

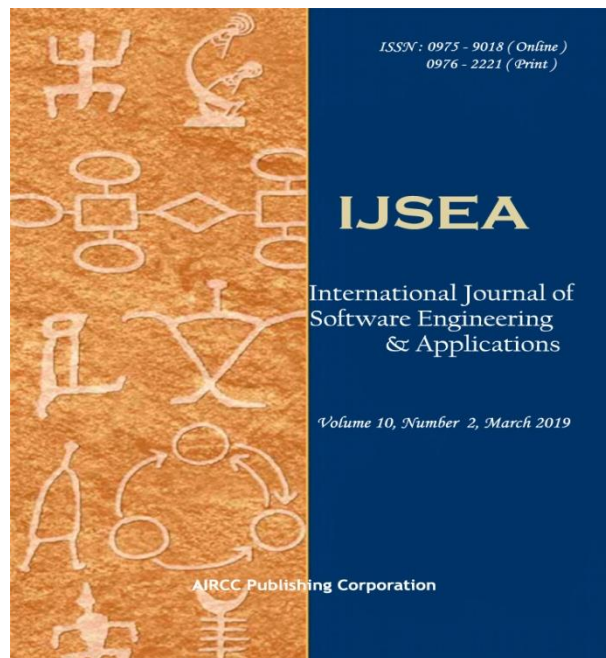
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EVALUATION OF MODELS TO IMPLEMENT THE ISO 9001 PROCESS APPROACH

Nuha El-Khalili

Department of Software Engineering, University of Petra, Amman, Jordan

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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MOBILE APPLICATION DEVELOPMENT METHODOLOGIES ADOPTED IN OMANI MARKET: A COMPARATIVE STUDY

Seiren Al-Ratrout¹, Omar Husain Tarawneh¹, Moath Husni Altarawneh² and Mejhem Yosef Altarawneh²

¹Dept. of Information Technology, Al zahra College for Women, Oman

²Dept. of Information Technology, The World Islamic Sciences and Education University, Jordan.

ABSTRACT

Popularity of mobile phones and huge growing for mobile applications make developers in need for flexible software process, which can deal with many challenges facing the mobile app development process. These challenges include: volatility of requirements, strong user involvement, development time tightness, process simplicity, and production of valuable software in low cost. This research study investigates the current mobile app development approaches adopted in Omani market and provides a comparison between existing methods. The results reveal that Agile approach is the most popular model for mobile software engineering in Omani, as it naturally fits most of the applications required in this market. The study also discusses various agile process models such as Scrum, XP, Lean, DSDM, and others. It is concluded that XP model is the most preferable model used by Omani developers due to its dynamic and adaptive nature for different mobile app processes. The study provides also a series of recommendations for mobile app developers which should help in selecting the most appropriate method that suits the targeted market sector.

KEYWORDS

Development approach, Mobile application, Agile, XP, survey, Oman..

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REQUIREMENTS VARIABILITY SPECIFICATION FOR DATA INTENSIVE SOFTWARE

Eman Muslah and Said Ghoul

Faculty of Information Technology, Research Laboratory on Bio-inspired Software
Engineering, Philadelphia University, Amman, Jordan

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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CONVERTING A SUBSET OF LTL FORMULA TO BUCHI AUTOMATA

Bilal Kanso And Ali Kansou

Department Of Computer Science, Lebanese University, Beirut

ABSTRACT

The translation of LTL formula into equivalent Büchi automata plays an important role in many algorithms for LTL model checking, which consist in obtaining a Büchi automaton that is equivalent to the software system specification and another one that is equivalent to the negation of the property. The intersection of the two Büchi automata is empty if the model satisfies the property.

Generating the Büchi automaton corresponding to an LTL formula may, in the worst case, be exponential in the size of the formula, making the model checking effort exponential in the size of the original formula. There is no polynomial solution for checking emptiness of the intersection. That comes from the translation step of LTL formula into finite state models. This makes verification methods hard or even impossible to be implemented in practice. In this paper, we propose a subset of LTL formula which can be converted to Büchi automata whose the size is polynomial.

