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A GROUNDED THEORY OF THE REQUIREMENTS ENGINEERING PROCESS

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ABSTRACT

This paper explores the requirements engineering (RE) process by conducting interviews with RE professionals and applying grounded theory to determine whether a theory of RE emerges. Analysis of the interviews revealed prominent data patterns that were used to model the RE process. The model depicts the RE process as one of establishing a match through discovery and streamlining, and which utilizes corrective measures in order to manage threats to establishing a match. The process involves many entities but is mainly conducted by RE professionals whose experience plays a major role in extracting complete requirements and detecting occasions of mismatch between customer needs and the software requirements, which represent their main concern during the process.

This paper contributes to the empirical analysis of RE by presenting evidence of the RE process in its basic form as carried out in industry, which may form as a building block for further RE research.

KEYWORDS

Requirements engineering, Grounded theory & Empirical software engineering

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An Analysis Of Software Requirements Specification Characteristics In Regulated Environments

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ABSTRACT

Requirements Engineering is the set of activities involved in creation, managing, documenting, and maintaining a requirements' set for a product. Engineering involves the use of systematic repeatability techniques to ensure that the Software Requirements are complete, consistent, valid, and verifiable. Software Requirements Specification is an organized process oriented toward defining, documenting and maintaining requirements throughout the development life cycle. Many authors suggest that requirements should always focus their claims on what the software product needs to address, without specifying how to implement them. However, the detail of Software Requirements is influenced by several factors such as: organizational thinking; existing specification standards; and regulatory needs. This work fits exactly with regulatory needs, where the characteristics of Software Requirements Specification in Regulated Environments such as aeronautics, railways and medical are presented and explored. This paper presents and analysis of software requirements specification characteristics in regulated environments. The four characteristics identified are: consistency (internal and external), unambiguity, verifiability, and traceability. The paper also describes the three standards used in these regulated environments (RTCA DO-178C, IEC 62279 and IEC 62304) and examines their similarities and differences from a Requirements Specification standpoint. The similarities and differences will be used to address a future requirements framework universal process that can be configured to address each standard by the usage of Software Process Lines.

KEYWORDS

Software, Requirements, Certification, Standards

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Understanding The Characteristics, Benefits And Challenges Of Agile It Project Management: A Literature Based Perspective

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ABSTRACT

The objectives of this study was to bring out the understanding of the concept of agile IT project management; what it is and what it is not. It was also aimed at comparing the pros and cons of both agile and traditional methods of IT project management in a typical industry setting; the challenges of going purely agile, and so on. It is purely a review of literature of peer reviewed papers sourced mainly from Google Scholar. It was revealed that agile outweigh the traditional methods in terms of benefits, but its implementation poses a lot of challenges due to a number of issues, paramount among them being organizational culture and empowerment of the project team. This has resulted in a number of industries sticking to the traditional methods despite the overwhelming benefits of agile. In another school of thought, the combination of the two paradigms is the way forward.

KEYWORDS

Project Management, Scrum, Agile, Software, Traditional

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Analysis Of Gamification Elements To Explore Misinformation Sharing Based On U&G Theory: A Software Engineering Perspective

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ABSTRACT

Gamification elements provide a personal drive to urge user experience, emotion, fun, and engagement, positively or negatively. These gamification elements may have been unintentionally employed through the design and implementation process of social media platforms to encourage users' behaviour towards misinformation sharing. This study intends to answer the subsequent question "What are the mostly used gamification elements that could possibly encourage users to share misinformation on social media platforms?". The study empirically investigates the usage of gamification elements and their relation to U&G theory with 286 participants. The results indicated that gamification elements usage scored high with regard to the self-expression perspective (frequency=216), as well as the interaction & collaborations perspective (frequency=198). Whereas, the information seeking perspective scored low (frequency=59) and leaderboard were the least usage (frequency=43). The results may be useful to guide software engineering, developers, GUI specialists to cater for design elements settings and their possible negative effects in social media contexts.

KEYWORDS

Online misinformation, Gamification elements, Software engineering, UGT.

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Introducing Refined Agile Model (Ram) In The Context Of Bangladesh's Software Development Environment Concentrating On The Improvement Of Requirement Engineering Process

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ABSTRACT

The Software Companies of Bangladesh are using different types of agile models for software development. Although theoretically these models are worthy for small and medium projects, in practical case they are not so effective. In doing so, this paper tries to find out why do the agile models not suitable for Bangladesh's Software Companies and how do the problems that the Software Companies face for using the models can be solved. To reveal the answers, this study is based on survey and interview methods. Findings of this paper show that Bangladesh's Software Companies are facing different problems for implementing traditional agile models, such as, Communicational gap, lack of Documentation, unavailability of Prototype, Customer's lack of knowledge in the area of IT and many more. The study shows that if the Requirement Engineering Process is perfectly managed and some rules are modified in the traditional agile models, these problems can be solved. In doing so, a new model has been proposed by the study named Refined Agile Model (RAM) which is claimed to be better for Bangladesh rather than the traditional Agile Models. This model proposes a process flow which consists of Prototyping Cycle, Development Iteration Cycle and Additional Development Iteration Cycle. This new model also ensures a Requirement Engineer at Client End, sufficient documentation, preparation of prototype and presentation of frequent Demos. After ensuring these requirements in several real time projects, it was found that those projects were completed more effectively compared to all other old project experiences. Eventually, the paper concludes by mentioning that the Refined Agile Model (RAM) is the best model in the Bangladeshi software environment.

