexity that these applications have reached. Furthermore, using program-analysis tools with out-of-the-box configurations in order to detect confidentiality violations may not yield the desired results because only a few pieces of private data, such as the device's ID and geographical location, are obtained from standard sources. The majority of confidentiality sources (such as credit-card and bank-account numbers) are application-specific and require careful configuration. This paper presents Labyrinth, a run-time privacy enforcement system that automatically detects leakage of private data originating from standard as well as application-specific sources. Labyrinth features several novel contributions: (i) it allows for visually configuring, directly atop the application's User Interface (UI), the fields that constitute custom sources of private data, (ii) it does not require operating-system instrumentation, but relies only an application-level instrumentation and on a proxy that intercepts the communication between the mobile device and the back-end servers, and (iii) it performs an enhanced form of value-similarity analysis to detect data leakage even when sensitive data (such as a password) has been encoded or hashed. Labyrinth supports both Android and iOS. We have evaluated Labyrinth experimentally, and in this paper we report results on production-level applications. © 2015 IEEE. |
| 91 | Aljaber T., Gordon N., Kambhampati C., Brayshaw M. | An evaluation framework for mobile health education software | 2015 | Mobile applications in general, and mobile applications for health education in particular, are commonly used to support patients, health professionals and other stakeholders. A critical evaluation framework is needed to ensure the usability and reliability of mobile applications for health education in order to save time and effort for the various stakeholders. This paper proposes a framework for evaluating mobile applications for health education. The intended outcome is to meet the needs and demands of different stakeholders and provide improvement for software engineering by creating new and more effective ways to evaluate such software. We conclude with some specific evaluation metrics that we applied in our evaluation framework: a hybrid utilizing heuristic evaluation (HE) and usability evaluation (UE). © 2015 IEEE. |
| 92 | Peischl B., Ferk M., Holzinger A. | The fine art of user-centered software development | 2015 | In this article, we report on the user-centered development of a mobile medical app under limited resources. We discuss (non-functional) quality attributes that we used to choose the platform for development of the medical app. As the major contribution, we show how to integrate user-centered design in an early stage of mobile app development under the presence of limited resources. Moreover, we present empirical results gained from our two-stage testing procedure including recommendations to provide both a useful and useable business app. © 2014, Springer Science+Business Media New York. |
| 93 | Peischl B., Ferk M., Holzinger A. | Integrating user-centred design in an early stage of mobile medical application prototyping: A case study on data acquistion in health organisations | 2015 | This paper reports on collaborative work with an SME, developing a system for data acquisition in health care organisations, providing mobile data support. We briefly introduce the ICF and the ICD classification scheme from the WHO as a foundation for our mobile application. A two-staged usability evaluation in a very early stage of development allows us to integrate user-centred design in the mobile application development process. Our procedure comprises interviews and usability tests with a limited number of users and thus can even be performed within a resource-constrained setting as it is typically found in smaller software development teams. We discuss the consolidated results of the usability tests quantitatively and qualitatively. From these results we deduce recommendations (and open issues) concerning the user interface design of the mobile application. © 2013 SCITEPRESS. |
| 94 | Parry D., Carter P., Koziol-Mclain J., Feather J. | A Model for Usability Evaluation for the Development and Implementation of Consumer eHealth Interventions | 2015 | Consumer eHealth products are often used by people in their own homes or other settings without dedicated clinical supervision, and often with minimal training and limited support-much as eCommerce and eGovernment applications are currently deployed. Internet based self-care systems have been advocated for over a decade as a way to reduce costs and allow more convenient care, and-because of the expectation that they will be used to reduced health cost -, by increasing self-care and avoiding hospitalization. However, the history of consumer eHealth interventions is mixed, with many unsuccessful implementations. Many consumer eHealth products will form part of a broader complex intervention, with many possible benefits and effects on both individuals and society. This poster describes a model of consumer eHealth assessment based on multiple methods of usability evaluation at different stages in the design and fielding of eHealth systems. We argue that different methods of usability evaluation are able to give valuable insights into the likely effects of an intervention in a way that is congruent with software development processes. © 2015 IMIA and IOS Press. |
| 95 | [No author name available] | Proceedings - 7th International Conference on Advanced Software Engineering and Its Applications, ASEA 2014 | 2015 | The proceedings contain 11 papers. The topics discussed include: model for the effectiveness estimation of simulation-based acquisition by considering the value of modeling and simulation; cost estimation of simulation models for the effectiveness estimation of simulation-based acquisition; current trends in usability evaluation methods: a systematic review; data integration progression in large data source using mapping affinity; the effect of database system application to alleviate chronic obstructive pulmonary disease; a design of efficient medical information system to enhance health behaviors after radical prostatectomy; construction for balanced Boolean function with maximum algebraic immunity; optical illusion effect by histogram analysis; a survey on encryption schemes in wireless sensor networks; a survey on security models, techniques, and tools for the internet of things; and quantitative risk management for communication and information systems: state-of-the-art and challenges. |
| 96 | [No author name available] | 12th International Conference on Smart Homes and Health Telematics, ICOST 2014 | 2015 | The proceedings contain 39 papers. The special focus in this conference is on Design and usability, Assistive and sentient environments, Cognitive technology, Activity recognition, Context and situation awareness and Health IT. The topics include: Designing a multi-sided health and wellbeing platform; design and usability of a smart home sensor data user interface for a clinical and research audience; an innovative way of increasing adoption of social media in older people; agile development for the creation of proper human-computer interfaces for the elderly; testing real-time in-home fall alerts with embedded depth video hyperlink; using smart, interactive tutorials in elderly software development; actimetric tele-surveillance and tailored to the signal data compression; monitoring patient recovery using wireless physiotherapy devices; comparison of two prompting methods in guiding people with traumatic brain injury in cooking tasks; a collaborative patient-carer interface for generating home based rules for self-management; measuring the impact of ICTs on the quality of life of ageing people with mild dementia; implementation in community settings; regression analysis for gesture recognition using RFID technology; improving activity recognition in smart environments with ontological modeling; remote monitoring using smartphone based plantar pressure sensors: unimodal and multimodal activity detection; ontology based context fusion for behavior analysis and prediction; quantifying semantic proximity between contexts; emotion aware system for the elderly; partial sharing of health documents in cloud and biomedical ontology matching as a service. |
| 97 | Militello L., Borders M., Sushereba C., Diiulio J., Doebbeling B., Imperiale T., Saleem J. | Employing decision-centered design to develop decision support for colorectal cancer screening (extended abstract) | 2015 | This paper describes a project employing decision-centered design to develop a decision support application called the Screening & Surveillance App (SSA) to aid primary care providers in tracking and managing colorectal cancer (CRC) screening for their patients. This paper details the path from cognitive task analysis (CTA) to a decision support application. We conducted ethnographic observations and CTA interviews to identify common elements of clinical workflow across health systems and articulate decision requirements. We describe three design iterations that emerged over the course of CTA and software development. Findings from a beta test evaluating the SSA suggest that it saves time, increases accuracy in responding to CRC-related patient-specific questions, and is perceived to reduce workflow as compared to participants' current electronic health records (EHR). Usability and usefulness ratings for the SSA as measured by the Health ITUES were above 4 on a 5-point scale where 5 was most positive. Copyright 2015 Human Factors and Ergonomics Society. |
| 98 | Assefi M., Liu G., Wittie M.P., Izurieta C. | An experimental evaluation of Apple Siri and Google Speech Recognition | 2015 | We perform an experimental evaluation of two popular cloud-based speech recognition systems. Cloudbased speech recognition systems enhances Web surfing, transportation, health care, etc. Using voice commands helps drivers stay connected to the Internet by avoiding traffic safety risks. The performance of these type of applications should be robust under difficult network conditions. User frustration with network traffic problems can affect the usability of these applications. We evaluate the performance of two popular cloud-based speech recognition applications, Apple Siri and Google Speech Recognition (GSR) under various network conditions. We evaluate transcription delay and accuracy of transcription of each application under different packet loss and jitter values. Results of our study show that performance of cloud-based speech recognition systems can be affected by jitter and packet loss; which are commonly occurring over WiFi and cellular network connections. |
| 99 | Washington P., Kumar M., Tibrewal A., Sabharwal A. | ScaleMed: A methodology for iterative mHealth clinical trials | 2015 | mHealth, which involves using smartphones as a tool for healthcare monitoring and delivery, continues to gain traction worldwide. As a result, new pilot programs and clinical trials continue to be launched to establish clinical evidence. However, the continual need for software changes between iterations of the trial creates a lengthy time loop between clinical researchers requesting a change and software developers implementing the requested change. We propose a new methodology for performing clinical trials, called ScaleMed. The ScaleMed methodology involves decoupling low-level app functionality from high-level trial-related operational parameters, a common software development practice. By utilizing a centralized website that allows clinical researchers to rapidly update these trial parameters, iterative clinical trials have the potential to move at a much faster rate than in current practice. We demonstrate an example of the ScaleMed methodology applied to an ongoing mental health trial (codenamed Lucy). In addition, we conducted a separate trial on the usability of the ScaleMed-enabled Lucy platform and found a predominantly positive response from the potential clinical users. In our limited trials, we showed that the time to make changes to app parameters was cut from weeks to less than a minute. © 2015 IEEE. |
| 100 | Hastings J., Haug K., Steinbeck C. | Ten recommendations for software engineering in research | 2014 | Research in the context of data-driven science requires a backbone of well-written software, but scientific researchers are typically not trained at length in software engineering, the principles for creating better software products. To address this gap, in particular for young researchers new to programming, we give ten recommendations to ensure the usability, sustainability and practicality of research software. © 2014 Hastings et al.; licensee BioMed Central Ltd. |
| 101 | Van Genuchten M., Mans R., Reijers H., Wismeijer D. | Is your upgrade worth it? process mining can tell | 2014 | [CDATA[Software vendors typically release updates and upgrades of their software once or twice a year. Users are then faced with the question of whether the upgrade is worth the price and the trouble. The software industry doesn't provide much evidence that it's worthwhile to upgrade to new releases. The authors propose the use of process mining to prove that upgrading to the next release provides quantifiable benefits to the end user. Process mining capitalizes on the fact that event logs capture information about processes. These events can be used to make processes visible and show the benefits of using a software product's next release. Three groups benefits from this process: end users, software suppliers, and researchers. The authors applied process mining to a medical software product and captured empirical data from 1,400 cases. The data shows that the new version was 11 percent more efficient than the old release.]]. © 2014 IEEE. |
| 102 | Lycett K., Wittert G., Gunn J., Hutton C., Clifford S.A., Wake M. | The challenges of real-world implementation of web-based shared care software: The HopSCOTCH Shared-Care Obesity Trial in Children | 2014 | Background: E-health initiatives hold promise to improve shared-care models of health care. In 2008-2011 we developed and trialled web-based software to facilitate a randomised trial of a shared-care approach for childhood obesity involving General Practitioners (GPs) working with tertiary specialists. We describe the software's development, implementation and evaluation, and make recommendations for future e-health initiatives. The web-based software was designed with the goals of allowing both GPs and specialists to communicate and review patient progress; integrating with existing GP software; and supporting GPs to deliver the structured intervention. Specifically, we aimed to highlight the challenges inherent in this process, and report on the extent to which the software ultimately met its implementation and user aims. Methods. The study was conducted at the Royal Children's Hospital and 22 general practices across Melbourne, Australia. Participants comprised 30 GPs delivering the shared-care intervention. Outcomes included the following. (1) GPs' pre-specified software requirements: transcribed from two focus groups and analysed for themes using content analysis. (2) Software implementation and performance based on the experience of the research team and GPs. (3) GP users' evaluation collected via questionnaire. (4) Software usage collected via GP questionnaire and qualified through visual inspection of the software meta-data. Results: Software implementation posed difficult and at times disabling technological barriers (e.g. out-dated hardware, poor internet connections). The software's speed and inability to seamlessly link with day-to-day software was a source of considerable frustration. Overall, GPs rated software usability as poor, although most (68%) felt that the structure and functionality of the software was useful. Recommendations for future e-health initiatives include thorough scoping of IT systems and server speed, testing across diverse environments, automated pre-requisite checks and upgrades of processors/memory where necessary, and user-created usernames and passwords. Conclusions: GPs are willing to embrace novel technologies to support their practice. However, implementation remains challenging mainly for technical reasons, and this precludes further evaluation of potential user-specific barriers. These findings could inform future e-health ventures into shared-care, and highlight the need for an appropriate infrastructure. Trial registration. Australian New Zealand Clinical Trials Registry: ACTRN126080000553. © 2014 Lycett et al.; licensee BioMed Central Ltd. |
| 103 | Rautenberg P.L., Kumaraswamy A., Tejero-Cantero A., Doblander C., Norouzian M.R., Kai K., Jacobsen H.-A., Ai H., Wachtler T., Ikeno H. | Neurondepot: Keeping your colleagues in sync by combining modern cloud storage services, the local file system, and simple web applications | 2014 | Neuroscience today deals with a "data deluge" derived from the availability of high-throughput sensors of brain structure and brain activity, and increased computational resources for detailed simulations with complex output. We report here (1) a novel approach to data sharing between collaborating scientists that brings together file system tools and cloud technologies, (2) a service implementing this approach, called NeuronDepot, and (3) an example application of the service to a complex use case in the neurosciences. The main drivers for our approach are to facilitate collaborations with a transparent, automated data flow that shields scientists from having to learn new tools or data structuring paradigms. Using NeuronDepot is simple: one-time data assignment from the originator and cloud based syncing-thus making experimental and modeling data available across the collaboration with minimum overhead. Since data sharing is cloud based, our approach opens up the possibility of using new software developments and hardware scalabitliy which are associated with elastic cloud computing. We provide an implementation that relies on existing synchronization services and is usable from all devices via a reactive web interface. We are motivating our solution by solving the practical problems of the GinJang project, a collaboration of three universities across eight time zones with a complex workflow encompassing data from electrophysiological recordings, imaging, morphological reconstructions, and simulations. © 2014 Rautenberg, Kumaraswamy, Tejero-Cantero, Doblander, Norouzian, Kai, Jacobsen, Ai, WachtlerandIkeno. |
| 104 | Duke J.D., Morea J., Mamlin B., Martin D.K., Simonaitis L., Takesue B.Y., Dixon B.E., Dexter P.R. | Regenstrief Institute's Medical Gopher: A next-generation homegrown electronic medical record system | 2014 | Objective: Regenstrief Institute developed one of the seminal computerized order entry systems, the Medical Gopher, for implementation at Wishard Hospital nearly three decades ago. Wishard Hospital and Regenstrief remain committed to homegrown software development, and over the past 4 years we have fully rebuilt Gopher with an emphasis on usability, safety, leveraging open source technologies, and the advancement of biomedical informatics research. Our objective in this paper is to summarize the functionality of this new system and highlight its novel features. Materials and methods: Applying a user-centered design process, the new Gopher was built upon a rich-internet application framework using an agile development process. The system incorporates order entry, clinical documentation, result viewing, decision support, and clinical workflow. We have customized its use for the outpatient, inpatient, and emergency department settings. Results: The new Gopher is now in use by over 1100 users a day, including an average of 433 physicians caring for over 3600 patients daily. The system includes a wizard-like clinical workflow, dynamic multimedia alerts, and a familiar 'e-commerce'-based interface for order entry. Clinical documentation is enhanced by real-time natural language processing and data review is supported by a rapid chart search feature. Discussion: As one of the few remaining academically developed order entry systems, the Gopher has been designed both to improve patient care and to support next-generation informatics research. It has achieved rapid adoption within our health system and suggests continued viability for homegrown systems in settings of close collaboration between developers and providers. © 2013 Elsevier Ireland Ltd. |
| 105 | Shaalan K., Al-Mansoori M., Tawfik H. | An awareness-raising E-learning approach for children living in a high diabetic population | 2014 | Recent epidemiological studies have shown an increased incidence of diabetes worldwide. In United Arab Emirates (UAE), where this study on Emirati children was conducted, over 20% of the population has diabetes. With such a high incidence, there is a need to raise the awareness of the disease in order to reduce the growing number of cases and manage the disease more effectively. This research aims to identify the needs of affected children and proposes a design for an E-learning prototype that can pedagogically raise their awareness and knowledge of the disease. The use of a prototype was chosen in order to validate and refine the usability of the system, and to quickly evaluate user-interface designs without the need for an expensive working model to help refine and develop the system design. The system requirements were identified through a set of interviews with kindergarten teachers, curriculum design experts in UAE, and diabetes nutrition specialists and clinicians. The rationale behind the interview was to identify the optimal age group, describe the appropriate level of the instructional materials and activities, and propose a suitable learning approach that could facilitate and improve diabetes awareness among this age group. The prototype was evaluated by children, teachers, parents (or guardians) and nutrition specialists. We followed a three-stage software development based on a user-informed approach model for stepwise refinement that ranged from prototype to final design. The evaluation results indicate that the proposed computer-supported learning approach can generate positive learning and behavior in children while reducing the time needed to complete awareness tasks when compared to traditional methods; thus making learning more engaging and allowing children to learn at their own pace. © 2014 Informa UK Ltd. All rights reserved: reproduction in whole or part not permitted. |
| 106 | Richardson I. | Software processes: How important is your domain? | 2014 | There was a time when researching software processes meant just that - we were interested in making sure that the process for software development was effective. We did not really have to worry about the domains in which our software was used - well, maybe that was up to the requirements engineers or even those who were interested in usability, but it did not really affect the software processes through which the software was developed. But, things have changed! Software has become more ubiquitous. Software is used in products that are governed by regulation. Software is being developed in organisations that heretofore did not consider themselves software companies - such as automotive and medical device companies. As the manner in which software is being used has changed, so too must the processes by which software is developed. This paper presents the position that software processes can no longer ignore the domain - they have to change to ensure that software can be used wherever it is needed. © 2014 Author. |
| 107 | Flood D., Mc Caffery F., Regan G., Casey V. | A Critical Evaluation of a Methodology for the Generation of Software Process Improvement Roadmaps | 2014 | For medical device organisations to market their devices in specific geographic regions they must adhere to the regulations of that region. These regulations often recommend that organisations adhere to specific standards and guidance documents which specify "what" must be achieved without specifying "how" this may be done. Due to changes to the medical device directive, which governs the development of medical devices within the EU, in March 2010, software can now in its own right be considered a medical device. This change has meant that a number of software organisations developing software for the medical device domain must now adhere to the same regulations as other medical device manufacturers. In this work we present a concept for a Software Process Improvement (SPI) roadmap to guide such organisations through the task of implementing medical device standards and guidance documents. In addition we present and evaluate a methodology that can be used to create a SPI roadmap from a set of requirements such as the aforementioned standards and guidance documents. © Springer-Verlag Berlin Heidelberg 2014. |
| 108 | Øvad T., Larsen L.B. | Experiences from training agile software developers in focused workshops | 2014 | Due to increasing focus on usability and user experience (UX) design, with a focus towards medical devices, this paper reports on the experiences of teaching developers to do UX work in an agile software development environment. The taught method is a focused workshop. The case study is not yet finalised, but the current results indicates that the developers support the idea of making some of the UX work themselves, they feel more secure and confident in the method after having been note takers in such a session and that both planning, conducting and analysing the workshop can be done during one development sprint. Copyright © 2014 IADIS Press All rights reserved. |
