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A METRICS SUITE FOR VARIABLE CATEGORIZATION TO SUPPORT PROGRAM INVARIANTS

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ABSTRACT

Invariants are generally implicit. Explicitly stating program invariants, help programmers to identify program properties that must be preserved while modifying the code. Existing dynamic techniques detect invariants which includes both relevant and irrelevant/unused variables and thereby relevant and irrelevant invariants involved in the program. Due to the presence of irrelevant variables and irrelevant invariants, speed and efficiency of techniques are affected. Also, displaying properties about irrelevant variables and irrelevant invariants distracts the user from concentrating on properties of relevant variables. To overcome these deficiencies only relevant variables are considered by ignoring irrelevant variables. Further, relevant variables are categorized as design variables and non-design variables. For this purpose a metrics suite is proposed. These metrics are validated against Weyuker's principles and applied on RFV and JLex open source software. Similarly, relevant invariants are categorized as design invariants, non-design invariants and hybrid invariants. For this purpose a set of rules are proposed. This entire process enormously improves the speed and efficiency of dynamic invariant detection techniques.

KEYWORDS

Program invariants, Design variables, Non-design variables, Metrics, Invariants.

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EA-MDA MODEL TO RESOLVE IS CHARACTERISTIC PROBLEMS IN EDUCATIONAL INSTITUTIONS

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ABSTRACT

Higher education institutions require a proper standard and model that can be implemented to enhance alignment between business strategy and existing information technologies. Developing the required model is a complex task. A combination of the EA, MDA and SOA concepts can be one of the solutions to overcome the complexity of building a specific information technology architecture for higher education institutions. EA allows for a comprehensive understanding of the institution's main business process while defining the information system that will assist in optimizing the business process. EA essentially focuses on strategy and integration. MDA relies on models as its main element and places focuses on efficiency and quality. SOA on the other hand uses services as its principal element and focuses on flexibility and reuse. This paper seeks to formulate an information technology architecture that can provide clear guidelines on inputs and outputs for EA development activities within a given higher education institution. This proposed model specifically emphasises on WIS development in order to ensure that WIS in higher education institutions has a coherent planning, implementation and control process in place consistent with the enterprise's business strategy. The model will then be applied to support WIS development and implementation at University of Lampung (Unila) as the case study.

KEYWORDS

Enterprise Architecture, Web Information system, Higher Education, MDA, SOA.

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THE IMPACT OF TEAM CLIMATE ON FAILURE AND SUCCESS OF SCRUM ADOPTION

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ABSTRACT

Software companies are widely using Agile methods in recent years. Scrum is the most popular Agile method which focuses on project management by defining the required roles, responsibilities, and activities. Despite of its simplicity, many reports address the challenges that threat the software teams when adapting to Scrum. Most of these reports highlight the details of the challenges which most of them roots back to the team climate. On the other hand, it seems that Scrum facilitators originate from the team climate, too. This study aimed to show the impact of software team climate on both failure and success of Scrum adoption. The results show that team climate has positive and negative impact on Scrum adoption process.

KEYWORDS

Agile Methods, Scrum, Scrum Adoption, Team Climate, Scrum Failure, Scrum Challenges

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COMPLEXITY METRICS FOR STATECHART DIAGRAMS

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ABSTRACT

Model-Driven Development and the Model-Driven Architecture paradigm have in the recent past been emphasizing on the importance of good models. In the Object-Oriented paradigm one of the key artefacts are the Statechart diagrams. Statechart diagrams have inherent complexity which keeps increasing every time the diagrams are modified, and this complexity poses problems when it comes to comprehending the diagrams. Statechart diagrams provide a foundation for analysing the dynamic behaviour of systems, and therefore, their quality should be maintained. The aim of this study is to develop and validate metrics for measuring the complexity of UML Statechart diagrams. This study used design science which involved the definition of metrics, development of a metrics tool, and theoretical and empirical validation of the metrics. For the measurement of the cognitive complexity of statechart diagrams, this study proposes three metrics. The defined metrics were further used to calculate the complexity of two sample statechart diagrams and found relevant. Also, theoretical validation of the defined metrics was done using the Weyuker's nine properties and revealed they are mathematically sound. Empirical validations were performed on the metrics and results indicate that all the three metrics are good for the measurement of the cognitive complexity of statecharts.

KEYWORDS

Software Quality, Models, Software quality models, Software components, COTS.

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TECHRISK –A DECISIONAL FRAMEWORK TO MEASURE TECHNICAL DIMENSIONS OF LEGACY APPLICATION FOR REJUVENATION THROUGH REENGINEERING

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ABSTRACT

Competitive business environment wants to modernize existing legacy system in to self-adaptive ones. A variety of options are available to renovate legacy system in to more contemporary system. Recently the phenomenon of "software reengineering ", a methodology to allow old ways of thinking to be replaced with new, fresh approaches to increase productivity and quality of system, has been reported. However evolving legacy system through reengineering is a risky and error –prone task due to extensive changes it requires in the majority of cases. Therefore cost effective reengineering requires identifying and measuring impact of system, managerial and technical risk. We present a technical domain framework TechRisk to identify and measure quality and functional dimensions of legacy system. The objective is to identify those risk factors of technical domain which are critical to the success of reengineering. Proposed decision driven framework TechRisk provide support to identify and eliminate the highest impact risks in the software reengineering process and help to create a successful reengineering solution.