KEYWORDS

Agile methodology, Requirement engineering process, Software development life cycle.

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A Literature Survey Of Cognitive Complexity Metrics For State chart Diagrams

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ABSTRACT

Statechart diagrams have inherent complexity which keeps increasing every time the diagrams are modified. This complexity poses problems in comprehending statechart diagrams. The study of cognitive complexity has over the years provided valuable information for the design of improved software systems. Researchers have proposed numerous metrics that have been used to measure and therefore control the complexity of software. However, there is inadequate literature related to cognitive complexity metrics that can apply to measure statechart diagrams. In this study, a literature survey of statechart diagrams is conducted to investigate if there are any gaps in the literature. Initially, a description of UML and statechart diagrams is presented, followed by the complexities associated with statechart diagrams and finally an analysis of existing cognitive complexity metrics and metrics related to statechart diagrams. Findings indicate that metrics that employ cognitive weights to measure statechart diagrams are lacking.

KEYWORDS

UML, Statechart diagrams, Software metrics, Cognitive complexity metrics, statechart complexity metrics

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Software Requirement Change Effort Estimation Model Prototype Tool For Software Development Phase

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ABSTRACT

In software development phase software artifacts are not in consistent states such as: some of the class artifacts are fully developed some are half developed, some are major developed, some are minor developed and some are not developed yet. At this stage allowing too many software requirement changes may possibly delay in project delivery and increase development budget of the software. On the other hand rejecting too many changes may increase customer dissatisfaction. Software change effort estimation is one of the most challenging and important activity that helps software project managers in accepting or rejecting changes during software development phase. This paper extends our previous works on developing a software requirement change effort estimation model prototype tool for the software development phase. The significant achievements of the tool are demonstrated through an extensive experimental validation using several case studies. The experimental analysis shows improvement in the estimation accuracy over current change effort estimation models.

KEYWORDS

Software Change Effort Estimation, Software Requirement Changes, Change Impact Analysis and Software Development Phase.

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Developing And Implementing A Web-Based Recycling System For Protecting The Green Environment

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ABSTRACT

Our society suffers a lot from the things that are thrown uselessly; these things may be beneficial to our society. On the other hand, communities suffer a lot of waste especially plastic waste; this has led to environmental pollution and depletion of natural resources. Therefore, this research aims to achieve sustainable development and achieve part of the Saudi Arabia vision 2030. Hence we have distributed a questionnaire to 88 responders, and based on the results of this study, which shows the importance of recycling and its impact on the environment and the extent of community interest in this subject and their supporters, The Let's Recycle site, based on the results of the questionnaire, will improve waste and plastics disposal in an environmentally positive manner. The proposed system was developed using the Unified Modelling Language (UML) and Microsoft Visual Studio2010 programming language.

KEYWORDS

Recycling System, Green Environment, Technology, Software Engineering and Unified Modelling Language.

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Evaluation Of Models To Implement The Iso 9001 Process Approach

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ABSTRACT

The ISO 9001 standard is adopted worldwide by organizations from different sectors. The ISO 9001:2015 guidelines for implementing the process approach require not only the identification of the organization processes, but also the description of their interactions as a network system. Flow charts are a common tool adopted in quality management to show the sequence flow of a process. However, they do not show interrelations between different processes. The first aim of this study is to investigate the utilization of some software engineering models to satisfy the process approach requirement in the ISO 9001:2015 standard. The second aim is to show the implementation of the ISO 9001:2015 process approach and the "Plan-Do- Check-Act" (PDCA) cycle to manage academic programs processes as a case study and to present how the proposed models can be utilized to describe the interactions between processes. Finally, the study used a semi-structured interview methodology to evaluate the proposed models based on three criteria: understandability, modifiability and process improvement.

KEYWORDS

ISO 9001:2015; process approach; Software engineering models; Academic Program Management; semi-structured interview

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Requirements Variability Specification For Data Intensive Software

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ABSTRACT

Nowadays, the use of feature modeling technique, in software requirements specification, increased the variation support in Data Intensive Software Product Lines (DISPLs) requirements modeling. It is considered the easiest and the most efficient way to express commonalities and variability among different products requirements. Several recent works, in DISPLs requirements, handled data variability by different models which are far from real world concepts. This, led to difficulties in analyzing, designing, implementing, and maintaining this variability. However, this work proposes a software requirements specification methodology based on concepts more close to the nature and which are inspired from genetics. This bio-inspiration has carried out important results in DISPLs requirements variability specification with feature modeling, which were not approached by the conventional approaches. The feature model was enriched with features and relations, facilitating the requirements variation management, not yet considered in the current relevant works. The use of genetics-based methodology seems to be promising in data intensive software requirements variability specification.

KEYWORDS

Requirements variability specification, Data intensive software product lines, Bio-inspired modeling, data versions, feature model.

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