| 109 | Sanches L.M.P., Harris M.R., Abbott P.A., Novaes M.A., Lopes M.H.B.M. | Collaborative software development for a Brazilian telehealth program | 2014 | Telehealth services in the State of Pernambuco, Brazil are led by the Telehealth Center (RedeNUTES) and based on HealthNet 2.0 software. Among the tele-assistance services, health professionals have clinical discussions focused on second opinions. This paper reports the experience in a PhD study through mixed-methods, to evaluate the telehealth services, planning and modeling a new tool to improve a telehealth system. We described the nurse's role in each phase of this study. The method of User-Centered Design was explored in three phases as Identification of work process, User's perception and collaborative modeling, Observational usability study. The main frame was based on collaborative techniques as Collaborative Prototype Design Process, cognitive walkthrough, and thinking-aloud. The users also identified all usability problems identified by the evaluators. The methods were useful in identifying usability problems, and easy to employ using standard equipment and software thus a relatively low cost approach to usability testing. © 2014 The authors and IOS Press. |
| 110 | Davids M.R., Chikte U., Grimmer-Somers K., Halperin M.L. | Usability testing of a multimedia e-learning resource for electrolyte and acid-base disorders | 2014 | The usability of computer interfaces may have a major influence on learning. Design approaches that optimize usability are commonplace in the software development industry but are seldom used in the development of e-learning resources, especially in medical education. We conducted a usability evaluation of a multimedia resource for teaching electrolyte and acid-base disorders by studying the interaction of 15 medical doctors with the application. Most of the usability problems occurred in an interactive treatment simulation, which was completed successfully by only 20% of participants. A total of 27 distinct usability problems were detected, with 15 categorized as serious. No differences were observed with respect to usability problems detected by junior doctors as compared with more experienced colleagues. Problems were related to user information and feedback, the visual layout, match with the real world, error prevention and management, and consistency and standards. The resource was therefore unusable for many participants; this is in contrast to good scores previously reported for subjective user satisfaction. The findings suggest that the development of e-learning materials should follow an iterative design-and-test process that includes routine usability evaluation. User testing should include the study of objective measures and not rely only on self-reported measures of satisfaction. © 2013 British Educational Research Association. |
| 111 | Sheikh J.A., Dar H.S., Sheikh F.J. | Usability guidelines for designing knowledge base in rural areas towards women empowerment | 2014 | The paper discusses issues related to Design, User experience Usability involved in designing the interface to be used in rural areas. This study analyses the problems based on tests done on the interface in the villages of Punjab, Pakistan. Rural development is based on economic, social and human development. Whereas, Software Requirement Engineering focuses on how requirements can be gathered to achieve better end product. We aim to discuss software requirement gathering process in rural areas and attempting to elicit requirements from Pakistani rural woman. This could help us in bridging the technological gaps exist between rural and remote areas. Our aim is to find a solution for this barrier by designing software for rural woman of Pakistan. Further break down of our study is health issues with rural woman by adopting software requirement gathering on various e-health issues. © Springer International Publishing Switzerland 2014. |
| 112 | Giménez M., Moscato M.M., Pombo C.G.L., Frias M.F. | HeteroGenius: A framework for hybrid analysis of heterogeneous software specifications | 2014 | Nowadays, software artifacts are ubiquitous in our lives being an essential part of home appliances, cars, cell phones, and even in more critical activities like aeronautics and health sciences. In this context software failures may produce enormous losses, either economical or, in the worst case, in human lives. Software analysis is an area in software engineering concerned with the application of diverse techniques in order to prove the absence of errors in software pieces. In many cases different analysis techniques are applied by following specific methodological combinations that ensure better results. These interactions between tools are usually carried out at the user level and it is not supported by the tools. In this work we present HeteroGenius, a framework conceived to develop tools that allow users to perform hybrid analysis of heterogeneous software specifications. HeteroGenius was designed prioritising the possibility of adding new specification languages and analysis tools and enabling a synergic relation of the techniques under a graphical interface satisfying several well-known usability enhancement criteria. As a case-study we implemented the functionality of Dynamite on top of HeteroGenius. © Moscato, M.M., Lopez Pombo, C.G. et. al. |
| 113 | Schueller S.M., Begale M., Penedo F.J., Mohr D.C. | Purple: A modular system for developing and deploying behavioral intervention technologies | 2014 | The creation, deployment, and evaluation of Web-based and mobile-based applications for health, mental health, and wellness within research settings has tended to be siloed, with each research group developing their own systems and features. This has led to technological features and products that are not sharable across research teams, thereby limiting collaboration, reducing the speed of dissemination, and raising the bar for entry into this area of research. This paper provides an overview of Purple, an extensible, modular, and repurposable system created for the development of Web-based and mobile-based applications for health behavior change. Purple contains features required to construct applications and to manage and evaluate research trials using these applications. Core functionality of Purple includes elements that support user management, content authorship, content delivery, and data management. We discuss the history and development of the Purple system guided by the rationale of producing a system that allows greater collaboration and understanding across research teams interested in investigating similar questions and using similar methods. Purple provides a useful tool to meet the needs of stakeholders involved in the creation, provision, and usage of eHealth and mHealth applications. Housed in a non-profit, academic institution, Purple also offers the potential to facilitate the diffusion of knowledge across the research community and improve our capacity to deliver useful and usable applications that support the behavior change of end users. |
| 114 | Anvari F., Tran H.M.T. | Holistic personas and reflective concepts for software engineers | 2014 | In a small to medium sized organisations, managements' understanding of the complexity of the Information Technology (IT), software applications' usability and lead time needed to build a new application is limited. Often these organisations do not have comprehensive understanding of the new market due to inadequate market research. To design and develop a new software application, software engineers elicit requirements, ideally from end users, but the end users and stakeholders are often unavailable. User-Centred Design (UCD) is a methodology used to develop applications that consider the goals of the users as a primary requirement. Personas, archetypical users, and scenarios, the interaction of personas with the application to achieve goals, are tools used within UCD methodology. Software engineers can deduce the application requirements from personas and scenarios. Hence the closer the persona represents the end user, the more usable the resultant software application will become. Holistic Persona, a persona with five dimensions: factual, personality, intelligence, knowledge and cognitive process, seeks to more closely resemble the end user. Reflection-inaction, reflection on the spontaneous thinking that is happening during a task, Reflection-on-action, reflection after the task is over, Reflection-for-action, reflection done to gain knowledge for a similar future task, enhances the skills of software engineers while designing a new software application. Reflective capacity is regarded by many as an essential characteristic for professional competence. In this paper we explore the research question: how can software engineers apply UCD methodologies and reflective concepts in designing and developing new software applications? Through two case studies, we provide insights into the applications of UCD methodologies and reflective concepts in software engineering for development of a new application. We present our experiences during design and development of the applications and lessons learnt from the projects. We speculate how Holistic Personas and scenarios would have resulted in speedier development and improvements in the quality of the end products. Case one is about engineering an idea into an e-health software application at a research-intensive Australian university. Case two is about engineering a system and an application to provide automated program guide, news, sport highlights, short feature films and weather published on an Australian national broadcasting services' website for the multi-channel digital television system. Both applications were green-field developments with no past histories of a similar application to model for their design and development. © The Authors, 2014. All Rights Reserved. |
| 115 | Blaise J.-C., Levrat E., Iung B. | Process approach-based methodology for safe maintenance operation: From concepts to SPRIMI software prototype | 2014 | Maintenance can be considered today as the main enabling system to sustain a target physical item - a workplace, a work equipment or means of transport - in a state in which it can perform the required function. In that way, whatever the sector is, workers carrying out maintenance activities are exposed to various hazards (e.g. chemical, physical, biological or psychosocial) that may be at risk of developing musculoskeletal disorders, diseases, etc. and occupational accidents (e.g. falls through or off something). Indeed maintenance can affect the health and safety not only of the workers directly involved in it, but of other people present in the workplace. To face this maintenance risk issue, risk assessment/management approaches are conventionally conducted by considering human, organisational or technical directions. Nevertheless such approaches are often not enough efficient because too focused on one direction without taking into account all its interactions with the others. Thus this paper presents a generic integrated risk management approach to maintenance which is based on a generic formalisation of maintenance (intervention) business processes/activities but also of their requirements more dedicated to health and safety. Then the approach and its resulting models have been automated on a tool called SPRIMI (software engineering) to be usable for information, support, training and design of safe maintenance system. © 2014 Elsevier Ltd. |
| 116 | Chen Y.Y., Goh K.N., Chong K. | Rule based clinical decision support system for hematological disorder | 2013 | Evidence Based Medicine (EBM) has become a popular approach to medical decision making. It is a method of assisting in clinical decision making by using the most relevant research evidence to answer clinical questions. Complete Blood Count (CBC) is one of the most commonly ordered blood test that could be done within minutes and is mostly used as a basis for further testing. Therefore, CBC could be used as a base to quickly diagnose a patient and later on, use external clinical evidence from systematic research to further diagnose the patient. This paper proposes the development of a clinical decision support system (CDSS) to assist physicians in evidence based practice. The system will be able to provide the list of external evidence (electronic medical journals) for each type of generated probable disease. Usability and user acceptance testing were conducted with a group of physicians and medical students. This study reveals some usability issues of the system and significant improvements that are required to improve the accuracy of the system in generating probable hematological disorder. © 2013 IEEE. |
| 117 | Peischl B., Ferk M., Holzinger A. | Integrating user-centred design in an early stage of mobile medical application prototyping a case study on data acquistion in health organisations | 2013 | This paper reports on collaborative work with an SME, developing a system for data acquisition in health care organisations, providing mobile data support. We briefly introduce the ICF and the ICD classification scheme from the WHO as a foundation for our mobile application. A two-staged usability evaluation in a very early stage of development allows us to integrate user-centred design in the mobile application development process. Our procedure comprises interviews and usability tests with a limited number of users and thus can even be performed within a resource-constrained setting as it is typically found in smaller software development teams. We discuss the consolidated results of the usability tests quantitatively and qualitatively. From these results we deduce recommendations (and open issues) concerning the user interface design of the mobile application. Copyright © 2013 SCITEPRESS. |
| 118 | [No author name available] | 2013 5th International Workshop on Software Engineering in Health Care, SEHC 2013 - Proceedings | 2013 | The proceedings contain 15 papers. The topics discussed include: software engineering in health care: is it really different? and how to gain impact; introducing usability testing in the risk management process in software development; an agile v-model for medical device software development to overcome the challenges with plan-driven software development lifecycles; PolicyForge: a collaborative environment for formalizing privacy policies in health care; modal abstraction view of requirements for medical devices used in healthcare processes; open source patient-controlled analgesic pump requirements documentation; taming complex healthcare data models with dictionary tooling; transformation operators for easier engineering of medical process models; proposing regulatory-driven automated test suites for electronic health record systems; and considerations for online deviation detection in medical processes. |
| 119 | Lindholm C., Host M. | Introducing usability testing in the risk management process in software development | 2013 | Human beings make errors and that is nothing that we can avoid completely. We can however lower the risk of people doing wrong in situations where, for example, medical devices are used. The overall objective of the research presented in this paper is to investigate how usability testing can contribute to software risk management process in the medical device domain. Experience has been collected from both the risk management process and usability testing in a development project of a medical device. It can be concluded that usability tests can give valuable input to the risk management process. Usability tests can indicate risks that are not identified in the risk management process and render the possibility to verify if risks with high risk value actually cause the presumed problems. © 2013 IEEE. |
| 120 | [No author name available] | Foundations of Health Information Engineering and Systems - Second International Symposium, FHIES 2012, Revised Selected Papers | 2013 | The proceedings contain 14 papers. The topics discussed include: modeling and analysis of flexible healthcare processes based on algebraic and recursive Petri nets; verification of timed healthcare workflows using component timed-arc Petri nets; enhancing product line development by safety requirements and verification; defining new structural and mobile support to improve hospital facilities access and usability; regulated software development - an onerous transformation; an architecture and reference implementation of an open health information mediator: enabling interoperability in the Rwandan health information exchange; OwlOntDB: a scalable reasoning system for OWL 2 RL ontologies with large ABoxes; and trustworthy pervasive healthcare services via multiparty session types. |
| 121 | De Carvalho A.V., De Lucena C.J.P., Cirilo E.J.R., Alves P.H.C., Da Silva E Souza Miranda P.A., De Carvalho G.R., De Araújo F.R.L., Lima G.V.C. | Software engineering in telehealth, an extension of Sana mobile applied to the process of a routine hospital | 2013 | The patient's medical record, containing the reasons for hospitalization, clinical evolution, laboratory tests, prescription drugs and other relevant information is of utmost importance to medical management care. Information technology plays a key role in communicating and disseminating the patient's clinical data [1]. The Sana Mobile, originally developed by MIT (the Massachusetts Institute of Technology) for mobile platform, consists of an open source electronic medical record. It has revolutionized the delivery of healthcare services in remote areas in a clear and objective way [2]. The mobile device stores Sana medical data, text files, audio and video containing patient's clinical information while transmitting data over the mobile platform to a web server, the Open Medical Record System - OpenMRS. This system gathers information about medications, diagnoses, and others crucial data from a patient, making them available to consultations by many medical experts. Our tests with Sana Mobile - OpenMRS focus on the development of an experimental extension of this mobile platform and its use in supporting education and training of medical students encompassing routine free ambulatory care and multidisciplinary research project. Participating in this study are researches and students of Software Engineering, Medicine and Design, respectively Software Engineering Lab - LES of the Department of Informatics of the Pontifical Catholic University of Rio de Janeiro - PUC-Rio, the School of Medicine and Surgery of the State University of Rio de Janeiro - UNIRIO which includes Gaffrée and Guinle University Hospital - HUGG, Laboratory of Ergonomics and Usability - LEUI of the Department of Arts and Design at PUC-Rio, under the coordination of LES. © 2013 Springer-Verlag. |
| 122 | Tawfik A.A., Belden J.L., Moore J.L. | Agile Management of a Mobile Application Development Project for Surgeon Workflows | 2013 | This case describes the agile management methods for an iPhone software development project. The overall objective was to design a smartphone solution that allowed surgeons access to dynamic Electronic Health Record (EHR) data to optimize their workflow. Three separate organizations distributed the responsibilities. Specifically, the lead organization, Cerner Corporation, collaborated with the University of Missouri Health Care and University of Missouri Information Experience Lab to create the technology. Project goals included increased surgeon satisfaction; improved task efficiency, as measured by time spent retrieving lab and vital sign data on morning rounds; dynamic data accessibility; and increased revenue from new product sales. To accomplish these goals, agile project management was utilized, applying iterative usability methods to create deliverables within a short development cycle. Each development cycle focused on user-centered design principles. Several challenges were encountered related to the user-centered design methods, usability data extraction, academic collaborations, and interface design choices. © 2013, IGI Global. |
| 123 | Sadasivam R.S., Tanik M.M. | A meta-composite software development approach for translational research | 2013 | Translational researchers conduct research in a highly data-intensive and continuously changing environment and need to use multiple, disparate tools to achieve their goals. These researchers would greatly benefit from meta-composite software development or the ability to continuously compose and recompose tools together in response to their ever-changing needs. However, the available tools are largely disconnected, and current software approaches are inefficient and ineffective in their support for meta-composite software development. Building on the composite services development approach, the de facto standard for developing integrated software systems, we propose a concept-map and agent-based meta-composite software development approach. A crucial step in composite services development is the modeling of users' needs as processes, which can then be specified in an executable format for system composition. We have two key innovations. First, our approach allows researchers (who understand their needs best) instead of technicians to take a leadership role in the development of process models, reducing inefficiencies and errors. A second innovation is that our approach also allows for modeling of complex user interactions as part of the process, overcoming the technical limitations of current tools. We demonstrate the feasibility of our approach using a real-world translational research use case. We also present results of usability studies evaluating our approach for future refinements. © 2013 Springer Science+Business Media New York. |
| 124 | Jetley R., Sudarsan S., Sampath R., Ramaswamy S. | Medical software - Issues and best practices | 2013 | Introduction: The design and functional complexity of medical software has increased during the past 50 years, evolving from the use of a metronome circuit for the initial cardiac pacemaker to functions that include electrocardiogram (EKG) analysis, laser surgery, and networked systems for monitoring patients across various healthcare environments. Software has become ubiquitous in healthcare applications, as is evident from its prevalent use for controlling medical devices, maintaining electronic patient health data, and enabling healthcare information technology (HIT) systems. As the software functionality becomes more intricate, concerns arise regarding efficacy, safety and reliability. It thus becomes imperative to adopt an approach or methodology based on best engineering practices to ensure that the possibility of any defect or malfunction in these devices is minimized. © 2013 Springer-Verlag Berlin Heidelberg. |
| 125 | Bhutkar G., Katre D., Ray G.G., Deshmukh S. | Usability model for medical user interface of ventilator system in intensive care unit | 2013 | A usability model is a hierarchical structure encompassing the key elements such as users, user interface and interaction between them. It is a generic template which is independent of usability evaluation methods and provides flexibility for adaptation in different contexts and domains. In this paper, a usability model for medical user interfaces, especially for ventilator systems in Intensive Care Unit (ICU), is proposed based on Norman’s action-oriented seven-step model to capture a related medical context. A ventilator system is a therapeutic device, which provides a respiratory support to critically-ill patients. Currently, a usability of user interfaces of ventilator systems is evaluated by typical usability evaluation methods from software industry. These evaluation methods miss out important elements in medical context. Therefore, a need for a specialized usability model for medical user interfaces is fulfilled with a proposed usability model encompassing vital elements such as medical user, user interface, ICU environment and time required. This usability model is validated first, through a human work analysis using videos of selected tasks with medical user interfaces and then, with an overview of critical factors affecting medical user interfaces in ICU. In future, a proposed usability model can be integrated with a suitable usability evaluation method for evaluating medical user interfaces to identify related medical usability problems more effectively. © IFIP International Federation for Information Processing 2013. |
| 126 | Patterson E.S., Zhang J., Abbott P., Gibbons M.C., Lowry S.Z., Quinn M.T., Ramaiah M., Brick D. | Enhancing electronic health record usability in pediatric patient care: A scenario-based approach | 2013 | Background: Usability of electronic health records (EHRs) is an important factor affecting patient safety and the EHR adoption rate for both adult and pediatric care providers. A panel of interdisciplinary experts (the authors) was convened by the National Institute of Standards and Technology to generate consensus recommendations to improve EHR usefulness, usability, and patient safety when supporting pediatric care, with a focus on critical user interactions. Methods: The panel members represented expertise in the disciplines of human factors engineering (HFE), usability, informatics, and pediatrics in ambulatory care and pediatric intensive care. An iterative, scenario-based approach was used to identify unique considerations in pediatric care and relevant human factors concepts. A draft of the recommendations were reviewed by invited experts in pediatric informatics, emergency medicine, neonatology, pediatrics, HFE, nursing, usability engineering, and software development and implementation. Recommendations: Recommendations for EHR developers, small-group pediatric medical practices, and children's hospitals were identified out of the original 54 recommendations, in terms of nine critical user interaction categories: patient identification, medications, alerts, growth chart, vaccinations, labs, newborn care, privacy, and radiology. Conclusion: Pediatric patient care has unique dimensions, with great complexity and high stakes for adverse events. The recommendations are anticipated to increase the rate of EHR adoption by pediatric care providers and improve patient safety for pediatric patients. The described methodology might be useful for accelerating adoption and increasing safety in a variety of clinical areas where the adoption of EHRs is lagging or usability issues are believed to reduce potential patient safety, efficiency, and quality benefits. Copyright 2013 © The Joint Commission. |