KEYWORDS

TechRisk, Reengineering, Risk engineering, Legacy system, Software quality, Domain.

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MANAGEMENT OF TIME UNCERTAINTY IN AGILE

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ABSTRACT

Agile software development represents a major departure from traditional methods of software engineering. It had huge impact on how software is developed worldwide. Agile software development solutions are targeted at enhancing work at project level. But it may encounter some uncertainties in its working. One of the key measures of the resilience of a project is its ability to reach completion, on time and on budget, regardless of the turbulent and uncertain environment it may operate within. Uncertainty of time is the problem which can lead to other uncertainties too. In uncertainty of time the main issue is that the how much delay will be caused by the uncertain environment and if the project manager comes to know about this delay before, then he can ask for that extra time from customer. So this paper tries to know about that extra time and calculate it.

KEYWORDS

Agile Software, Slack, Optimistic time, Pessimistic time, Probability of Delay.

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INTEGRATING SOFTWARE REPOSITORY MINING: A DECISION SUPPORT CENTERED APPROACH

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ABSTRACT

Mining software repositories (MSR) research had significantly contributed to software engineering. However, MSR results integration across repositories is a recent concern that is getting more attention from researchers each day. Some noticeable research in this sense is related to the approximation between MSR and semantic web, specially linked data approaches which makes it possible to integrate repositories and mined results. Manifested that way, we believe that current research is not fully addressing the practical integration of MSR results, specially, in software engineering due to not considering that these results needs to be integrated to the tools as assistance to activity performers, as a kind of decision making support. Based on this statement this research describes an approach, named Sambasore, which is concerned with MSR results inter-repository integration and also to decision making support processes, based on tool assistance modelling. To show its feasibility we describe the main concepts, some related works and also a proof of concept experiment applied to a software process modelling tool named Spider PM.

KEYWORDS

Network Protocols, Wireless Network, Mobile Network, Virus, Worms & Trojon.

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TRACING REQUIREMENTS AS A PROBLEM OF MACHINE LEARNING

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ABSTRACT

Software requirement engineering and evolution essential to software development process, which defines and elaborates what is to be built in a project. Requirements are mostly written in text and will later evolve to fine-grained and actionable artifacts with details about system configurations, technology stacks, etc. Tracing the evolution of requirements enables stakeholders to determine the origin of each requirement and understand how well the software's design reflects to its requirements. Reckoning requirements traceability is not a trivial task, a machine learning approach is used to classify traceability between various associated requirements. In particular, a 2-learner, ontology-based, pseudo-instances-enhanced approach, where two classifiers are trained to separately exploit two types of features, lexical features and features derived from a hand-built ontology, is investigated for such task. The hand-built ontology is also leveraged to generate pseudo training instances to improve machine learning results. In comparison to a supervised baseline system that uses only lexical features, our approach yields a relative error reduction of 56.0%. Most interestingly, results do not deteriorate when the hand-built ontology is replaced with its automatically constructed counterpart.

KEYWORDS

Requirements Traceability, Software Design, Machine Learning

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A NOVEL EFFORT ESTIMATION MODEL FOR SOFTWARE REQUIREMENT CHANGES DURING SOFTWARE DEVELOPMENT PHASE

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ABSTRACT

Software Requirements Changes is a typical phenomenon in any software development project. Restricting incoming changes might cause user dissatisfaction and allowing too many changes might cause delay in project delivery. Moreover, the acceptance or rejection of the change requests become challenging for software project managers when these changes are occurred in Software Development Phase. Where in Software Development Phase software artifacts are not in consistent state 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. However, software effort estimation and change impact analysis are the two most common techniques which might help software project managers in accepting or rejecting change requests during Software Development Phase. The aim of this research is to develop a new software change effort estimation model which helps software project manager in estimating the effort for software Requirement Changes during Software Development Phase. Thus, this research has analyzed the existing effort estimation models and change impact analysis techniques for Softwrae Development Phase from the literature and proposed a new software change effort estimation model by combining change impact analysis technique with effort estimation model. Later, the new proposed model has been evaluated by selecting four small size software projects as case selections in applying experimental approch. The experiment results show that the overall Mean Magnitude Relative Error value produced by the new proposed model is under 25%. Hence it is concluded that the new proposed model is applicable in estimating the amount of effort for requirement changes during SDP.

KEYWORDS

Software Change Effort Estimation, Software Requirement Changes, Function Point Analysis, Constructive Cost Model and Software Development Phase.

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I.T. PROJECT SUCCESS: PRACTICAL FRAMEWORKS BASED ON KEY PROJECT CONTROL VARIABLES

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ABSTRACT

The objectives of this study were to research into the interdependencies IT project control variables, and also come out with frameworks to help IT project managers understand how to effectively control these variables to ensure the success of IT projects. The study employed six control variables: Cost, Time (Schedule), Scope, Quality, Risk, and Benefits. A qualitative approach was adopted, where selected IT program and project managers of the Telecom industry in Ghana were interviewed individually and in a group based on a set of questions. The findings, espoused in the frameworks, reiterated the theory of the dependence of one control variable on the other, and the fact that varying one affects the others positively or negatively in relation to IT project success, as is the case for the iron triangle. Again, key activities of the control variables necessary to ensure IT project success were discovered.

KEYWORDS

Information, Technology, Control, Variables, Projects.

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