KEYWORDS

Linear Temporal Logic, Büchi automata, Model checking, Compositional modelling.

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Bio-Inspired Requirements Variability Modeling Withuse Case

Esraa Abdel-Ghani and Said Ghoul

Faculty of Information Technology, Research Laboratory on Bio-inspired Software
Engineering, Philadelphia University, Amman, Jordan

ABSTRACT

Background. Feature Model (FM) is the most important technique used to manage the variability through products in Software Product Lines (SPLs). Often, the SPLs requirements variability is by using variable use case model which is a real challenge in actual approaches: large gap between their concepts and those of real world leading to bad quality, poor supporting FM, and the variability does not cover all requirements modeling levels.

Aims. This paper proposes a bio-inspired use case variability modeling methodology dealing with the above shortages.

Method. The methodology is carried out through variable business domain use case meta modeling, variable applications family use case meta modeling, and variable specific application use case generating.

Results. This methodology has led to integrated solutions to the above challenges: it decreases the gap between computing concepts and real world ones. It supports use case variability modeling by introducing versions and revisions features and related relations. The variability is supported at three meta levels covering business domain, applications family, and specific application requirements.

Conclusion. A comparative evaluation with the closest recent works, upon some meaningful criteria in the domain, shows the conceptual and practical great value of the proposed methodology and leads to promising research perspectives

KEYWORDS

Software requirements variability, bio-inspired variability modeling, use case variability, feature model, software requirements versions, software requirements revisions.

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Size Metrics For Service-Oriented Architecture

Samson Wanjala Munialo¹, Geoffrey Muchiri Muketha² and Kelvin Kabeti Omieno³

¹Department of Information Technology, Meru University of Science and technology,
Kenya

²Department of Information Technology, Murang'a University, Kenya

³Department of Information Technology and Informatics, Kaimosi Friends University
College

ABSTRACT

Determining the size, effort and cost of Service-oriented Architecture (SOA) systems is important to facilitate project planning and eventually successful implementation of a software project. SOA approach is one of the recent software architectures that allow integration of applications within and outside the organization regardless of heterogeneous technology over a distributed network. A number of research studies have been done to measure SOA size. However, these studies are not based on software metrics rendering them to be ineffective in their estimation. This study defined a set of SOA size metrics based on Unified Modelling Language (UML). The study employed Briand's theoretical validation to test the validity of the designed SOA size metrics. Findings from this study will provide metrics to measure SOA size more accurately and form a basis for future software engineering researchers to develop more effective and more accurate size metrics and effort estimation methods.

KEYWORDS

Service-oriented Architecture, Web services, software metrics, Unified Modelling Language, effort estimation.

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AUTHORS

Samson Wanjala Munialo is an assistant lecturer in Meru University of Science and Technology, Kenya. He has BED. Degree from Catholic University of Eastern Africa, Kenya MSc Information Technology Management from University of Sunderland, UK and currently he is pursuing his PHD Information Technology at Masinde Muliro University of Science and Technology. His area of research includes software metrics, software effort estimation and IT project management.



Geoffrey Muchiri Muketha received the BSc degree in Information Science from Moi University in 1995, the MSc degree in Computer Science from Periyar University in 2004, and the PhD degree in Software Engineering from Universiti Putra Malaysia in 2011. He is Associate Professor and Dean of the School of Computing and Information Technology at Murang'a University of Technology, where he has taught and supervised both undergraduate and postgraduate students for many years. His research interests include software and business process metrics, software quality, verification and validation, empirical methods in software engineering, and component-based software engineering. He is a member of the International Association of Engineers (IAENG).



Dr. Kelvin Omieno is a Senior Lecturer in the Department of Information Technology and Informatics, School of Computing and Information Technology, Kaimosi Friends University College, Kenya. He holds a PhD in Information Systems of Jaramogi University of Science and Technology, MSc in Information Technology and BSc in Computer Science. His research interests are in performance evaluation, System optimization, security and parallel and distributed system