| 127 | Tényi B., Csík A., Monoki I., Tegzes F. | Experience with an Integrated Risk Management Process in the Medical Regulatory Environment | 2013 | In the medical domain, manufacturers are required to implement a Risk Management Process by multiple standards. ISO 14971 provides a framework and taxonomy for medical device risk management process but does not provide details or explanations of its requirements. The IEC 60601 standard family for medical electrical equipment defines the major hazards as an input for the Risk Management Process. Further process standards deal with software and use-related risks in particular (IEC 62304, ISO 62366). It is a challenging task to fulfil all these requirements in one integrated process and provide a comprehensive documentation (Risk Management File) to achieve compliance. We have set up a Risk Management (RM) process for our two different active medical devices. We will share our implementation which handles the Hardware, Software and Use Risk in an integrated way on the functional level. Further particular software-related RM tasks are handled in the software development life-cycle separately. Additionally, we will present our tool chain, which provides evidence of carrying out RM tasks throughout the whole development life-cycle, including connections to the requirement management and effectiveness verification. © Springer-Verlag Berlin Heidelberg 2013. |
| 128 | Dixon J., Dehlinger J., Dixon S.D. | The design and usability testing of a mobile application to aid in child-to-adult-care transition | 2013 | As mobile devices become more central in our lives, accessibility and utility for users becomes essential. The widespread availability of mobile devices introduces a number of challenges to traditional software engineering including: 1. mobile user interfaces differ from traditional interfaces; and, 2. the diversity of mobile platforms. As part of a larger research effort, this poster presents the design, implementation and initial testing of a mobile application aimed at helping the child-to-adult-care transition process for children with chronic disease. Based on recommendations from the American Academy of Pediatrics, the application will help guide patients through four main components of transition: 1. assess transition readiness; 2. plan the transition; 3. implement the transition; and, 4. help document the transition. The design, implementation and testing of a mobile application may ease the transition process. By leveraging modern cross-compilation tools, this application can be implemented on multiple mobile platforms. This will lead to a variety of users, including those who may be differently-abled, to have a more fluid transition to their new health care providers. © Springer-Verlag Berlin Heidelberg 2013. |
| 129 | [No author name available] | 24th Australasian Conference on Information Systems 2013 | 2013 | The proceedings contain 175 papers. The special focus in this conference is on technical, organisational, business, and social issues in the application of Information Technology (IT). The topics include: ‘I just saw this on facebook, I need it now’; insights from an investigation of the design of a consumer health 2.0 application to address the relationship between on-line social networks and health-related behaviours; social-psycho issues of enterprise information system usage among government outsource vendors comprising Malaysian small-medium enterprises; aligning capabilities and social media affordances for open innovation in governments; self-organising roles in agile globally distributed teams; employment seeking under consideration of social capital on social network sites; method for business process management system selection; DM model transformations framework; crossing the communication barrier in global software development projects via global software development brokers; exploring the use and benefits of web 2.0 for supply chain management; the effects of learners’ personality traits on M-learning; discount focus subgroup method; enabling and encouraging greater diversity in ICT; institutionalisation of enterprise resource planning systems; a conceptual framework for assessing strategic information systems planning (SISP) success in the current dynamic environments; from participatory design to co-creation; adaptive music score trainer for visually impaired in Sri Lanka; towards a heuristic model for usable and secure online banking; the role of users’ emotions and associated quality goals on appropriation of systems; The use of social media in public e-procurement; consumer engagement perspectives at the business social network site and institutionalisation of enterprise systems through organisational isomorphism |
| 130 | Fritzsche K.H., Neher P.F., Reicht I., van Bruggen T., Goch C., Reisert M., Nolden M., Zelzer S., Meinzer H.-P., Stieltjes B. | MITK diffusion imaging | 2012 | Background: Diffusion-MRI provides a unique window on brain anatomy and insights into aspects of tissue structure in living humans that could not be studied previously. There is a major effort in this rapidly evolving field of research to develop the algorithmic tools necessary to cope with the complexity of the datasets. Objectives: This work illustrates our strategy that encompasses the development of a modularized and open software tool for data processing, visualization and interactive exploration in diffusion imaging research and aims at reinforcing sustainable evaluation and progress in the field. Methods: In this paper, the usability and capabilities of a new application and toolkit component of the Medical Imaging and Interaction Toolkit (MITK, www.mitk.org), MITKDI, are demonstrated using in-vivo datasets. Results: MITK-DI provides a comprehensive software framework for high-performance data processing, analysis and interactive data exploration, which is designed in a modular, extensible fashion (using CTK) and in adherence to widely accepted coding standards (e.g. ITK, VTK). MITK-DI is available both as an open source software development toolkit and as a ready-to-use in stallable application. Conclusions: The open source release of the modular MITK-DI tools will increase verifiability and comparability within the research community and will also be an important step towards bringing many of the current techniques towards clinical application. © Schattauer 2012. |
| 131 | Budnik C. | Software testing, software quality and trust in software-based systems | 2012 | In our daily life we increasingly depend on softwarebased systems deployed as embedded software control systems in the automotive domain, or the numerous health or government applications. Software-based systems are more and more developed by reusable components available as commercial off-the-shelf components or open source components. The successful introduction of such integrated systems into businesses however does depend whether we trust the system or not. Trust and therewith the quality of software-based systems is determined by many properties such as completeness, consistency, maintainability, security, safety, reliability, and usability, among others. However during the development of software-based systems there are many opportunities to introduce errors in the different phases of the software development lifecycle. Testing is commonly applied as the predominant activity in industry to ensure high software quality providing a wide variety of methods and techniques to detect different types of errors in software-based systems. The panel goal is to discuss software testing strategy and techniques to improve the quality of the software and at the same time to build trust with customers. The panel will discuss the experts view on what the key factors are in developing high quality software-based systems. Through the panel, the discussions shall include the impact of testing on software quality within several domains and their businesses. © 2012 IEEE. |
| 132 | [No author name available] | 18th Americas Conference on Information Systems 2012, AMCIS 2012, Volume 4 | 2012 | The proceedings contain 572 papers. The special focus in this conference is on Information Systems. The topics include: Health diagnosis of communities of practices (CoPs); open source alternatives for business intelligence; identifying business process activity mappings by optimizing behavioral similarity; hanging with the right crowd; a taxonomy of web-based inbound open innovation initiatives; database intrusion detection: defending against the insider threat; an empirical study of the GIGO axiom in satisficing decisions; analysis of probabilistic news recommender systems; the influence of technology characteristics on privacy calculus; instant messaging privacy in the clouds; towards a component-based description of business models; two-sided cybermediary platforms; an integrative analysis of transactional e-government web usage; facebook usage in government-a case study of information content; deriving business value from asymmetric penalty-reward perspectives of IS users; create attention to attract attention-viral marketing of digital music in social networks; towards a framework for transforming business models into business processes; factors affecting perceived satisfaction with a BPM tool; hypercompetition in the Erp industry; structural flaws in the ethics of technology; ethical considerations for virtual worlds; personality, gender and careers in information technology; on IT control weaknesses in auditors' reports on internal control; effect of the SOX act on IT governance; the influence of general sustainability attitudes and value congruence on consumer behavior; user privacy in mobile advertising; system learning of user interactions; deploying mission critical learning management system using open source software; theorizing the dual role of information technology in technostress research; boundary spanning in business process management; ERP usability and the mangle of practice; direct manipulation tablet apps for education; comparing graphical and tangible user interfaces for a tower defense game; visual perception model for online target marketing; eye movements, perceptions, and performance; individual relationships with technology; internal audit function response to ERP systems implementation; auditing journal entries using self-organizing map; consumer perceptions of the adoption of electronic personal health records; investigating the reciprocal relationships within health virtual communities; designing and visualising healthcare delivery systems; how multinational firms use IT to manage their global operations; conflict, value diversity, and performance in virtual teams; mobile ICT and knowledge sharing in underserved communities; agile decision making framework to support mobile microloans for unbanked customers; the analysis of the telecommunications industry in Thailand; the business value of knowledge management; providing information feedback to bidders in online multi-unit combinatorial auctions; spatial modeling using agents; using probabilistic ontologies for video exploration; new directions, new challenges, and new understandings; function-based categorization of online product information types; exploring antecedents of habit on social network service; personality correlation analysis and applications in social networks; identifying experts in virtual forecasting communities; black males in IT higher education in the USA; technology features, empowering perceptions, and voicing behavior on microblog; information security policy compliance; a preliminary taxonomy for software failure impact; an examination of the success of post-merger IT integration; an analysis of and perspective on the information security maturity model; geographic information systems and the nonprofit sector; effectiveness of shallow hierarchies for document stores; a methodology for the development of web-based information systems; balanced resource allocation; demand response in smart grids; decision support for electric vehicle charging; the expectations for faculty in Latin America; mastering the social IT/Business Alignment Challenge; supply chain resource planning systems; towards a research framework for VLBA operation management; integrating enterprise system's 3rd wave into IS curriculum; a two-tier data-centric framework for flexible business process management; engagement in online communities; organisational semiotics methods to assess organisational readiness for internal use of social media; social media in the workplace; economics of pair programming revisited; social traps of agile methods; metadata exploitation in large-scale data migration projects; collaboratively assessing information quality on the web; reputation management in social commerce communities; E-Business adoption research; a preliminary information theory of difference; replacement of project manager during IT projects-a research agenda; a simulation study of project management and collaborative information technologies; the role of business information visualization in knowledge creation; effects of narrative structure and salient decision points in role playing games; adoption of pervasive e-health solutions; security practices and regulatory compliance in the healthcare industry; the role of demographic characteristics in health care strategic security planning; tailoring software process capability/maturity models for telemedicine systems; understanding dynamic collaboration in teleconsultation; the pathway to enterprise mobile readiness; investigating the role of social media and social capital; exploring 311-driven changes in city government; preventing the gradual decline of shared service centers; developing a conceptual framework for evaluating public sector transformation in the digital era; the impact of cultural differences on cloud computing ecosystems in U.S. and China; an examination of the impact of service climate on service productivity in the organizational context; information systems facilitating groundwater sustainability management; keeping electronic medical records secure and portable; the emerging role of robotics in home health care; information quality assessment technique to evaluate the information exchange; boundary dialogues in user-centric innovation; towards a meditation brain state model using electroencephalographic data; design method requirements for agile system of systems; design and evaluation of a socially enhanced classroom blog to pomote student learning in higher education; it's not all about the music: user preference for musicians on facebook; knowledge seeking and knowledge sharing in a nonprofit organizational partner network: a social network analysis; the mediating role of adaptive personalization in online shopping; exploring the temporal nature of sociomateriality from a work system perspective; sociomateriality as radical ontology; information security management; meeting global business information requirements with enterprise resource planning; knowledge sharing in social networking sites for e-collaboration; applying cognitive principles of similarity to data integration-the case of SIAM; reference model in design science research to gather and model information; impact of online content on attitudes and buying intentions; prospect theory and information security investment decisions; using domain knowledge to facilitate cyber security analysis; conceptualizing data security threats and countermeasures in the E-Discovery process with misuse cases; an empirical analysis of an individual's 360 degree protection from file and data loss; analysis of eBook lending: a game-theory approach; facilitating consumers' evaluation of experience goods and the benefits for vendors; three-factor Model vs. Two-Factor Model; automating enterprise architecture documentation using an enterprise service bus; the influence of role models on students' decisions to pursue the IS major; teaching "people networking" skills for CIS students; a case of bias in teaching, grading, and plagiarism; a relational view of accounting information sharing; reporting capabilities, financial closing time and effects on cost of equity capital; reflecting on the role of IT and IT research in healthcare; social media around the world; understanding the effects of freeriding in team dynamics; password policy effects on entropy and recall: research in progress; the role of individual characteristics on insider abuse intentions; building a methodology to assess the e-Government transformation success; optimizing freight delivery for less-than-truckload transportation; the influence of perceived information and network characteristics on the attitude towards information overload; information disclosure and generational differences in social network sites; trasactive memory systems virtual team training model; the case of open government and teaching and learning in a virtual world. |
| 133 | [No author name available] | 18th Americas Conference on Information Systems 2012, AMCIS 2012, Volume 3 | 2012 | The proceedings contain 572 papers. The special focus in this conference is on Information Systems. The topics include: Health diagnosis of communities of practices (CoPs); open source alternatives for business intelligence; identifying business process activity mappings by optimizing behavioral similarity; hanging with the right crowd; a taxonomy of web-based inbound open innovation initiatives; database intrusion detection: defending against the insider threat; an empirical study of the GIGO axiom in satisficing decisions; analysis of probabilistic news recommender systems; the influence of technology characteristics on privacy calculus; instant messaging privacy in the clouds; towards a component-based description of business models; two-sided cybermediary platforms; an integrative analysis of transactional e-government web usage; facebook usage in government-a case study of information content; deriving business value from asymmetric penalty-reward perspectives of IS users; create attention to attract attention-viral marketing of digital music in social networks; towards a framework for transforming business models into business processes; factors affecting perceived satisfaction with a BPM tool; hypercompetition in the Erp industry; structural flaws in the ethics of technology; ethical considerations for virtual worlds; personality, gender and careers in information technology; on IT control weaknesses in auditors' reports on internal control; effect of the SOX act on IT governance; the influence of general sustainability attitudes and value congruence on consumer behavior; user privacy in mobile advertising; system learning of user interactions; deploying mission critical learning management system using open source software; theorizing the dual role of information technology in technostress research; boundary spanning in business process management; ERP usability and the mangle of practice; direct manipulation tablet apps for education; comparing graphical and tangible user interfaces for a tower defense game; visual perception model for online target marketing; eye movements, perceptions, and performance; individual relationships with technology; 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| 138 | Nosseir A., Flood D., Harrison R., Ibrahim O. | Mobile development process spiral | 2012 | Recent advances in mobile technology have led to ever-increasing demands for specialized software for these devices. Furthermore, the need for mobility has introduced unique constraints such as context, connectivity, size and data entry methods that impact on the apps' usability. These constraints can create usability errors that could increase risk levels especially in contexts like finance, health, or road navigation. The desire of Enterprises to embed their mobile apps' development into their business cycle increases the need to have a specialized software development process. Although many agile methods have been introduced over the last decade, none of methods has focused on reducing usability errors. This paper proposes a novel Mobile Development Process Spiral which is a Usability-Driven-Model. The process is designed to integrate usability into existing application development processes and recommends usability techniques for assessing mobile apps. © 2012 IEEE. |
| 139 | De Vries B., Allameh E., Heidari Jozam M. | Smart-BIM (Building Information Modeling) | 2012 | Purpose: After a long period of international research and development, BIM has become mature. Many tools support the BIM process, or at least they claim. BIM not only offers opportunities for the Architectural Engineering and Construction industry, but also for the client. In this paper we don't focus on the professional client, but on the client of a building assignment that act as the end-user. Involvement of the end user in the design process has been advocated by many scholars and designers, but has so far only marginally been adopted in practice. The importance of user participation is demonstrated by the lack of success of smart technologies in new housing or in renovation. Particularly elderly people resist accepting these technologies in their home environment, although they could benefit from these technologies to improve comfort and health care. As a result of poor understanding of these new technologies by both designers and end users, researchers observe that there is a mismatch between user demands and smart technology usability. Hence, this paper is an attempt to improve the role of users in the design process in two ways. Firstly, by adding the missing components of smart technology to current BIM model libraries. Secondly, by developing a virtual model in which users can interact with the smart technologies and configure their preferred layout. The final results are interesting not only for technology developers but also for housing designers who aim at improving the quality of life in future housing for aging society. Method: For a better understanding of BIM, a historical perspective is taken in this paper. The initiatives from different research institutes are discussed and how they affected each other. The up-take by the software industry is highlighted and their delicate relationship with science. In today's design process BIM systems support spatial design that is accommodate by smart technology. Usually this smart technology is added after the spatial design in the final design stage by the installations expert. In our research we want to turn this process around; the smart technologies are accommodated by spatial design. Therefore we develop a design system with a library of smart components such as smart wall, smart kitchen and smart furniture. The difference between smart technologies and standard building components is that smart technologies interact with the building users. BIM allows for realistic visualization of designs in an early stage. In our prototype system, clients are presented a virtual space with a wide range of smart technologies. After being introduced to these technologies, the client expresses how these will fit within his/her activities. Following he/she can experience in the virtual model how smart technologies react when activities are executed. Results & Discussion: A prototype system is presented that allows clients such as elderly to experience smart technologies. In contrast with traditional design it does not start from the spatial layout but from the activities that should be accommodated supported by smart technologies. We expect that fundamentally different layout will emerge from this approach. Although no experimental data are available yet, some first experiences will be discussed. |
| 140 | Hrgarek N. | Certification and regulatory challenges in medical device software development | 2012 | The critical nature of safety in medical device software requires a repeatable and compliant software engineering process. This process should take into account the whole development life cycle, risk management, and software verification and validation activities that would commensurate with the device's complexity and risk. This paper discusses some of the key challenges medical device manufacturers are facing in the development and certification of medical device software. These challenges include: compliance with the EU and US regulatory requirements for medical device software, making software development and maintenance processes more agile in the medical device regulatory environment, integrating usability engineering process/human factors into software development, regulation of networked medical devices and mobile medical applications (apps). The MED-EL case study highlights some of the challenges described in this paper, and the approaches taken to overcome these challenges. © 2012 IEEE. |
| 141 | De Souza Alcantara T., Bastianelli P., Ferreira J., Maurer F. | A multi-touch approach to control MRI scans: A user-centered study report | 2012 | This paper reports on a study investigating the usability challenges faced by users of Magnetic Resonance Imaging (MRI) tools. In order to understand these problems, observation, shadowing and interviews were conducted with MRI scan users at two centers. After analyzing the collected data, low-fidelity prototypes were created and evaluated. We addressed the usability issues found by proposing a user-friendly and efficient high-fidelity prototype that replaces keyboard and mouse with two multi-touch screens. © 2012 IEEE. |
