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| **ID\_ART** | **Authors** | **Title** | **Year** | **Abstract** |
| 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; 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| 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; 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| 134 | [No author name available] | 18th Americas Conference on Information Systems 2012, AMCIS 2012, Volume 5 | 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; 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| 135 | [No author name available] | 18th Americas Conference on Information Systems 2012, AMCIS 2012, Volume 2 | 2012 | The proceedings contain 572 papers. The special focus in this conference is on Information Systems. 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| 136 | [No author name available] | 18th Americas Conference on Information Systems 2012, AMCIS 2012, Volume 1 | 2012 | The proceedings contain 572 papers. The special focus in this conference is on Information Systems. 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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. |