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| **ID\_ART** | **Authors** | **Title** | **Year** | **Abstract** |
| 137 | [No author name available] | 18th Americas Conference on Information Systems 2012, AMCIS 2012, Volume 6 | 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. |
| 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. |