| 142 | Cofini V., Di Giacomo D., Di Mascio T., Necozione S., Vittorini P. | Evaluation plan of TERENCE: When the user-centred design meets the evidence-based approach | 2012 | TERENCE is an FP7 EU project that aims at developing an adaptive learning system with the twofold objective of helping children in improve deep text understanding, and supporting teachers in their daily work. The present paper focuses on the design of the evaluation of the pedagogical effectiveness and the usability of the TERENCE software. It starts from the user-centred design experience, evidence-based medicine, psychology, and from discussions about statistical methods and ethics considerations. The objective is to provide an innovative, evidence-based and efficient support, for children and teachers, that could be an efficient alternative to the traditional method of reading, so as to prevent and reduce problems of text comprehension that represent a public health and social problem. For this purpose, we developed an evaluation protocol within a reading laboratory in collaboration with teachers, to be hosted in the school structures that will join the project in Italy. © 2012 Springer-Verlag. |
| 143 | Bowen J., Reeves S. | Modelling user manuals of modal medical devices and learning from the experience | 2012 | Ensuring that users can successfully interact with software and hardware devices is a critical part of software engineering. There are many approaches taken to ensure successful interaction, e.g. the use of user-centred design, usability studies, training and education etc. In this paper we consider how the users of modal medical devices, such as syringe pumps, are supported (or not) post-training by documentation such as user manuals. Our intention is to show that modelling such documents is a useful component in the software engineering process, allowing us to discover inconsistencies between devices and manuals as well as uncovering potentially undesirable properties of the devices being modelled. Copyright 2012 ACM. |
| 144 | Martin C.C., Burkert D.C., Choi K.R., Wieczorek N.B., McGregor P.M., Herrmann R.A., Beling P.A. | A real-time ergonomic monitoring system using the Microsoft Kinect | 2012 | Laborers in factories all across the world perform physically intensive tasks daily. With every lift they put themselves at risk of injury. Many still-frame modeling systems exist that can assess the different stresses and strains on the laborers body given his or her position. These models are only usable by experts, and do not allow for real-time alerts. In 1995, companies in the United States lost $50 billion due to injured employee absences and compensation settlements. Companies are not only eager to reduce their overhead costs, but also aim to better society by offering more robust worker safety practices. The focus of this project was to design a system that can be used in a training environment. Our system is used to teach employees if their current lifting and carrying methods can be detrimental to their health. Our system is designed to be used for longstanding employees as well as new hires. This project's primary requirement was to implement a motion sensing device to aid in the analysis of ergonomics in an industrial environment. To do this we proposed to make use of Microsoft Kinect© sensors. The Kinect© is able to provide skeletal tracking at 30 frames/second for two individuals in the field of view. To develop the system we selected the Microsoft software development kit (SDK) from a large variety of alternative professional and open source SDKs because of a variety of desirable features. A static ergonomic model was integrated with the Kinect© software. Multiple other software packages were assessed for compatibility with the Kinect© in an effort to enhance the Kinects'O ability to recognize objects and humans. After development was complete the system was tested by analyzing our system's output using different skeletal lift positions to compare to the real results. Our system provides real-time ergonomic analysis of lifts performed by humans. This system lacks the ability to recognize specific individuals and objects necessary to customize the system to adequately evaluate a lift, and has not been tested in a factory environment. In the future we hope to implement a dynamic ergonomic model so that it can recognize whole movements or gestures which lead to injury, rather than recognizing a single position. Our system successfully outputs a number for the recommended weight limit as well as other methods to measure the strain on a worker's skeleton. In a training environment the system will help individuals correct the problems with their lifting motions. © 2012 IEEE. |
| 145 | Wyatt T.H., Li X., Indranoi C., Bell M. | Developing iCare v.1.0: An academic electronic health record | 2012 | An electronic health record application, iCare v.1.0, was developed and tested that allows data input and retrieval while tracking student performance over time. The development and usability testing of iCare v.1.0 followed a rapid prototyping software development and testing model. Once the functionality was tested by engineers, the usability and feasibility testing began with a convenience sample of focus group members including undergraduate and graduate students and faculty. Three focus groups were created, and four subjectsparticipated in each focus group (n = 12). Nielsen's usability heuristics and methods of evaluation were used to evaluate data captured from each focus group. Overall, users wanted a full-featured electronic health record with features that coached or guided users. The earliest versions of iCare v.1.0 did not provide help features and prompts to guide students but were later added. Future versions will incorporate a full-featured help section. The interface and design of iCare v.1.0 are similar to professional electronic health record applications. As a result of this usability study, future versions of iCare will include more robust help features along with advanced reporting and elements specific to specialty populations such as pediatrics and mental health services. Copyright © 2012 Wolters Kluwer Health | Lippincott Williams & Wilkins. |
| 146 | Wang L., Wang J., Wang M., Li Y., Liang Y., Xu D. | Using internet search engines to obtain medical information: A comparative study | 2012 | Background: The Internet has become one of the most important means to obtain health and medical information. It is often the first step in checking for basic information about a disease and its treatment. The search results are often useful to general users. Various search engines such as Google, Yahoo!, Bing, and Ask.com can play an important role in obtaining medical information for both medical professionals and lay people. However, the usability and effectiveness of various search engines for medical information have not been comprehensively compared and evaluated. Objective: To compare major Internet search engines in their usability of obtaining medical and health information. Methods: We applied usability testing as a software engineering technique and a standard industry practice to compare the four major search engines (Google, Yahoo!, Bing, and Ask.com) in obtaining health and medical information. For this purpose, we searched the keyword breast cancer in Google, Yahoo!, Bing, and Ask.com and saved the results of the top 200 links from each search engine. We combined nonredundant links from the four search engines and gave them to volunteer users in an alphabetical order. The volunteer users evaluated the websites and scored each website from 0 to 10 (lowest to highest) based on the usefulness of the content relevant to breast cancer. A medical expert identified six well-known websites related to breast cancer in advance as standards. We also used five keywords associated with breast cancer defined in the latest release of Systematized Nomenclature of Medicine-Clinical Terms (SNOMED CT) and analyzed their occurrence in the websites. Results: Each search engine provided rich information related to breast cancer in the search results. All six standard websites were among the top 30 in search results of all four search engines. Google had the best search validity (in terms of whether a website could be opened), followed by Bing, Ask.com, and Yahoo!. The search results highly overlapped between the search engines, and the overlap between any two search engines was about half or more. On the other hand, each search engine emphasized various types of content differently. In terms of user satisfaction analysis, volunteer users scored Bing the highest for its usefulness, followed by Yahoo!, Google, and Ask.com. Conclusions: Google, Yahoo!, Bing, and Ask.com are by and large effective search engines for helping lay users get health and medical information. Nevertheless, the current ranking methods have some pitfalls and there is room for improvement to help users get more accurate and useful information. We suggest that search engine users explore multiple search engines to search different types of health information and medical knowledge for their own needs and get a professional consultation if necessary. © Liupu Wang, Juexin Wang, Michael Wang, Yong Li, Yanchun Liang, Dong Xu. |
| 147 | Konstantinidis G., Anastassopoulos G.C., Karakos A.S., Anagnostou E., Danielides V. | A user-centered, object-oriented methodology for developing health information systems: A clinical information system (CIS) example | 2012 | The aim of this study is to present our perspectives on healthcare analysis and design and the lessons learned from our experience with the development of a distributed, object-oriented Clinical Information System (CIS). In order to overcome known issues regarding development, implementation and finally acceptance of a CIS by the physicians we decided to develop a novel object-oriented methodology by integrating usability principles and techniques in a simplified version of a well established software engineering process (SEP), the Unified Process (UP). A multilayer architecture has been defined and implemented with the use of a vendor application framework. Our first experiences from a pilot implementation of our CIS are positive. This approach allowed us to gain a socio-technical understanding of the domain and enabled us to identify all the important factors that define both the structure and the behavior of a Health Information System. © Springer Science+Business Media, LLC 2010. |
| 148 | Taylor P., Toujilov I. | Mammographic knowledge representation in description logic | 2012 | We present an advanced approach to representing knowledge about breast radiographs or mammograms which has advantages in terms of both usability and software engineering. The approach uses ontologies to create not merely a class hierarchy for a vocabulary but a full formal representation and, further, takes advantage of reasoning with description logic to provide application behaviour. The ontologies support a disjoint representation of graphical features and their interpretation in terms of medical findings. This separation of image features and medical findings allows the representation of different conceptual interpretations of the same graphical object, allowing different opinions of radiologists to be used in reasoning, which makes the approach useful for describing images to be used in computer-based learning and other applications. Three applications are discussed in detail: assessment of overlap in annotations, a conceptual consistency check in radiology training, and modelling temporal changes in parenchymal patterns. Reasoner usage, software testing, and implementation in Java are presented. The results show that, despite performance problems using the current implementations of reasoners, the description logic approach can be useful in practical applications. © 2012 Springer-Verlag. |
| 149 | Bonderup M.A., Hangaard S.V., Lilholt P.H., Johansen M.D., Hejlesen O.K. | Patient support ICT tool for hypertension monitoring | 2012 | Detection of hypertension is traditionally a matter for the general practitioner, but an alternative detection scheme is home blood pressure measurement by patients, on patients' or doctors' decision. We designed and implemented a prototype software tool to provide information about hypertension, video instructions on correct home blood pressure measurement technique and a measurements diary. The system was developed using standard, software development methods and techniques. The program was developed for Danishspeaking patients. Usability (navigability, level and outcome of instructions, logical arrangement, level and focus of information, and program accessibility) was evaluated in a think-aloud test with test users performing specific, realistic tasks. The prototype provides written information about hypertension, written and video instructions on correct blood pressure measurement technique, and measurements diary functionality. All test users performed all tasks and rated navigability, level and outcome of instructions, logical arrangement, level and focus of information, and program accessibility high, and had positive attitudes towards the system. The components in the patient support tool can be used separately or in combination. The effects of video for home blood pressure measurement technique instruction remain unexplored. © 2012 European Federation for Medical Informatics and IOS Press. All rights reserved. |
| 150 | Sahoo S.S., Zhao M., Luo L., Bozorgi A., Gupta D., Lhatoo S.D., Zhang G.Q. | OPIC: Ontology-driven Patient Information Capturing system for epilepsy. | 2012 | The widespread use of paper or document-based forms for capturing patient information in various clinical settings, for example in epilepsy centers, is a critical barrier for large-scale, multi-center research studies that require interoperable, consistent, and error-free data collection. This challenge can be addressed by a web-accessible and flexible patient data capture system that is supported by a common terminological system to facilitate data re-usability, sharing, and integration. We present OPIC, an Ontology-driven Patient Information Capture (OPIC) system that uses a domain-specific epilepsy and seizure ontology (EpSO) to (1) support structured entry of multi-modal epilepsy data, (2) proactively ensure quality of data through use of ontology terms in drop-down menus, and (3) identify and index clinically relevant ontology terms in free-text fields to improve accuracy of subsequent analytical queries (e.g. cohort identification). EpSO, modeled using the Web Ontology Language (OWL), conforms to the recommendations of the International League Against Epilepsy (ILAE) classification and terminological commission. OPIC has been developed using agile software engineering methodology for rapid development cycles in close collaboration with domain expert and end users. We report the result from the initial deployment of OPIC at the University Hospitals Case Medical Center (UH CMC) epilepsy monitoring unit (EMU) as part of the NIH-funded project on Sudden Unexpected Death in Epilepsy (SUDEP). Preliminary user evaluation shows that OPIC has achieved its design objectives to be an intuitive patient information capturing system that also reduces the potential for data entry errors and variability in use of epilepsy terms. |
| 151 | Martin T., Ding H., D'Souza M., Karunanithi M. | Evaluation of Bluetooth low power for physiological monitoring in a home based cardiac rehabilitation program | 2012 | Cardiovascular disease (CVD) is the leading cause of mortality in Australia, and places large burdens on the healthcare system. To assist patients with CVDs in recovering from cardiac events and mediating cardiac risk factors, a home based cardiac rehabilitation program, known as the Care Assessment Platform (CAP), was developed. In the CAP program, patients are required to manually enter health information into their mobile phones on a daily basis. The manual operation is often subject to human errors and is inconvenient for some elderly patients. To improve this, an automated wireless solution has been desired. The objectives of this paper are to investigate the feasibility of implementing the newly released Bluetooth 4.0 (BT4.0) for the CAP program, and practically evaluate BT4.0 communications between a developed mobile application and some emulated healthcare devices. The study demonstrated that BT4.0 addresses usability, interoperability and security for healthcare applications, reduces the power consumption in wireless communication, and improves the flexibility of interface for software development. This evaluation study provides an essential mobile BT4.0 framework to incorporate a large range of healthcare devices for clinical assessment and intervention in the CAP program, and hence it is useful for similar development and research work of other mobile healthcare solutions. © 2012 The authors and IOS Press. All rights reserved. |
| 152 | Teixeira L., Saavedra V., Ferreira C., Santos B.S. | Using participatory design in a health information system | 2011 | This article describes the experience of developing an interactive Health Information System (iHIS) currently under test in a hospital, which benefited from the practices of the User-Centred Design (UCD), in a Participatory Design (PD) approach. Techniques from the Human-Computer Interaction (HCI) and/or Usability Engineering (UE), combined with traditional Software Engineering (SE), allowed an effective and usable solution from the user's point of view. The good results usually achieved with this approach were confirmed. Despite these good results, we deem that if there is not some control of the procedure by the project manager, it may be difficult to end the requirement analysis, since requirement reformulation is fostered. © 2011 IEEE. |
| 153 | [No author name available] | 18th European Conference on System and Software Process Improvement, EuroSPI 2011 | 2011 | The proceedings contain 27 papers. The special focus in this conference is on Software Process Improvement in assessment, implementation, improvement methods, organization, people/teams, reuse, innovation and functional safety. The topics include: a multi-model workflow before establishing an acquisition contract based on CMMI-ACQ mode; ISO/IEC 15504-5 best practices for IT service management; a self-assessment framework for finding improvement objectives with ISO/IEC 29119 test standard; improving the deployment of IT service management processes; a survey on the application of the V-Modell XT in German government agencies; improving verification and validation in the medical device domain; the meaning of success for software SMEs; five agile factors: helping self-management to self-reflect; a detailed software process improvement methodology; motivation and empowerment in process improvement; improvement of innovation management through the enlargement of idea sources; the usability approach in software process improvement; a study of software development team dynamics in SPI; an empirical investigation into social productivity of a software process; agile process improvement; a reusable process model for enabling SPI in small settings; process support for product line application engineering; introducing scrum in a very small enterprise; using ISO/IEC 29110 to harness process improvement in very small entities; a software tool to support the integrated management of software projects in mature SMEs; how can software SMES become medical device software SMEs; the future of SPI knowledge and networking in Europe; adapting the FMEA for safety critical design processes and extending automotive SPICE to cover functional safety requirements and a safety architecture. |
| 154 | Sivakumar M.S., Casey V., McCaffery F., Coleman G. | Improving verification & validation in the medical device domain | 2011 | The benefits of effective verification and validation activities in the medical device domain include increased usability and reliability, decreased failure rate and recalls and reduced risks to patients and users. Though there is guidance on verification and validation in multiple standards in the medical device domain, these are difficult for the manufacturer to implement, as there is no consolidated information on how they can be successfully achieved. The paper is intended to highlight three major areas for improvement in the medical device software development domain. This research is based on an analysis of available literature in the field of verification and validation in generic software development, safety-critical and medical device software domains. Additionally, we also performed a review of the standards and process improvement models available in these domains. © Springer-Verlag Berlin Heidelberg 2011. |
| 155 | Ferracioli F., De Oliveira Camargo-Brunetto M.A. | Using and integrating discount usability engineering in the life cycle of a health care web application | 2011 | Usability is an important characteristic in any interactive system, but sometimes is neglected by some software development teams because of the lack of knowledge of these about usability techniques. They think that the methods are hard to learn, execute and integrate on the software development life cycle. A kind of application that suffer with usability problems is the health care software. Our team work with a health care software developed by people from computer science and physiotherapy, without people related to usability. After various functions developed, the users continuously claim for easier ways to use the software, and we detect some learnability problems. At this point we decided to focus in usability, using the methods of Discount Usability Engineering. This work presents the methodology used during the heuristic evaluation and usability tests. The results show that is possible to reach a satisfactory amount of problems to correct, great feedback from users, similar results between heuristic evaluation and usability tests with users and that even people with few knowledge about usability can learn and conduct tests like ones of the Usability Engineering. Additionally, these methods can be integrated in our software life cycle, what will avoid future re-work. |
| 156 | Wang L., Wang J., Wang M., Liang Y., Xu D. | User experience evaluation of Google search for obtaining medical knowledge: A case study | 2011 | More and more people use internet search engines, especially Google, to learn about diseases and possible treatments. We conducted a hallway testing to evaluate the effectiveness of Google in obtaining medical information. We searched 'Breast Cancer- using Google. Six volunteers scored their experience for each of the top 500 websites. Our study shows that 50 hits of Google often help lay users in getting medical information, but some highly useful websites may be buried beyond top 200. Hence, the specificity of using Google in searching for medical information is satisfactory while the sensitivity of the search has significant room for improvement. Copyright © 2011 Inderscience Enterprises Ltd. |
| 157 | [No author name available] | India HCI 2011 - Proceedings of the 2011 International Conference on Computer-Human Interaction | 2011 | The proceedings contain 17 papers. The topics discussed include: context-aware technology for improving interaction in video-based agricultural extension; counting on your fingertips ? an exploration and analysis of rich touch patterns; cultural differences affecting quality and productivity in western / Asian offshore software development; how are distributed groups affected by an imposed structuring of their decision-making process?; NAPTune: fine tuning graphical authentication; semiotic analysis combined with usability and ergonomic testing for evaluation of icons in medical user interface; a pattern language for touch point ecosystem user experience: a proposal; understanding industrial user experience- an excerpt from 1st international workshop on industrial UserExperience (WIndUX 2011); an exploration of gesture-speech multimodal patterns for touch interfaces; and designing an efficient virtual keyboard for text composition in Bengali. |
| 158 | Monem H., Hussin A.R.C., Sharifian R., Shaterzadeh H. | CRM software implementation factors in hospital: Software & patient perspectives | 2011 | Customer Relationship Management (CRM) related issues, during three consecutive years, were in the top nine lists of most concern for the hospitals' chief executive officers in the USA and furthermore, Information Technology (IT) projects' failure rate in the organizations were quite high. To deal with such problems Success Factors (CSF) from different perspectives such as management, staff, patient and software were reviewed in previous healthcare's literatures. In this paper, software and patient factors deeply were focused and added to the Egg model and a five perspective map was created. Implementation success factors map depicts inadequate study on patient's trust and perception and software's customization, complexity, usability, privacy and usefulness. Chief Information Officers (CIO) and Chief Executive Officers (CEO) of hospitals and hospital's CRM system vendors can use proposed factors' map for more successful implementations. It should be noted that this result is part of a PhD research and further investigation is required to test these factors in term of practical usage in heath care environment. © 2011 IEEE. |
| 159 | Sadasivam R.S., Delaughter K., Crenshaw K., Sobko H.J., Williams J.H., Coley H.L., Ray M.N., Ford D.E., Allison J.J., Houston T.K. | Development of an interactive, web-delivered system to increase provider-patient engagement in smoking cessation | 2011 | Background: Patient self-management interventions for smoking cessation are effective but underused. Health care providers do not routinely refer smokers to these interventions. Objective: The objective of our study was to uncover barriers and facilitators to the use of an e-referral system that will be evaluated in a community-based randomized trial. The e-referral system will allow providers to refer smokers to an online smoking intervention during routine clinical care. Methods: We devised a four-step development and pilot testing process: (1) system conceptualization using Delphi to identify key functionalities that would overcome barriers in provider referrals for smoking cessation, (2) Web system programming using agile software development and best programming practices with usability refinement using think-aloud testing, (3) implementation planning using the nominal group technique for the effective integration of the system into the workflow of practices, and (4) pilot testing to identify practice recruitment and system-use barriers in real-world settings. Results: Our Delphi process (step 1) conceptualized three key e-referral functions: (1) Refer Your Smokers, allowing providers to e-refer patients at the point of care by entering their emails directly into the system, (2) practice reports, providing feedback regarding referrals and impact of smoking-cessation counseling, and (3) secure messaging, facilitating provider-patient communication. Usability testing (step 2) suggested the system was easy to use, but implementation planning (step 3) suggested several important approaches to encourage use (eg, proactive email cues to encourage practices to participate). Pilot testing (step 4) in 5 practices had limited success, with only 2 patients referred; we uncovered important recruitment and system-use barriers (eg, lack of study champion, training, and motivation, registration difficulties, and forgetting to refer). Conclusions: Implementing a system to be used in a clinical setting is complex, as several issues can affect system use. In our ongoing large randomized trial, preliminary analysis with the first 50 practices using the system for 3 months demonstrated that our rigorous preimplementation evaluation helped us successfully identify and overcome these barriers before the main trial. © Rajani S Sadasivam, Kathryn Delaugther, Katie Crenshaw, Heather J Sobko, Jessica H Williams, Heather L Coley, Midge N Ray, Daniel E Ford, Jeroan J Allison, Thomas K Houston. |
| 160 | Arabaci M., Aktuǧ A., Ertek G. | Actionable insights through association mining of exchange rates: A case study | 2011 | Association mining is the methodology within data mining that researches associations among the elements of a given set, based on how they appear together in multiple subsets of that set. Extensive literature exists on the development of efficient algorithms for association mining computations, and the fundamental motivation for this literature is that association mining reveals actionable insights and enables better policies. This motivation is proven valid for domains such as retailing, healthcare and software engineering, where elements of the analyzed set are physical or virtual items that appear in transactions. However, the literature does not prove this motivation for databases where items are "derived items", rather than actual items. This study investigates the association patterns in changes of exchange rates of US Dollar, Euro and Gold in the Turkish economy, by representing the percentage changes as "derived items" that appear in "derived market baskets", the day on which the observations are made. The study is one of the few in literature that applies such a mapping and applies association mining in exchange rate analysis, and the first one that considers the Turkish case. Actionable insights, along with their policy implications, demonstrate the usability of the developed analysis approach. © 2011 IEEE. |
| 161 | [No author name available] | Human Centered Design - Second International Conference, HCD 2011, Held as Part of HCI International 2011, Proceedings | 2011 | The proceedings contain 66 papers. The topics discussed include: investigating users' interaction with physical products applying qualitative and quantitative methods; a holistic model for integrating usability engineering and software engineering enriched with marketing activities; possibilities for cultural customization of mobile communication devices: the case of Iranian mobile users; co-simulation and multi-models for pervasive computing as a complex system; cognitive prostheses: findings from attempts to model some aspects of cognition; management of weight-loss: patients' and healthcare professionals' requirements for an e-health system for patients; a design-supporting tool for implementing the learning-based approach: accommodating users' domain knowledge into design processes; social networking applications: smarter product design for complex human behaviour modeling; and SemaZoom: semantics exploration by using a layer-based focus and context metaphor. |
| 162 | Bernhaupt R., Boy G., Faery M., Palanque P. | SIG: Engineering automation in interactive critical systems | 2011 | This SIG focuses on the engineering of automation in interactive critical systems. Automation has already been studied in a number of (sub-) disciplines and application fields: design, human factors, psychology, (software) engineering, aviation, health care, games. One distinguishing feature of the area we are focusing on is that in the field of interactive critical systems properties such as reliability, dependability and fault-tolerance are as important as usability or user experience. The SIG targets at two problem areas: first the engineering of the user interaction with (partly-) autonomous systems: how to design, build and assess autonomous behavior, especially in cases where there is a need to represent on the user interface both autonomous and interactive objects. An example of such integration is the representation of an unmanned aerial vehicle (UAV) (where no direct interaction is possible), together with aircrafts (that have to be instructed by an air traffic controller to avoid the UAV). Second the design and engineering of user interaction in general for autonomous objects/systems (for example a cruise control in a car or an autopilot in an aircraft). The goal of the SIG is to raise interest in the CHI community on these aspects and to identify a community of researchers and practitioners interested in those more and more prominent issues of interfaces for interactive critical systems. The expected audience should be interested in addressing the issues of integration of mainly unconnected research domains to formulate a new joint research agenda. |
| 163 | Kostaras N., Xenos M. | A study on how usability flaws in GUI design increase mouse movements and consequently may affect users' health | 2011 | The objective of this study is to discuss how software usability flaws may cause a significant increase in mouse movements and, as a potential side effect, may even affect users' health. During the literature review, this article examines the potential relationship between mouse movement and musculoskeletal disorders of the upper extremity, based on studies from medical sciences. Subsequently, in the main part of the present study, three software products were selected that had at least one usability flaw related to extra mouse movement (the selection of the software was made out of over 20 software programs that had been evaluated in our Software Quality Assessment Laboratory). For these products, all additional mouse movements were measured, involving actual users in various settings and computer configurations. The findings showed that even a single usability flaw may increase mouse movement to a magnitude of between 3.6 and 4.7 m/h. The article concludes that the role of software engineering is to focus on software usability as well, taking into account that a user friendly graphical user interface (GUI) which is able to eliminate unnecessary mouse movement may also eventually contribute to the reduction of fatigue and discomfort, caused by musculoskeletal disorders. © 2011 Taylor & Francis. |
| 164 | Kato C., Shiono Y., Goto T., Tsuchida K. | Development of online counseling system and usability evaluation | 2011 | Rising prevalence of mental health diseases is a serious problem for society. Some areas in Asia have no medical facilities and proper mental health care is unavailable. To cope with these problems, application of ICT for mental health services has been recognized as one of the effective approaches. Therefore, we have been studying and putting into practice online counseling for people assigned overseas. We constructed a system using agile software development for those assigned overseas in Asia. The first step involved developing a prototype system based on system requirements after we repeatedly discussed system development with people in charge of a clinic. Next, we conducted interviews about the online counseling system. We also discussed and analyzed the interviews. Finally, we completed the online Web counseling system by repeatedly discussing possible improvements with the clinic and then incorporating the changes in the system. Moreover, we evaluated the system by conducting a survey in the form of a questionnaire. Since we developed an effective online counseling system using statistical methods, this paper reports on the construction and usability evaluation of the system. © 2011 ACADEMY PUBLISHER. |
| 165 | Anagnostopoulos A.K., Tsiliki G., Spyrou G., Tsangaris G.T. | Bioinformatics approaches in the discovery and understanding of reproduction-related biomarkers | 2011 | The emerging field of bioinformatics in proteomics is introducing new algorithms in order to handle large and heterogeneous datasets and improve the knowledge-discovery process. Management systems, software construction and application, database population and leverage, as well as computed prediction, have crafted bioinformatics into a valuable tool for basic research. Human reproduction is one of many fields proteomics has been extensively studying over the last decade, accumulating complex experimental data at a rate far exceeding the ability to assimilate them. Transformation of the rapidly proliferating quantities of experimental information into a usable form in order to facilitate their analysis is a challenging task. On this track, bioinformatics, an essential part of proteomics research, aspires to amend inquiries into a better manipulated, a better handled and a better understood form so as to enhance existing knowledge expansion. © 2011 Expert Reviews Ltd. |
| 166 | Zuyev L., Benoit A.N., Chang F.Y., Dykes P.C. | Tailored prevention of inpatient falls: Development and usability testing of the fall tips toolkit | 2011 | Patient falls and fall-related injuries are serious problems in hospitals. The Fall TIPS application aims to prevent patient falls by translating routine nursing fall risk assessment into a decision support intervention that communicates fall risk status and creates a tailored evidence-based plan of care that is accessible to the care team, patients, and family members. In our design and implementation of the Fall TIPS toolkit, we used the Spiral Software Development Life Cycle model. Three output tools available to be generated from the toolkit are bed poster, plan of care, and patient education handout. A preliminary design of the application was based on initial requirements defined by project leaders and informed by focus groups with end users. Preliminary design partially simulated the paper version of the Morse Fall Scale currently used in hospitals involved in the research study. Strengths and weaknesses of the first prototype were identified by heuristic evaluation. Usability testing was performed at sites where research study is implemented. Suggestions mentioned by end users participating in usability studies were either directly incorporated into the toolkit and output tools, were slightly modified, or will be addressed during training. The next step is implementation of the fall prevention toolkit on the pilot testing units. Copyright © 2011 Wolters Kluwer Health | Lippincott Williams & Wilkins. |
| 167 | Prause C.R. | A software project perspective on the fitness and evolvability of personal learning environments | 2011 | This position paper deals with the exploration of fitness and evolvability of personal learning environments (PLEs). Taking a software engineer's perspective, PLE evolution is a software project. Software quality characteristics like Functionality and Usability map to the PLE's fitness, while Maintainability is important for evolvability. Only adaptation can secure future fitness. But for this, the software project has to be a good PLE for its developers in its on right. |
| 168 | Borycki E.M., Househ M., Kushniruk A.W., Kuziemsky C. | Use of qualitative methods across the software development lifecycle in health informatics | 2011 | In this paper the authors review and discuss four different qualitative approaches as they are used to evaluate health information systems: (1) grounded theory, (2) ethnography, (3) verbal protocol analysis/usability engineering and (4) action research. The authors describe the historical origins, current uses, strengths and weakness of the three qualitative methodologies that are frequently used in health informatics and they discuss an emerging approach: action research. More importantly, they identify how each of the approaches can be used across the SDLC to inform planning, analysis, design, implementation and support of health information systems. © 2011 ITCH 2011 Steering Committee and IOS Press. |
| 169 | Karopka T., Schmuhl H., Marcelo A., Molin J.D., Wright G. | Towards open collaborative health informatics - The Role of free/libre open source principles. Contribution of the IMIA Open Source Health Informatics Working Group. | 2011 | : To analyze the contribution of Free/Libre Open Source Software in health care (FLOSS-HC) and to give perspectives for future developments. The paper summarizes FLOSS-related trends in health care as anticipated by members of the IMIA Open Source Working Group. Data were obtained through literature review and personal experience and observations of the authors in the last two decades. A status quo is given by a frequency analysis of the database of Medfloss.org, one of the world's largest platforms dedicated to FLOSS-HC. The authors discuss current problems in the field of health care and finally give a prospective roadmap, a projection of the potential influences of FLOSS in health care. FLOSS-HC already exists for more than 2 decades. Several projects have shown that FLOSS may produce highly competitive alternatives to proprietary solutions that are at least equivalent in usability and have a better total cost of ownership ratio. The Medfloss.org database currently lists 221 projects of diverse application types. FLOSS principles hold a great potential for addressing several of the most critical problems in health care IT. The authors argue that an ecosystem perspective is relevant and that FLOSS principles are best suited to create health IT systems that are able to evolve over time as medical knowledge, technologies, insights, workflows etc. continuously change. All these factors that inherently influence the development of health IT systems are changing at an ever growing pace. Traditional models of software engineering are not able to follow these changes and provide up-to-date systems for an acceptable cost/value ratio. To allow FLOSS to positively influence Health IT in the future a "FLOSS-friendly" environment has to be provided. Policy makers should resolve uncertainties in the legal framework that disfavor FLOSS. Certification procedures should be specified in a way that they do not raise additional barriers for FLOSS. |
| 170 | Camille Peres S., Kortum P., Muddimer A., Akladios M., Napit S. | Geophysical software ergonomics: Methods for effective evaluation | 2011 | The ubiquitous use of workstation and laptop-based geophysical applications for seismic interpretation presents a risk for injuries associated with computer use. While work has been done to decrease ergonomic risk for geophysical field personnel (Pearce and Shackel, 1979) the risk to office personnel is still high. Specifically, over the last decade, the incidence of musculoskeletal disorders (MSDs) has been on the rise. An analysis of incident reports verifies that for oil and gas companies, up to 40% of reported lost-time incidents may be related to computer usage (Taylor, 2007), and the cost for operators in lost productivity and medical costs may be approaching that of more catastrophic and high visibility offshore injuries. The International Association of Geophysical Contractors lists Repetitive Strain Injury (RSI) due to poor ergonomics as one of the potential factors that could adversely affect health and welfare and should be considered in a Company health risk assessment (IAGC, 2004). Software that is “RSI-friendly” may could likely improve software usability, interpretational efficiency, and ultimately an interpreter's health. Strategies to address software-related ergonomic risk can be formulated using standard hazard abatement techniques already established by the Safety, Health, and Environment (SH&E) discipline. In some cases, software design can be adapted to reduce RSI risk, such as by providing configurable “hot-key” setups or providing interfaces to alternate input devices or voice recognition systems (Bednar and Bednar, 2001). Previous efforts at mitigating the risks of RSI have focused on primarily administrative controls (e.g., requiring frequent breaks) and use of protective equipment (e.g., utilizing different input devices like foot pedals or improving the ergonomics of the office furniture). However there has been little effort to apply engineering controls (i.e., redesigning the applications) to reduce risk exposures of RSI due to computer application use. Any potential for improvement in the ergonomic computing environment depends on the degree to which the ergonomic fitness of individual applications and/or workflows can be measured. The software development industry has for many years routinely applied standard usability criteria to improve their products, but an accepted framework for assessing software ergonomic fitness is lacking. This paper reports the results of a multi-company effort to develop tool that can approximate an application's ergonomic risk. Specifically, we examined the relationship between objective and subjective measures associated with risk of RSI, i.e., muscle strain. Our initial goal in this development process was to confirm that self-report measures of strain could approximate the actual muscle strain of software users. © 2011 SEG. |
| 171 | Peres S.C., Kortum P., Muddimer A., Akladios M., Napit S. | Geophysical software ergonomics: Methods for effective evaluation | 2011 | The ubiquitous use of workstation and laptop-based geophysical applications for seismic interpretation presents a risk for injuries associated with computer use. While work has been done to decrease ergonomic risk for geophysical field personnel (Pearce and Shackel, 1979) the risk to office personnel is still high. Specifically, over the last decade, the incidence of musculoskeletal disorders (MSDs) has been on the rise. An analysis of incident reports verifies that for oil and gas companies, up to 40% of reported lost-time incidents may be related to computer usage (Taylor, 2007), and the cost for operators in lost productivity and medical costs may be approaching that of more catastrophic and high visibility offshore injuries. The International Association of Geophysical Contractors lists Repetitive Strain Injury (RSI) due to poor ergonomics as one of the potential factors that could adversely affect health and welfare and should be considered in a Company health risk assessment (IAGC, 2004). Software that is "RSI-friendly" may could likely improve software usability, interpretational efficiency, and ultimately an interpreter's health. Strategies to address software-related ergonomic risk can be formulated using standard hazard abatement techniques already established by the Safety, Health, and Environment (SH&E) discipline. In some cases, software design can be adapted to reduce RSI risk, such as by providing configurable "hot-key" setups or providing interfaces to alternate input devices or voice recognition systems (Bednar and Bednar, 2001). Previous efforts at mitigating the risks of RSI have focused on primarily administrative controls (e.g., requiring frequent breaks) and use of protective equipment (e.g., utilizing different input devices like foot pedals or improving the ergonomics of the office furniture). However there has been little effort to apply engineering controls (i.e., redesigning the applications) to reduce risk exposures of RSI due to computer application use. Any potential for improvement in the ergonomic computing environment depends on the degree to which the ergonomic fitness of individual applications and/or workflows can be measured. The software development industry has for many years routinely applied standard usability criteria to improve their products, but an accepted framework for assessing software ergonomic fitness is lacking. This paper reports the results of a multi-company effort to develop tool that can approximate an application's ergonomic risk. Specifically, we examined the relationship between objective and subjective measures associated with risk of RSI, i.e., muscle strain. Our initial goal in this development process was to confirm that self-report measures of strain could approximate the actual muscle strain of software users. © 2011 Society of Exploration Geophysicists. |
| 172 | Ohta M., Kozaki K., Mizoguchi R. | An extension of an environment for building/using ontologies "Hozo" toward practical ontology engineering | 2010 | Through the spread of ontological engineering, many technologies and software tool for ontology construction were developed. By using them, many ontologies have been constructed in various domains. On these backgrounds, we have been developing an ontology engineering environment "Hozo" and using the tool to construct a lot of ontologies in various domains such as medical science, bioinformatics, nano-technology, education, environment engineering and so on. Through these practical experiences, we found out many issues concerning ontology construction and have solved them by enhancing the ontological theories and technical functions of Hozo. The number of items of improvements amounts to 67 in both theoretical and practical issues. This paper focuses on the practical issues and presents the improved functions of Hozo. Then, we consider how those functions have been useful for ontology construction through actual uses in six ontology development projects and evaluation experiment of usability of Hozo. Through these extensions, usability and reliability of Hozo have been improved. It also would contribute to development of other ontology engineering environments. |
| 173 | Gershon R., Rothrock N.E., Hanrahan R.T., Jansky L.J., Harniss M., Riley W. | The development of a clinical outcomes survey research application: Assessment centerSM | 2010 | Introduction The National Institutes of Health sponsored Patient-Reported Outcome Measurement Information System(PROMIS) aimed to create item banks and computerized adaptive tests (CATs) across multiple domains forindividuals with a range of chronic diseases. Purpose Web-based software was created to enable a researcher to create study-specific Websites that could administer PROMIS CATs and other instruments to research participants or clinical samples. This paper outlines the process used to develop a user-friendly, free, Web-based resource (Assessment CenterSM) for storage, retrieval, organization, sharing, and administration of patient-reported outcomes (PRO) instruments. Methods Joint Application Design (JAD) sessions were conducted with representatives from numerous institutions in order to supply a general wish list of features. Use Cases were then written to ensure that end user expectations matched programmer specifications. Program development included daily programmer "scrum" sessions, weekly Usability Acceptability Testing (UAT) and continuous Quality Assurance (QA) activities pre- and post-release. Results Assessment Center includes features that promote instrument development including item histories, data management, and storage of statistical analysis results. Conclusions This case study of software development highlights the collection and incorporation of user input throughout the development process. Potential future applicationsof Assessment Center in clinical research are discussed. © Springer Science+Business Media B.V. 2010. |
| 174 | Ballentine B.D. | Requirements specifications and anticipating user needs: Methods and warnings on writing development narratives for new software | 2010 | Purpose: This article studies and determines the benefits for technical communicators using narrative to compose and edit software requirements specifications. Specifically, this article is an examination of requirements specifications written for a Web-based radiology application serving the medical industry. Method: The study adheres to the usability principle that successful design accommodates complex problem solving. Requirements specifications, the application, and the application's code are examined as part of the study. Results: The first determination is that composing detailed narratives within the requirements specifications can ensure flexible spaces for users, in this case doctors, to view, study, and manipulate data as they see fit. The article also acknowledges and accounts for the reality of low-level or code-level procedural programming required for creating such flexible spaces. The second determination is that employing narratological structures within requirements specifications also leads to technical inventions at the code level. Practitioners will have a better understanding of how their work facilitates the development of a software application's functionality, design, and even code. Conclusion: Ultimately, narrative is the suggested method for developing the flexible affordances desired by usability specialists and it simultaneously helps negotiate low-level code. |
| 175 | Tejani N., Dresselhaus T.R., Weinger M.B. | Development of a hand-held computer platform for real-time behavioral assessment of physicians and nurses | 2010 | We developed a hand-held data collection tool to facilitate real-time collection of data on the factors that affect hospital staff performance. To assure high-yield of data from busy clinicians, the design objectives included low response burden, the ability to collect complex real-time data in dynamic work environments, and automated data integration. Iterative user-centered design of custom interfaces resulted in a dynamic intuitive platform where branching logic was applied to present a series of survey questions dependent on the participant's responses. Over a 12-month period, 304 inpatient physicians and nurses completed (with minimal initial training) a total of 11,381 survey responses. For randomly timed repeated survey prompts, complete (73%) or partial (12%) responses were obtained in a median time of 96 s. © 2009 Elsevier Inc. |
| 176 | Russ A.L., Baker D.A., Fahner W.J., Milligan B.S., Cox L., Hagg H.K., Saleem J.J. | A Rapid Usability Evaluation (RUE) Method for Health Information Technology | 2010 | Usability testing can help generate design ideas to enhance the quality and safety of health information technology. Despite these potential benefits, few healthcare organizations conduct systematic usability testing prior to software implementation. We used a Rapid Usability Evaluation (RUE) method to apply usability testing to software development at a major VA Medical Center. We describe the development of the RUE method, provide two examples of how it was successfully applied, and discuss key insights gained from this work. Clinical informaticists with limited usability training were able to apply RUE to improve software evaluation and elected to continue to use this technique. RUE methods are relatively simple, do not require advanced training or usability software, and should be easy to adopt. Other healthcare organizations may be able to implement RUE to improve software effectiveness, efficiency, and safety. |
| 177 | Beuscart-Zéphir M.-C., Pelayo S., Bernonville S. | Example of a Human Factors Engineering approach to a medication administration work system: Potential impact on patient safety | 2010 | Objective: The objectives of this paper are:1.To describe a Human Factors Engineering (HFE) approach to a medication administration work system, in the context of a hospital medication Computerized Provider Order Entry (CPOE) project.2.To identify the determinants of this work system potentially impacting both the efficiency and the safety of the medication use process. In this approach, the implementation of such a complex IT solution is considered a major redesign of the work system. The paper describes the Human Factor (HF) tasks embedded in the project lifecycle: (1) analysis and modelling of the current work system and usability assessment of the medication CPOE solution; (2) HF recommendations for work re-design and usability recommendations for IT system re-engineering both aiming at a safer and more efficient work situation. Methods: Standard ethnographic methods were used to support the analysis of the current work system and work situations, coupled with cognitive task analysis methods and documents review. Usability inspection (heuristic evaluation) and both in-lab (simulated tasks) and on-site (real tasks) usability tests were performed for the evaluation of the CPOE candidate. Adapted software engineering models were used in combination with usual textual descriptions, tasks models and mock-ups to support the recommendations for work and product re-design. Results: The analysis of the work situations identified different work organisations and procedures across the hospital's departments. The most important differences concerned the doctor-nurse communications and cooperation modes and the procedures for preparing and administering the medications. The assessment of the medication CPOE functions uncovered a number of usability problems including severe ones leading to impossible to detect or to catch errors. Models of the actual and possible distribution of tasks and roles were used to support decision making in the work design process. The results of the usability assessment were translated into requirements to support the necessary re-engineering of the IT application. Conclusion: The HFE approach to medication CPOE efficiently identifies and distinguishes currently unsafe or uncomfortable work situations that could obviously benefit from an IT solution from other work situations incorporating efficient work procedures that might be impaired by the implementation of the CPOE. In this context, a careful redesign of the work situation and of the entire work system is necessary to actually benefit from the installation of the product in terms of patient safety and human performances. In parallel, a usability assessment of the product to be implemented is mandatory to identify potentially dangerous usability flaws and to fix them before the installation. © 2009 Elsevier Ireland Ltd. All rights reserved. |
| 178 | Niès J., Pelayo S. | From users involvement to users' needs understanding: A case study | 2010 | Companies developing and commercializing Healthcare IT applications may decide to involve the users in the software development lifecycle in order to better understand the users' needs and to optimize their products. Unfortunately direct developers-users dialogues are not sufficient to ensure a proper understanding of the users' needs. It is also necessary to involve human factors specialists to analyze the users' expression of their needs and to properly formalize the requirements for design purposes. The objective of this paper is to present a case study reporting the collaborative work between HF experts and a company developing and commercializing a CPOE. This study shows how this collaboration helps resolve the limits of direct users involvement and usual problems pertaining to users' needs description and understanding. Method: The company participating in the study has implemented a procedure to convene regular meetings allowing direct exchanges between the development team and users' representatives. Those meetings aim at getting users' feedbacks on the existing products and at validating further developments. In parallel with usual HF methods supporting the analysis of the work system (onsite observations followed by debriefing interviews) and the usability evaluation of the application (usability inspection and usability tests), HF experts took the opportunity of the meetings organized by the company to collect, re-interpret and re-formulate the needs expressed by the users. Results: The developers perceive the physicians' requirements concerning the display of the patient's list of medication as contradictory. In a previous meeting round the users had required a detailed view of the medication list against the synthesized existing one. Once this requirement satisfied, the users participating in the current meeting round require a synthesized view against the existing detailed one. The development team is unable to understand what they perceive as a reverse claim. Relying on a cognitive analysis of the physicians' decision making concerning the patient's treatment, the HF experts help re-formulate the physicians' cognitive needs in terms of synthesized/detailed display of the medication list depending on the stage of the decision making process. This led to an astute re-engineering of the application allowing the physicians to easily navigate back and forth between the synthesized and detailed views depending on the progress of their decision making. Conclusion: This study demonstrates that the integration of users' representatives in the software lifecycle is a good point for the end users. But it remains insufficient to resolve the complex usability problems of the system. Such solutions require the integration of HF expertise. Moreover, such an involvement of HF experts may generate benefits in terms of reduction of (i) the number of iterative developments and (ii) the users' training costs. © 2009 Elsevier Ireland Ltd. All rights reserved. |
| 179 | [No author name available] | Proceedings of 2nd International Conference on Interaction Sciences: Information Technology, Culture and Human | 2009 | The proceedings contain 268 papers. The topics discussed include: learning and making sense of project phenomena in information systems education; a comparative study on structure of the motivation for information security by security incident experiences; a study of correlation between transitions and sound effects in a fairy tale movie; a survey on HCI considerations in the software development life cycle: from practitioner's perspective; database design for global patient monitoring applications using WAP; determinism in speech pitch relation to emotion; mobile technology for irrigation problems in rural India; proportional fairness of call blocking probability; relationship of blink, affect, and usability of graph reading tasks; star economy in the user generated content: a new perspective for digital ecosystems; and the deployment of PDA accessible clinical-log for medical education in PBL-approach. |
| 180 | [No author name available] | Proceedings of the 2009 Annual Conference of the Southern African Computer Lecturers' Association, SACLA 2009 | 2009 | The proceedings contain 14 papers. The topics discussed include: usability testing of e-learning: an approach incorporating co-discovery and think-aloud; facebook as an academic tool for ICT lecturers; away with computer literacy modules at universities, or not?; intelligent risk management tools for software development; open source software adoption by south African MSEs: barriers and enablers; a spell checker and corrector for the native south African language, south sotho; web application by south African health institutions; business intelligence projects in second year information systems courses; the school subject information technology: a south African perspective; the soft practice of the information systems practitioner-towards an engaging style for future graduate is education; computer skills of first-year students at a south African university; social interaction online: the case of a cross-disciplinary research conference; and a study of object-oriented design errors made by novice programmers. |
| 181 | Paladini G., Azar F.S. | An extensible imaging platform for optical imaging applications | 2009 | The National Institutes of Health (NIH) has recently developed an extensible imaging platform (XIP), a new open-source software development platform. XIP can be used to rapidly develop imaging applications designed to meet the needs of the optical imaging community. XIP is a state-of-the-art set of visual 'drag and drop' programming tools and associated libraries for rapid prototyping and application development. The tools include modules tailored for medical imaging, many of which are GPU hardware accelerated. They also provide a friendlier environment for utilizing popular toolkits such as ITK and VTK, and enable the visualization and processing of optical imaging data and standard DICOM data. XIP has built-in functionality for multidimensional data visualization and processing, and enables the development of independently optimized and re-usable software modules, which can be seamlessly added and interconnected to build advanced applications. XIP applications can run "stand alone", including in client/server mode for remote access. XIP also supports the DICOM WG23 "Application Hosting" standard, which will enable plug-in XIP applications to run on any DICOM host workstation. Such interoperability will enable the optical imaging community to develop and deploy modular applications across all academic/clinical/industry partners with WG23 compliant imaging workstations. © 2009 SPIE. |
| 182 | Soubra S. | Combining 3D models and simulations to meet the design challenges of the twenty-first century | 2009 | No part of the economic community can escape from the urgent issues related to global warming, carbon footprint and reducing energy consumption. Nevertheless, the building sector is particularly under pressure. Indeed, it is one of the biggest consumers of energy, either directly for lighting and thermal comfort (heating and air conditioning) or indirectly for the production of building materials. It also largely contributes to the massive use of some critical resources (such as energy, water, materials and space) and is responsible for a large portion of greenhouse gas emissions (Ratti et al. 2005). At the same time, the construction sector is expected, more than ever, to provide better living and working conditions: accessible and comfortable for all, safe and secure, durably enjoyable, efficient and flexible to changing demands, available and affordable. Current business models and working methods have reached their limits, and there is an urgent need for creativity-enhancing tools that support an 'out-of-the-box' approach to design, aiming for: • environmentally sustainable construction (in a context of limited resources - energy, water, materials and space); • meeting clients' and citizens' needs in terms of health (from indoor and outdoor exposures), security (against natural and industrial hazards), accessibility and usability for all (including the disabled and elderly), and enhanced life quality in buildings and urban environments. In that context, the chapter explores the possibilities of using geospatial information as input data to construct 3D models of the built environment. The models are then combined with simulations in order to address sustainable urban development issues within the planning process. Special focus will be given to 1) minimizing energy consumption and 2) simulation of air quality, taking into account meteorological data and traffic conditions. Finally, it is now commonly agreed that research must not be concerned solely with technology, as social, organisational and human issues also need to be considered in an interdisciplinary manner (Soubra et al. 2006). New working methods need to emerge in order to move away from the current situation where different groups or departments involved in urban planning (e.g. city planning, the legal office, the environment office, the roads department, the green department, etc.) sometimes work on the same project without communicating or, even worse, while hiding crucial information from each other. The chapter will report on how these aspects have been tackled by considering two test cities in Europe. © 2009 Editorial Matter - Geoffrey Qiping Shen, Peter Brandon and Andrew Baldwin. All rights reserved. |
| 183 | Wenq C., Levine B.A., Mun S.K. | Software architecture and engineering for patient records: Current and future | 2009 | During the "The National Forum on the Future of the Defense Health Information System," a track focusing on "Systems Architecture and Software Engineering" included eight presenters. These presenters identified three key areas of interest in this field, which include the need for open enterprise architecture and a federated database design, net centrality based on service-oriented architecture, and the need, for focus on software usability and reusability. The eight panelists provided recommendations related to the suitability of service-oriented architecture and the enabling technologies of grid computing and Web 2.0 for building health, services research centers and federated data warehouses to facilitate large-scale collaborative health care and research. Finally, they discussed the need to leverage industry best practices for software engineering to facilitate rapid, software development, testing, and deployment. Copyright © by Association of Military Surgeons of U.S. 2009. |
| 184 | Jansky L.J., Huang J.C. | A multi-method approach to assess usability and acceptability: A case study of the patient-reported outcomes measurement system (PROMIS) workshop | 2009 | The Patient-Reported Outcomes Measurement System (PROMIS) network, funded as part of the National Institute of Health's roadmap initiative, is in the process of developing a revolutionary computerized adaptive testing system for use in the clinical research community as a standardized method to select and implement patient-reported outcome measures. Soliciting end-user feedback on the system has posed logistical challenges, given the magnitude of the system's scope and the diversity of the target audience and their research needs. This case study presents the application of multiple qualitative methodsĝ€ "participant observation, usability testing, and focus groupsĝ€ "to determine end-users' acceptance of the system and its usability. Findings from these methods highlight the value in using a multifaceted approach to solicit end-user input to software development. © 2009 SAGE Publications. |
| 185 | Lopez D.M., Blobel B.G.M.E. | A development framework for semantically interoperable health information systems | 2009 | Background: Semantic interoperability is a basic challenge to be met for new generations of distributed, communicating and co-operating health information systems (HIS) enabling shared care and e-Health. Analysis, design, implementation and maintenance of such systems and intrinsic architectures have to follow a unified development methodology. Methods: The Generic Component Model (GCM) is used as a framework for modeling any system to evaluate and harmonize state of the art architecture development approaches and standards for health information systems as well as to derive a coherent architecture development framework for sustainable, semantically interoperable HIS and their components. The proposed methodology is based on the Rational Unified Process (RUP), taking advantage of its flexibility to be configured for integrating other architectural approaches such as Service-Oriented Architecture (SOA), Model-Driven Architecture (MDA), ISO 10746, and HL7 Development Framework (HDF). Results: Existing architectural approaches have been analyzed, compared and finally harmonized towards an architecture development framework for advanced health information systems. Conclusion: Starting with the requirements for semantic interoperability derived from paradigm changes for health information systems, and supported in formal software process engineering methods, an appropriate development framework for semantically interoperable HIS has been provided. The usability of the framework has been exemplified in a public health scenario. © 2008 Elsevier Ireland Ltd. All rights reserved. |
| 186 | [No author name available] | 5th IFIP WG 2.13 International Conference on Open Source Systems, OSS 2009 | 2009 | The proceedings contain 43 papers. The special focus in this conference is on Open Source Systems. The topics include: Open source is changing the way work gets done; how open source can still save the world; design evolution of an open source project using an improved modularity metric; software engineering in practice; incentives for organizations to publish software source code; opening industrial software; providing commercial open source software; analysis of open source software development iterations by means of burst detection techniques; the importance of external support in the adoption of open source server software; customization of open source software in companies; reporting empirical research in open source software; an empirical study of the reuse of software licensed under the GNU general public license; challenges of the open source component marketplace in the industry; integrating HCI specialists into open source software development projects; a survey of usability practices in free/libre/open source software; the words and actions that distinguish core from periphery in bug reports and how core and periphery interact together; group maintenance behaviors of core and peripherial members of free/libre open source software teams; a study of the vista electronic medical record software; openness to standard document formats in Swedish public sector organisations; practice and futures; release mismanagement in open source; libre software in Spanish public administrations; open source in the public sector and governance in open source projects and communities. |
| 187 | Cai J., Alpan A., Dubuisson T., Verduyckt I., Grenez F., Schoentgen J. | A clinical Workstation software for voice Quality assessment | 2009 | This paper presents the design and implementation of a clinical workstation software for analyzing voice disorders. The software is developed by using Java technology and MySQL database system. A variety of vocal cues, e.g. Jitter and shimmer, that describe irregularities of speech cycles in sustained vowels can be automatically derived by the system. For assessing voice disorders in connected speech, a vocal cue called signal-to-dysperiodicity ratio is evaluated by carrying out a generalized variogram analysis. In the development, special attention has been paid to software engineering conventions and the principles of architectural design of software structures to achieve good quality attributes such as developmental simplicity and modifiability. Preliminary tests have shown that the system provides satisfactory usability and performance for clinical applications. © 2009 Firenze University Press. |
| 188 | Cai Y., Pavlyshak I., Laws J., Magargle R., Hoburg J. | Augmented privacy with virtual humans | 2008 | Visual privacy is a sensitive subject because it literally deals with human private parts. It presents a bold challenge to the field of Computer Science. The goal of this study is to build a virtual human model for designing and evaluating visual privacy technologies before a security system is built. Given the available databases of anthropological models from CAESAR, 3D scanners and the physical parameters of human imaging systems, we simulate the scanning imagery data with the High Frequency Structure Simulator (HFSS). The proportion and template matching algorithms have been developed to find the human surface features from 3D scanning data. The concealed object detection algorithms are developed according to the wave intensity and surface characteristics. Then the privacy-aware rendering methods are evaluated by usability studies. This forward-thinking approach intends to transform the development of visual privacy technologies from device-specific and proprietary to device-independent and open source. It also advances privacy research from an ad-hoc problem-solving process to a systematic design process, enabling multi-disciplinary innovations in digital human modeling, computer vision, information visualization, and computational aesthetics. The results of this study can be used in the privacy-aware imaging systems in airports and medical systems. They can also benefit the custom-fit products that are designed from personal 3D scanning data. Furthermore, our results can be used in the reconstruction of objects in digital archeology and medical imaging technologies such as virtual colonoscopy. © 2008 Springer Berlin Heidelberg. |
| 189 | Doerr J., Kerkow D., Landmann D. | Supporting requirements engineering for medical products - Early consideration of user-perceived quality | 2008 | The usability and, more generally, the overall user-perceived quality of medical devices is an important aspect, which is often insufficiently addressed in the corresponding system development activities. Fortunately, the development of new standards like IEC/DIN EN 60601-1-6 is strengthening the focus on usability / user acceptance issues. This paper argues for the need to consider usability and user acceptance issues in early system development phases like the requirements engineering phase. In this paper, an empirically validated new quality model for user satisfaction is described first. The importance of the quality aspects included in this quality model for the medical domain is outlined. Then, the new quality model is used to develop a systematic methodology called Appraisal and Measurement of User Satisfaction (AMUSE), which allows gathering user acceptance information early in system development. The key activities of the AMUSE methodology and typical application scenarios are shown. Further on, the application of AMUSE, which was developed in close cooperation with Siemens Corporate Technology, is demonstrated in a real-world scenario at Siemens Audiologische Technik, a line of business of Siemens Medical Solutions. At the end, the first lessons learned from the application of the AMUSE methodology in this medical domain are discussed. Copyright 2008 ACM. |
| 190 | Amiruzzaman Md., Hyoung J.K. | A health-care service for mobile computing | 2008 | In this paper an embedded, automated health-care monitoring service is presented. The proposed service is based on multi-agent system, which is usable for mobile computing environment. In proposed a modified (i.e., two-way handshaking) iSCSI protocol applied for higher transmission rate. The proposed system compared with resource constrained devices, and conventional system. © 2008 IEEE. |
| 191 | Stock S.E., Davies D.K., Wehmeyer M.L., Palmer S.B. | Evaluation of cognitively accessible software to increase independent access to cellphone technology for people with intellectual disability | 2008 | Background: There are over two billion telephones in use worldwide. Yet, for millions of Americans with intellectual disabilities (ID), access to the benefits of cellphone technology is limited because of deficits in literacy, numerical comprehension, the proliferation of features and shrinking size of cellphone hardware and user interfaces. Developments in smart phone technology and PDA-based cellphones provide an opportunity to make the social and safety benefits of cellphones more independently accessible to this population. Method: This project involved employment of universal design and other specialised software development methods to create a multimedia cellphone interface prototype which was compared with a typical mainstream cellphone in a usability evaluation for individuals with ID. Participants completed a structured set of incoming/outgoing phone tasks using both the experimental and control conditions. Usability measurements included the amount of assistance needed and errors made in completing the cellphone use sequence. Results: A total of 22 individuals with ID participated in the research by engaging in a series of incoming and outgoing cellphone calls using both the multimedia cellphone prototype system and a mainstream Nokia 6360 cellphone. Test subjects required significantly less help (P = 0.001) and made significantly fewer errors (P < 0.001) when completing eight calls using the specialised multimedia phone system as compared with the mainstream phone. Conclusions: The statistical evidence of both usability results provide promising evidence of the feasibility of implementing universal design and other specialised software development methodologies for increasing independent access to the benefits of cellphone technologies for students and adults with ID. Issues related to designing cognitively accessible interfaces, study limitations and future directions are discussed. © Journal compilation © 2008 Blackwell Publishing Ltd. |
| 192 | [No author name available] | Proceedings of the 1st International Conference on Advances in Computer-Human Interaction, ACHI 2008 | 2008 | The proceedings contain 50 papers. The topics discussed include: focusing graphical user interfaces in model-driven software development; studying input device performance: an en d-user driven experiment in wearIT@work; a convivial interface for the transfer of medical images; intelligent camera interface (ICI): a challenging HMI for disabled people; an interactive and immersive 3D game simulation provided with force feedback; evaluating the significance of the desktop area in everyday computer use; NALP: navigating assistant for large display presentation using laser pointer; the development of automatic speech recognition software for portable devices; multimodal interaction- improving usability and efficiency in a mobile GIS context; special auditory interface for an embedded communication device in a car; and texture and shape information fusion for facial action action unit recognition. |
| 193 | Narasimhadevara A., Radhakrishnan T., Leung B., Jayakumar R. | On designing a usable interactive system to support transplant nursing | 2008 | Solid organ transplant has been steadily increasing in number both nationally and internationally. Caring for the transplant patients in the hospital setting, right after the patient is moved from the intensive care unit to the ward, is one of the most challenging tasks in nursing. It involves many procedures, rigid protocols, tight monitoring, and intensive data gathering for use by the other coordinating healthcare professionals. The complexity is further increased when a nurse has to take care of several transplant patients in a single shift. Of late, there has been a growth of computer applications in nursing and clinical information systems. Their acceptability and usability determine the ultimate success of computer support for this complex task. In this paper, we present a case study in which we combine two well-known software engineering techniques-namely, agile programming and user centered design-toward the goal of developing an interactive system for supporting the activities of transplant nurses in a hospital setting. This has resulted in a usable end-product and the user centered approach has motivated the nurses to move towards the use of computers in their jobs for better productivity. The product's usability was formally evaluated and is reported herein. The strengths and limitations of this approach are also discussed. The software product developed has been well accepted and is currently being planned to replace the manual methods followed in the transplant ward of a large metropolitan hospital. © 2007 Elsevier Inc. All rights reserved. |
| 194 | Xiao L., Peet A., Lewis P., Dashmapatra S., Sáez C., Croitoru M., Vicente J., Gonzalez-Velez H., Lluch I Ariet M. | An adaptive security model for multi-agent systems and application to a clinical trials environment | 2007 | We present in this paper an adaptive security model for Multi-agent systems. A security meta-model has been developed in which the traditional role concept has been extended. The new concept incorporates the need of both security management as used by role-based access control (RBAC) and agent functional behaviour in agent-oriented Software Engineering (AOSE). Our approach avoids weaknesses of traditional RBAC approaches and provides a practically usable security model for Multi-agent Systems (MAS). A unified role interaction model framework has been put forward that incorporates not only functional requirements but also security constraints in MAS. A security policy rule scheme has been used to express security requirements in relation to affective roles. The major contribution of the work is that little redevelopment effort will be required when security is to be engineered into the overall MAS architecture, hence minimising the impact of the security requirements changes to the MAS architecture. We illustrate the approach through its potential application in a clinical trial setting involving a prototype medical decision support system, HealthAgents. © 2007 IEEE. |
| 195 | Hornbæk K., Høegh R.T., Pedersen M.B., Stage J. | Use case evaluation (UCE): A method for early usability evaluation in software development | 2007 | It is often argued that usability problems should be identified as early as possible during software development, but many usability evaluation methods do not fit well in early development activities. We propose a method for usability evaluation of use cases, a widely used representation of design ideas produced early in software development processes. The method proceeds by systematic inspection of use cases with reference to a set of guidelines for usable design. To validate the method, four evaluators inspected a set of use cases for a health care application. The usability problems predicted by the evaluators were compared to the result of a conventional think-aloud test. About one fourth of the problems were identified by both think-aloud testing and use case inspection; about half of the predicted problems not found by think-aloud testing were assessed as providing useful input to early development. Qualitative data on the evaluators' experience using the method are also presented. On this background, we argue that use case inspection has a promising potential and discuss its limitations. © IFIP International Federation for Information Processing 2007. |
| 196 | Weber-Jahnke J.H., Price M. | Engineering medical information systems: Architecture, data and usability & security | 2007 | There has been increasing pressure on the health care sector to adopt information technologies to rationalize service delivery and increase service quality. Medical information systems need to be highly interoperable and effectively manage complex information of great sensitivity. Moreover, they have to be optimized for usability in a highly complex knowledge base and agile work environment. This tutorial introduces key concepts, methods and techniques essential for engineering clinical information systems, in particular electronic medical records. It targets participants with basic software engineering knowledge who are or will be involved in development, maintenance, evolution or research of medical software. © 2007 IEEE. |
| 197 | Rosenbloom S.T., Crow A.N., Blackford J.U., Johnson K.B. | Cognitive factors influencing perceptions of clinical documentation tools | 2007 | Identifying healthcare providers' perceptions of clinical documentation methods can inform the design of computer-based documentation tools. The authors investigated the cognitive factors underlying such perceptions by performing a qualitative analysis that included open-ended in-depth interviews of a convenience sample of healthcare providers who use a variety of documentation methods. A total of 16 providers participated in the study; subjects included physicians and nurse practitioners from medical and surgical specialties who used paper- and computer-based documentation tools. Based on interview data, authors identified five factors that influenced satisfaction with clinical documentation tools: document system time efficiency, availability, expressivity, structure, and quality. These factors, if validated by subsequent investigations, can be used to develop a formal conceptual model of providers' perceptions of their satisfaction with various documentation systems. © 2006 Elsevier Inc. All rights reserved. |
| 198 | da Costa T.M., Pinto V.C., Mauad R.F., Afonso D.L., da Silva F.A., Alves D., Schor P., Pisa I.T. | PDA for health professionals: can you deal with that? | 2007 | Personal digital assistants (PDAs) are being increasingly used on the health field, however, there are not many papers guiding a PDA-software development process concerning its usability in health field. This paper presents our experience dealing with PDAs regarding some elements of usability. We have shown that if simple yet extremely important points are to be observed before and during the development process, usability on PDA software can be greatly improved. |
| 199 | Bishea D.M., Wood S.B., Muddimer A. | Ergonomic computing in geophysical interpretation | 2007 | Workstation-based geophysical interpretation may pose a risk for repetitive strain injury (RSI). The physical environment for interpretation can be improved to reduce RSI risk (e.g., adjustable chairs, tables, monitors), but the degree to which software is "RSI-friendly" may also have an impact on software usability, interpretational efficiency, and ultimately an interpreter's health. Strategies to address software-related ergonomic risk can be formulated using standard hazard abatement techniques borrowed from the Safety, Health, and Environment (SH&E) discipline. However, the potential for improvement in the ergonomic computing environment also depends on the degree to which the ergonomic fitness of individual applications and/or workflows can be measured. The software development industry has for many years routinely applied standard usability criteria to improve their products, but an accepted framework for assessing software ergonomic fitness is lacking. This paper describes a nascent, multicompany effort to develop a checklist for the purpose of quantifying an application's ergonomic risk. This checklist is being tested and benchmarked to compare geoscience interpretation tools and identify areas for ergonomic improvement. © 2007 Society of Exploration Geophysicists. All rights reserved. |
| 200 | Bishea D.M., Wood S.B., Muddimer A. | Ergonomic computing in geophysical interpretation | 2007 | Workstation-based geophysical interpretation may pose a risk for repetitive strain injury (RSI). The physical environment for interpretation can be improved to reduce RSI risk (e.g., adjustable chairs, tables, monitors), but the degree to which software is "RSI-friendly" may also have an impact on software usability, interpretational efficiency, and ultimately an interpreter's health. Strategies to address software-related ergonomic risk can be formulated using standard hazard abatement techniques borrowed from the Safety, Health, and Environment (SH&E) discipline. However, the potential for improvement in the ergonomic computing environment also depends on the degree to which the ergonomic fitness of individual applications and/ or workflows can be measured. The software development industry has for many years routinely applied standard usability criteria to improve their products, but an accepted framework for assessing software ergonomic fitness is lacking. This paper describes a nascent, multicompany effort to develop a checklist for the purpose of quantifying an application's ergonomic risk. This checklist is being tested and benchmarked to compare geoscience interpretation tools and identify areas for ergonomic improvement. © 2007 Society of Exploration Geophysicists. |
| 201 | [No author name available] | 13th International Conference on Distributed Multimedia Systems, DMS 2007 | 2007 | The proceedings contain 65 papers. The special focus in this conference is on Collaborative multimedia environments, Multimedia databases, Distributed multimedia systems/computing I, Multimedia software engineering, multimedia for ambient and environment management and Distributed multimedia computing II. The topics include: Assessing and computing blended and pure learning approaches; a scalable architecture for latency sensitive massively multiplayer online games; E-education to reach the unreached; region based image clustering using distributed K-median clustering; appropriate cutting segments of XML elements for multiple keywords queries; an interactive visualization system for exploring time-series data; a conceptual approach for active surveillance of indoor environments; a self-organizing approach to mission initialization and control in emergency management; a black-box testing method for multi-agent systems; a new browsing model based on AJAX strategies; a method for verifying usability and performance of a multi-user healthcare embedded system; towards a formal semantics for distributed multimedia computing; data normalization and fusion in multibiometric systems; an ambient intelligence application for cultural heritage; an integrated system for easying the access to georeferenced information on the web; exploiting MPEG-21 file format for cross media content; effects of agents communications on system performance in medical organizations; vLab, a virtual laboratory for computer engineering education; multimedia knowledge eclipse environment; distributed E-learning with TAO through eclipse and grid computing; teaching with eclipse through the simulations; improving student’s self-efficacy using an adaptive approach and beyond learning management systems in lifelong learning. |
| 202 | Burton J., Caffery F.M., Richardson I. | A risk management capability model for use in medical device companies | 2006 | Medical device software is a risky business. Failure of the software can have potentially catastrophic effects, leading to injury of patients or even death. It is therefore no surprise that regulators throughout the world are penalising medical device manufacturers that do not demonstrate that sufficient attention is devoted to the areas of hazard analysis and risk management (RM) throughout the software lifecycle. If a medical device company fails to comply with the regulations of a given country, in effect they surrender their legal right to market their device in that country. With so much at stake, it is in everybody's best interest that the medical device manufacturer gets it right. However, with so many different standards, regulatory guidance papers and industry guides on RM, the task of collating this information into a usable model is itself daunting. This paper seeks to extract the important concepts from a number of industry accepted standards and guides, and present them as a generic usable model for the medical device software industry. © 2006 ACM. |
| 203 | Wiltgen M., Holzinger A., Groell R., Wolf G., Habermann W. | Usability of image fusion: Optimal opacification of vessels and squamous cell carcinoma in CT scans | 2006 | The purpose of this study was to evaluate the feasibility and usability of digital image fusion of different phases in spiral CT studies of the head and neck. Patients with squamous cell carcinomas underwent dual-phase spiral CT using a contrast material. The images of the early phase were showing optimal vascular enhancement. The images of the late phase were showing optimal tumor conspicuity. Selected images of the early phase were fused with selected images of the late phase by application of user-centered developed software. The image fusion was done in a semi-automatically way on a desktop computer (PC). The relationship between tumors and adjacent vessels was better visualized on the fused images than on the original source images. As a conclusion it can be emphasized, that digital image fusion of early and late phases enabled combined opacification of vessels and squamous cell carcinomas, which facilitated the topographic assessment of the tumors size and spread. |
| 204 | Tang Z., Johnson T.R., Tindall R.D., Zhang J. | Applying heuristic evaluation to improve the usability of a telemedicine system | 2006 | The development of a telemedicine system should not only take advantage of technological advances but also pay close attention to users and the human issues involved. In this paper we examine the utility of heuristic evaluation in improving the usability of a digital emergency medical services (EMS) system equipped on an ambulance. The digital EMS system used advanced communication technologies to help remotely located trauma specialists gain access to patient data in real-time and direct life-saving measures in a timely fashion. To improve its usability, three experts inspected prototypes of the system according to 14 software usability heuristics. The analyses revealed information on the prevalence, severity, and nature of heuristic violations in the user interface design. The results were subsequently utilized to guide the iterative software design process. A comparison between two consecutive prototypes showed that the second design had only half as many usability violations as the first prototype and had considerable improvement in a number of usability heuristic categories. The validity of heuristic evaluation was examined in an ethnographic study of paramedics using a prototype of the system in their work environment. Users' task performances partially verified heuristic evaluation results. However, they also revealed problems that were not identified in heuristic evaluation but only became prominent during field observation. In conclusion, we argue that usability should be given high priority in the development of a telemedicine system, and that heuristic evaluation can be an effective and efficient way to identify usability problems in the early stage of software development. © Mary Ann Liebert, Inc. |
| 205 | Manfredi C., Tocchioni V., Bocchi L. | A robust tool for newborn infant cry analysis | 2006 | In this paper, a new robust adaptive tool for newborn infant cry analysis is proposed, characterised by high tracking capability, well suited for the signals under study. It performs F0, noise and resonance frequencies tracking, on signal frames of varying length (even few ms), adaptively tailored to varying signal characteristics. Moreover, voiced/unvoiced separation is implemented, allowing disregarding unvoiced parts of the signal where misleading results could be obtained. Plots of F0 and its harmonics, noise tracking, spectrogram with resonance frequencies superimposed, are presented in a coloured-scale. Some added statistics allow further understanding and comparison of results. The new software tool is completely automatic, working with any sampling frequency and F0, and also with strongly corrupted signals, and does not need any manual setting of whatever option to be made by the user, thus being easily usable also by non-experts. Some examples are reported, concerning both healthy and pathological new-born infant cries. © 2006 IEEE. |
| 206 | Upender B. | Staying agile in government software projects | 2005 | Can government software projects be agile? What do Scrum and XP practices have to offer in this regulated and highly political environment? In this experience report, I will discuss some of the unique challenges in our environment and how we have had to adapt these practices to produce commercial-grade software, I will provide a "report card" on our progress in applying Scrum and XP practices to a clinical data management project over a two-year period. In addition, I will describe the practices that were accepted "religiously", adapted to get the job done, and abandoned completely. In particular, I will discuss how we got around bootstrapping, Rational tools, documentation needs, and managing a product backlog for a diverse, decentralized user community. Putting these practices to work was hard, but they resulted in better team communication, a more usable product, and improved partnership between the users and the development team. In addition, staying agile is just as hard as becoming agile. © 2005 IEEE. |
| 207 | Webster I., Ivanova V., Cysneiros L.M. | Reusable knowledge for achieving privacy: A canadian health information technologies perspective | 2005 | Privacy is a fundamental aspect when dealing with Personal Information. Privacy requirements are those that capture privacy goals and its associated measures for a system under development. In order to ensure privacy we must identify these elements. However, there are many challenges in their identification. For example, privacy requirements may be difficult to quantify and precisely specify. There is a need for systematic approaches for reasoning, modeling and analyzing privacy from the early stages of the software development. Furthermore, it is necessary to develop a usable ontology or classification of measurable aspects of privacy that can be used to aid in the specification of privacy requirements. These ontologies should be represented in a way that facilitates their use as guidelines for the requirements elicitation process. This work builds on a review of privacy legislation to develop a catalog of aspects of privacy that can be considered during requirements gathering. This catalogue is used to guide the requirements engineer through alternatives for achieving privacy. The approach uses the i\* framework to model privacy as a special type of goal. We show how privacy can be modelled through different viewpoints with different alternatives for its operationalization. An example in the health care domain is used to illustrate our work. |
| 208 | Kornecki A.J., Zalewski J. | Experimental evaluation of software development tools for safety-critical real-time systems | 2005 | Since the early years of computing, programmers, systems analysts, and software engineers have sought ways to improve development process efficiency. Software development tools are programs that help developers create other programs and automate mundane operations while bringing the level of abstraction closer to the application engineer. In practice, software development tools have been in wide use among safety-critical system developers. Typical application areas include space, aviation, automotive, nuclear, railroad, medical, and military. While their use is widespread in safety-critical systems, the tools do not always assure the safe behavior of their respective products. This study examines the assumptions, practices, and criteria for assessing software development tools for building safety-critical real-time systems. Experiments were designed for an avionics testbed and conducted on six industry-strength tools to assess their functionality, usability, efficiency, and traceability. The results some light on possible improvements in the tool evaluation process that can lead to potential tool qualification for safety-critical real-time systems. © Springer-Verlag Berlin Heidelberg 2005. |
| 209 | Pieper S., Halle M., Kikinis R. | 3D Slicer | 2004 | To be applied to practical clinical research problems, medical image computing software requires infrastructure including routines to read and write various file formats, manipulate 2D and 3D coordinate systems, and present a consistent user interface paradigm and visualization metaphor. At the same time, research software needs to be flexible to facilitate implementation of new ideas. 3D Slicer is a project that aims to provide a platform for a variety of applications through a community-development model. The resulting system has been used for research in both basic biomedical and clinically applied settings. 3D Slicer is built on a set of powerful and widely used software components (Tcl/Tk, VTK, ITK) to which is added an application layer that makes the system usable by non-programmer end-users. Using this approach, advanced applications including image guided surgery, robotics, brain mapping, and virtual colonoscopy have been implemented as 3D Slicer modules. In this paper we discuss some of the goals of the 3D Slicer project and how the architecture helps support those goals. We also point out some of the practical issues which arise from this approach. © 2004 IEEE. |
| 210 | Yu P., Yu H. | Lesions learned from the practice of mobile health application development | 2004 | This fast abstract briefly discusses lessons learned in terms of how to overcome limitations of PDA devices, effectively capture requirements for mobile health application development and effectively re-engineer a desktop application on PDA. The limitation of PDA devices includes (1) small screen size, which limits text-based data entry, reporting and browsing; (2) limited storage space and slow processing, which requires effective and efficient coding generation; (3) security limitations and inadequate third party application support, which poses challenge for application development. The corresponding strategies addressing the above challenges are (1) providing check box, radio button, drop down list, text field, combo box based data entry and minimise text-based data entry, such as text area; (2) allocating as much as possible data storage, communication and computation tasks to the desktop system and minimise the function PDA component needs to handle, store data in file instead of database on PDA; (3) carefully selecting the device and implementation platform that supports development. To maximise the usability of PDA-based health application, the solution to be implemented on PDA ideally should be data management tasks with minimum text-based data entry and high frequency of recording. Challenges and solutions for software re-engineering from desktop system to PDA-based application is outlined based on one application developed for World Health Organisation. In this example, the complex task of communication among PDA-based application, desktop system and the existent desktop application EpiData is effectively handled through the utilisation of XML files. A dynamic tool 'Questionnaire Designer' provides a completely dynamic user interface generation tool that could easily be handled by end user. The design idea for this application sets up a model for mobile health application with adequate flexibility of handling changing data management needs of end users. © 2004 IEEE. |
| 211 | Lee M., Abdullah H.A., Basir O.A. | Model-driven interactive system design for therapy robots | 2004 | Physiotherapy using intelligent robots is emerging as a new approach to recovery for many stroke patients. Although therapy robots have a strong potential in dealing with therapeutic and other medical applications, they have not been fully utilized in everyday therapy activities due to concerns over safety and the lack of friendly robot user/patient interaction models. From the viewpoint of software engineering, a user-centred design based on UML (Unified Modelling Language) has been known to be one of the best solutions to satisfy usability since the design process relies heavily on the analysis of users and their tasks to reach their goals. Therefore, a model-driven approach to interactive system design via UML for therapy robots is needed to make them usable in the real world. This paper proposes such approach and introduces a new graphical notation that describes user interface elements and the methods of connection with hardware/software objects. With the proposed abstract interaction models, prototyping interactive systems can be made faster and allows for their evaluation by users and system developers before implementation in order to improve usability from the perspectives of users and system developers. |
| 212 | Yang L., Frize M., Eng P. | Incorporating Usability Design Factors into Development of Clinical Decision Support Systems | 2003 | Usability is an important component of software engineering. Medical computer systems that take usability into consideration allow users to improve clinical productivity effectively and efficiently, while promoting positive feelings of satisfaction. Clinical Decision Support Systems (CDSS) share similar usability issues as other applications, and raise unique user concerns. In this paper, we propose the CDSS Usability Framework as a solution for improving the usability of decision support tools. We also suggest that CDSSs should be evaluated using the discounted usability method to iteratively improve CDSS tools. |
| 213 | Mirel B. | General hospital: Modeling complex problem solving in complex work system | 2003 | To be truly useful, applications for complex problem solving require distinct design approaches. One that is crucial is getting the user model right for dynamic, emergent, nonlinear work. Drawing on an example in healthcare, this paper proposes modeling complex work in ways that go beyond common user-centered approaches. It models nurses' dosage decisions as patterns of inquiry and visualizes them as task landscapes. Copyright 2003 ACM. |
| 214 | Boivie I., Åborg C., Persson J., Löfberg M. | Why usability gets lost or usability in in-house software development | 2003 | This study tries to shed some light on what happens to usability and occupational health issues in a bespoke software development project. Usability is an essential quality in software, in particular in a work context where poor usability and other risk factors related to the software and computers may cause health problems. We have interviewed a number of software developers, usability people and users about their attitudes to and practices for integrating usability and users' health concerns in software development. The interviews were conducted in two Swedish organisations with in-house development of bespoke software. Our main conclusion is that several factors combine to push usability and occupational health matters aside, some of which are attitudes to usability and users' health issues, unclear responsibilities, poor support for user-centeredness and usability in software development models, ineffective user participation and usability and users' health being ignored or forgotten in decisions about the software, its use and its design. © 2003 Elsevier B.V. All rights reserved. |
| 215 | Bonetto P., Comis G., Formiconi A.R., Guarracino M. | A new approach to brain imaging, based on an open and distributed environment | 2003 | The standard way to offer image reconstruction algorithms and processing tools to the medical community is through the proprietary software preinstalled on the computing system that comes along with the acquisition device. This makes it difficult for the medical community to experiment with new advances in the field of image reconstruction and analysis, and at the same time, for the basic research community to benefit from an extended feedback from the end users of its products. A prototypal set of software tools and strategies to reconstruct, display, analyze as well as store, share, distribute and organize medical images, is described. The main goal of the project was to design an easily available and usable software environment with which the medical community could experiment on one side, and that the research groups could use as a reference or as a basis for continuing research on the other side. The outcome of this work consists of software that is platform independent, remotely executable, freely downloadable and accessible, and based on open source code, while, at the same time, addressing the major problems in the field of image reconstruction and processing. © 2003 IEEE. |
| 216 | Kushniruk A. | Evaluation in the design of health information systems: Application of approaches emerging from usability engineering | 2002 | This paper examines the role of evaluation in the design of health care information systems. A framework is presented for considering evaluation in the context of software development processes, in particular, the systems development life cycle (SDLC). Variations on standard design methodologies are then discussed, including methods based on rapid development and continual evaluation of prototype systems. Usability testing is presented as a key method for conducting evaluations during iterative system development. The emergence of design methodologies, where evaluation is viewed as a central part of the development cycle is also discussed. Evaluation methodologies are then considered along a continuum, ranging from studies involving a high degree of experimental control to observational approaches. A full cycle approach to evaluation of health care systems is argued for, involving deployment of new methods across the SDLC. Implications for future work exploring the integration of design and evaluation processes in health informatics are discussed. © 2002 Elsevier Science Ltd. All rights reserved. |
| 217 | Moise A., Atkins M.S. | New trends in radiology workstation design | 2002 | In the radiology workstation design, the race for adding more features is now morphing into an iterative user centric design with the focus on ergonomics and usability. The extent of the list of features for the radiology workstation used to be one of the most significant factors for a Picture Archiving and Communication System (PACS) vendor's ability to sell the radiology workstation. Not anymore! The list of features and tools offered by a radiology workstation is now very much the same between the major players in the PACS market. How these features work together distinguishes different radiology workstations. Integration (with the PACS/Radiology Information System (RIS) systems, with the 3D tool, Reporting Tool etc.), usability (user specific preferences, advanced display protocols, smart activation of tools etc.) and efficiency (what is the output a radiologist can generate with the workstation) are now core factors for selecting a workstation. This paper discusses these new trends in radiology workstation design. We demonstrate the importance of the interaction between the PACS vendor (software engineers) and the customer (radiologists) during the radiology workstation design. We focus on iterative aspects of the workstation development, such as the presentation of early prototypes to as many representative users as possible during the software development cycle and present the results of a survey of 8 radiologists on designing a radiology workstation. |
| 218 | Serra M., Muzio J. | The IT support for acquired brain injury patients - The design and evaluation of a new software package | 2002 | The problems with producing a software system to assist in the rehabilitation of people who have suffered serious traumatic brain injuries are described. In addition to this primary use, therapists need the system for evaluation, monitoring and measurement purposes. The challenges of ensuring a high level of usability by incorporating the best of graphical and HCI design into a well-established software engineering methodology are discussed, as well as the details of the specific approach that we designed. The software needs to be repeatedly used and enjoyed by both the patients and the therapists. The challenges to writing software for use by such disparate groups are significant, and there is currently very little software that has been written specifically for this user group. As we discovered, many of the standard software design paradigms are inappropriate for users suffering from brain trauma injuries. The resulting suite of programs is now in use at a rehabilitation hospital in Victoria, and we report on their successful adoption. © 2002 IEEE. |
| 219 | Schmid M., Hill F., Ghosh A.K. | Protecting data from malicious software | 2002 | Corruption or disclosure of sensitive user documents can be among the most lasting and costly effects of malicious software attacks. Many malicious programs specifically target files that are likely to contain important user data. Researchers have approached this problem by developing techniques for restricting access to resources on an application-by-application basis. These so-called "sandbox environments," though effective, are cumbersome and difficult to use. In this paper, we present a prototype Windows NT/2000 tool that addresses malicious software threats to user data by extending the existing set of file-access permissions. Management and configuration options make the tool unobtrusive and easy to use. We have conducted preliminary experiments to assess the usability of the tool and to evaluate the effects of improvements we have made. Our work has produced an intuitive data-centric method of protecting valuable documents that provides an additional layer of defense beyond existing antivirus solutions. © 2002 IEEE. |
| 220 | Grimson J. | Delivering the electronic healthcare record for the 21st century | 2001 | In spite of over four decades of research into Electronic Healthcare Record Systems, the penetration of records which incorporate more than simply basic information, into the working life of healthcare organisations is relatively small. This paper discusses some of the key impediments to progress including in particular, the lack of application of software engineering methodologies, the absence of usable standards, and the failure to acknowledge the impact of record systems on the healthcare system itself. However, Health Informatics researchers need to be preparing for the next generation of systems which will be triggered by the twin revolutions of the Internet and Genetic Medicine. This next generation of EHCR will be a longitudinal cradle-to-the-grave active record readily accessible and available via the Internet, and which will be linked to clinical protocols and guidelines to drive the delivery of healthcare to the individual citizen. Post-genomic research will unravel the link between genes, disease, treatment and the environment and this information will be used to promote health and individualise care. A number of key research issues are identified which need to be addressed in order to realise the delivery of the next generation of EHCR Systems. Copyright © 2001 Elsevier Science Ireland Ltd. |
| 221 | Anderson J., Fleek F., Garrity K., Drake F. | Integrating usability techniques into software development | 2001 | Focusing on the user early in the development process goes a long way toward improving product quality and eliminating rework. This article discusses how Shared Medical systems, now merged into Siemens Medical Solutions Health Services, is working toward this goal. |
| 222 | Gregor P., Alm N., Arnott J., Newell A.F. | The application of computing technology to interpersonal communication at the University of Dundee's Department of Applied Computing | 1999 | This paper provides an overview of the major areas of research within the Department of Applied Computing at the University of Dundee. This research focuses on the areas of Interactive Communication Systems, Telecommunications and Remote Learning, Computer based Interviewing and Knowledge Elicitation, Health Informatics, Software Engineering, and Digital Signal Processing. A major strand throughout these areas is a focus on Human Computing Interaction issues, and the use of computing technology to facilitate interpersonal communication, particularly for people with disabilities. The research has produced many new insights in these areas and a number of commercial products have been licensed as a result. The Department's unique approach is based on placing the user at the centre of the design process, and having people with disabilities make major contributions as participants in the research and also as researchers. |
| 223 | Rector A.L. | Terminology and concept representation languages: Where are we? | 1999 | Issues in terminology are now the center of attention in medical informatics and are becoming the natural point of interaction medical informatics with other fields in artificial intelligence and information management. Different aspects of the problems are addressed: problems in reconciling the needs of natural language understanding with more general requirements of concept representation for medical information; management of the maintenance and updating large scale terminology; and technical method of making the results more accessible and usable to ordinary users. |
| 224 | [No author name available] | Proceedings of the 1999 32nd Annual Hawaii International Conference on System Sciences, HICSS-32 | 1999 | The proceedings contains 441 papers from the Thirty-Second Annual Hawaii International Conference on Systems Sciences. Topics discussed include: adoption and diffusion of collaborative systems and technologies; asynchronous learning networks; distributed group support systems; engineering organizational processes and systems; judge advisor systems; negotiation support systems; organization memory and knowledge management; knowledge construction technologies; technology support learning; genre in digital documents; human factors and usability issues; understanding digital documents; engineering complex computer systems; restructuring the electric power industry; formal methods and industries; and scenario-based system development. |
| 225 | Coble Janette M., Karat John, Kahn Michael G. | Maintaining a focus on user requirements throughout the development of clinical workstation software | 1997 | Establishing user requirements is well recognized as a critical step in the development of useful and usable systems. Recent innovations in human-computer interaction design address new methods for effective requirements gathering, such as Participatory Design and Contextual Inquiry. However, even when projects use these methods successfully to collect valid requirement descriptions, it remains a challenge to establish a process that makes direct use of those descriptions during software development. Valuable requirements information can be lost as it is reinterpreted during the development of functional specifications and the implementation of the proposed system. We describe the several steps we have taken to keep an ongoing and evolving understanding of user requirements under consideration by system designers and developers as they face the `real' (to them) requirements of adapting function to the constraints of computer platforms, project cost, and delivery schedule. The specific work reported here applies to the design of software for a clinical workstation used to review medical information. However, we believe the lessons we learned, maintaining the influence of user requirements throughout the development process, will apply in other practical system development situations. |
| 226 | Fechter J., Grunert T., Miguel Encarnação L., Straßer W. | User-centered development of medical visualization applications: Flexible interaction through communicating application objects | 1996 | Today's software systems for medical visualization still suffer from a shortage of practical applications due to their lack of usability with respect to a large variety of users with different computerskills and experiences. Furthermore, progress is often hampered by the lack of adequate software tools that allow research ideas to be rapidly accomplished, evaluated, and brought into routine. We developed an integrated software environment that is distinct because it, on the one hand, provides an applicationbuilder toolbox for medical diagnosis and therapy. And, on the other hand, it allows for the development, integration, and user-centered evaluation of existing and new interaction techniques in 2-D, 3-D, and Virtual Reality (VR). The environment's interaction support is based on communicating application objects that employ a sophisticated message-based inter-object communication. In addition, the system contains a component for user-adapted interaction and system support. The system has been used for several clinical applications which are briefly described at the end of this paper. Copyright (©) 1996 Elsevier Science Ltd. |
| 227 | Degoulet P., Jean F.C., Engelmann U., Meinzer H.-P., Baud R., Sandblad B., Wigertz O., Le Meur R., Jagermann C. | The component-based architecture of the HELIOS medical software engineering environment | 1994 | The constitution of highly integrated health information networks and the growth of multimedia technologies raise new challenges for the development of medical applications. We describe in this paper the general architecture of the HELIOS medical software engineering environment devoted to the development and maintenance of multimedia distributed medical applications. HELIOS is made of a set of software components, federated by a communication channel called the HELIOS Unification Bus. The HELIOS kernel includes three main components, the Analysis-Design and Environment, the Object Information System and the Interface Manager. HELIOS services consist in a collection of toolkits providing the necessary facilities to medical application developers. They include Image Related services, a Natural Language Processor, a Decision Support System and Connection services. The project gives special attention to both object-oriented approaches and software re-usability that are considered crucial steps towards the development of more reliable, coherent and integrated applications.The constitution of highly integrated health information networks and the growth of multimedia technologies raise new challenges for the development of medical applications. We describe in this paper the general architecture of the HELIOS medical software engineering environment devoted to the development and maintenance of multimedia distributed medical applications. HELIOS is made of a set of software components, federated by a communication channel called the HELIOS Unification Bus. The HELIOS kernel includes three main components, the Analysis-Design and Environment, the Object Information System and the Interface Manager. HELIOS services consist in a collection of toolkits providing the necessary facilities to medical application developers. They include Image Related services, a Natural Language Processor, a Decision Support System and Connection services. The project gives special attention to both object-oriented approaches and software re-usability that are considered crucial steps towards the development of more reliable, coherent and integrated applications. |
| 228 | Abed M., Angue J.C. | New method for conception, realisation and evaluation of man-machine | 1994 | The problems of Man-Machine (M-M) communication in any branches of industry (medical, industrial, aeronautical...) lead to develop some approaches of tasks modelization permitting the designing of Man-Machine systems. In this case, a methodology is proposed to design and formalize an operator's task. This methodology is based on the description and comparison of two different models of human tasks: one model - an 'a priori model' - dealing with a probable behaviour and a second - an 'a posteriori model' - dealing with a real observed behaviour. The result constitutes a model explaining an operator's behaviour. The description of this model is rendered by the SADT (Structured Analysis and Design Technique) and SPN (Synchronized Petri Network) theories which give an easy and formal tool directly usable by the designer. |
| 229 | Ligier Y., Ratib O., Logean M., Girard C., Perrier R., Scherrer J.R. | Object-oriented design of medical imaging software | 1994 | A special software package for interactive display and manipulation of medical images was developed at the University Hospital of Geneva, as part of a hospital wide Picture Archiving and Communication System (PACS). This software package, called Osiris, was especially designed to be easily usable and adaptable to the needs of noncomputer-oriented physicians. The Osiris software has been developed to allow the visualization of medical images obtained from any imaging modality. It provides generic manipulation tools, processing tools, and analysis tools more specific to clinical applications. This software, based on an object-oriented paradigm, is portable and extensible. Osiris is available on two different operating systems: the Unix X-11/OSF-Motif based workstations, and the Macintosh family. © 1994. |
| 230 | Rector A.L., Horan B., Fitter M., Kay S., Newton P.D., Nowlan W.A., Robinson D., Wilson A. | User centred development of a general practice medical workstation: the PEN&PAD experience | 1992 | The goal of the PEN&PAD project is to design and develop a useful and usable medical workstation for day-to-day use in patient care. The project has adopted a user centred approach and direct observations of doctors, participative design and Formative Evaluation have therefore been an integral part of the process of software development. Indeed, doctors have been involved from the earliest stages of the project. The project has focussed on British General Practitioners, but the methods which have been evolved are general. This paper describes the strategy by which doctors can be involved in the successful design and development of a medical workstation. |
| 231 | [No author name available] | Proceedings of the 36th Annual Meeting of the Human Factors Society | 1992 | This conference proceedings contains 180 papers. The topics included are aerospace systems; workload assessment; automation effects; situation awareness; cockpit displays; selection and training; maintenance; fatigue effects; space systems; human aging; communication; auditory perception; keyboards and other input devices; cursor control; menu systems; graphic displays; user interfaces; usability and rapid prototyping; control room design; automotive applications; warning research; food labeling; human factors education; environmental design; forensics; human error and medical devices; ergonomics; and biomechanics. |
| 232 | Kaye Edita | SOFTWARE THAT INCREASES DIAGNOSTIC ACCURACY. | 1986 | This article describes three software developments that help the doctor in diagnosis. The first processes the images from the thallium test to enhance the images for more accurate detection of small changes in the heart (rest vs. exercise). It is claimed that with the new software, about 15 percent of patients referred for angiograms may be spared the procedure and as many as 10 percent of all patients who would benefit from the invasive diagnostic procedure are spared and relieved of the consequences of coronary and artery disease quickly and safely. The second development is a diabetes monitoring system (Sugar II), usable with the Apple II, which uses a mouse for selecting icons and symbols to record glucose levels and select units of insulin. Another program using a mouse has been developed for the IBM PC. The third development uses Baysian statistics to help diagnosticians determine the finite differences between forms of dementia and Alzheimer's disease. |