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BENCHMARKING MACHINE LEARNING TECHNIQUES FOR SOFTWARE DEFECT DETECTION

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ABSTRACT

Machine Learning approaches are good in solving problems that have less information. In most cases, the software domain problems characterize as a process of learning that depend on the various circumstances and changes accordingly. A predictive model is constructed by using machine learning approaches and classified them into defective and non-defective modules. Machine learning techniques help developers to retrieve useful information after the classification and enable them to analyse data from different perspectives. Machine learning techniques are proven to be useful in terms of software bug prediction. This study used public available data sets of software modules and provides comparative performance analysis of different machine learning techniques for software bug prediction. Results showed most of the machine learning methods performed well on software bug datasets.

KEYWORDS

Machine Learning Methods, Software Bug Detection, Software Analytics, Predictive Analytics

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How do Agile Software Startups deal with uncertainties by Covid-19 pandemic?

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ABSTRACT

The dissipation of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has already taken on pandemic proportions, affecting over 100 countries in a couple of weeks. The evolution of the disease and its economic impact is highly uncertain, which brings challenges for newly created software companies. Software startups are companies that create innovative software products and services in a dynamic and fast-growing market. Agile Software Methods aims to enable startups in responding to uncertainty caused by Covid-19. This paper investigates the impact of Covid-19 in a real software startup context to understand how they have reacted against uncertainties caused by Covid-19. As a research methodology, action research within Di2Win, a Brazilian software startup, has been applied. The study was carried out throughout six sprints, during the quarantine. Practices employed to mitigate threats while simultaneously allowing teams to remain open to opportunities and challenges are detailed. This paper shares lessons learned that could help agile software startups improve their way of work in an uncertain environment caused by the Covid-19 pandemic.

KEYWORDS

Agile software development, Software startups, Uncertainties, Covid-19, Empirical software engineering

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Design and Develop of En E-Learning Content Based on Multimedia Game

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ABSTRACT

This paper aims to develop e-learning contents for multimedia technology lesson with the purpose to assist students in learning the subject. The multimedia game was used to make the lesson more interesting and at the same time to provide students with real example of how multimedia works. The effectiveness of the developed contents was studied by comparing results of the same test from students taking conventional class-room lectures and those using the developed e-learning contents. We found that the latter performed better at the statistical significance level of 0.05.

KEYWORDS

Index Term— e-learning; content; courseware; Game; multimedia

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FLEXIBILITY: A KEY FACTOR TO TESTABILITY

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ABSTRACT

Testability is an important software quality factor that is ineffective if it is not available at an early stage in the development life-cycle. It becomes more essential in the case of object oriented design. Flexibility is an important key factor to testability analysis and measurement for delivering high class testable and maintainable software. Flexibility is a criterion of crucial significance to software developers, designers and the quality controllers. It constantly guides and supports to avoid wastage of resources as well as enable the designers for continuous improvement in the development process. Flexibility is concerned with building high quality and reliable software within the constraints of cost and time. It greatly influences cost, quality and reliability at software evolution process. Despite the fact flexibility is vital and highly significant aspect for software development processes, it is poorly managed. This paper focuses the need and importance of flexibility early at design phase. A model has been proposed for flexibility measurement of object oriented design by establishing multiple linear regression. Finally the proposed model has been validated using experimental tryout.

KEYWORDS

Flexibility Measurement, Testability Estimation, Software Testability, Software Quality, Design Phase, Object Oriented Design.

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Problem Based Learning (PBL]: Analysis of Continuous Stirred Tank Chemical Reactors with a Process Control Approach

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ABSTRACT

This work is focused on a project that integrates the curriculum such as thermodynamic, chemical reactor engineering, linear algebra, differential equations and computer programming. The purpose is that students implement the most knowledge and tools to analyse the stirred tank chemical reactor as a simple dynamic system. When the students finished this practice they should have learned about analysis of dynamic system through bifurcation analysis, hysteresis phenomena, find equilibrium points, stability type, and phase portrait. Once the steps were accomplished, we concluded that the purpose was satisfactorily reached with an increment in creative ability. The student showed a bigger interesting in this practice, since they worked in group. The most important fact is that the percentage of failure among students was 10%. Finally, using alternative teaching-learning process improves the Mexican system education.

KEYWORDS

Bifurcation, Equilibrium Point, Hysteresis, PBL, and Phase Portrait

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DATA VIRTUALIZATION FOR DECISION MAKING IN BIG DATA

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ABSTRACT

Data analytics and Business Intelligence (BI) are essential components of decision support technologies that gather and analyze data for faster and better strategic and operational decision making in an organization. Data analytics emphasizes on algorithms to control the relationship between data offering insights. The major difference between BI and analytics is that analytics has predictive competence which helps in making future predictions whereas Business Intelligence helps in informed decision-making built on the analysis of past data. Business Intelligence solutions are among the most valued data management tools whose main objective is to enable interactive access to real-time data, manipulation of data and provide business organizations with appropriate analysis. Business Intelligence solutions leverage software and services to collect and transform raw data into useful information that enable more informed and quality business decisions regarding customers, market competitors, internal operations and so on. Data needs to be integrated from disparate sources in order to derive valuable insights. Extract-Transform-Load (ETL), which are traditionally employed by organizations help in extracting data from different sources, transforming and aggregating and finally loading large volume of data into warehouses. Recently Data virtualization has been used to speed up the data integration process. Data virtualization and ETL often serve unique and complementary purposes in performing complex, multi-pass data transformation and cleansing operations, and bulk loading the data into a target data store. In this paper we provide an overview of Data virtualization technique used for Data analytics and BI.

KEYWORDS

Data Analytics, Business Intelligence, Big data, Data Virtualization, ETL and Data Integration

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STRATEGIES TO REDUCE REWORK IN SOFTWARE DEVELOPMENT ON AN ORGANISATION IN MAURITIUS

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ABSTRACT

Rework is a known vicious circle in software development since it plays a central role in the generation of delays, extra costs and diverse risks introduced after software delivery. It eventually triggers a negative impact on the quality of the software developed. In order to cater the rework issue, this paper goes in depth with the notion of rework in software development as it occurs in practice by analysing a development process on an organisation in Mauritius where rework is a major issue. Meticulous strategies to reduce rework are then analysed and discussed. The paper ultimately leads to the recommendation of the best strategy that is software configuration management to reduce the rework problem in software development

KEYWORDS

Rework, Software development, Software Quality, Software Configuration Management

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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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CONTRIBUTORS PREFERENCE IN OPEN SOURCE SOFTWARE USABILITY: AN EMPIRICAL STUDY

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ABSTRACT

The fact that the number of users of open source software (OSS) is practically un-limited and that ultimately the software quality is determined by end user's experience, makes the usability an even more critical quality attribute than it is for proprietary software. With the sharp increase in use of open source projects by both individuals and organizations, the level of usability and related issues must be addressed more seriously. The research model of this empirical investigation studies and establishes the relationship between the key usability factors from contributors' perspective and OSS usability. A data set of 78 OSS contributors that includes architects, designers, developers, testers and users from 22 open source projects of varied size has been used to study the research model. The results of this study provide empirical evidence by indicating that the highlighted key factors play a significant role in improving OSS usability.

KEYWORDS

Open Source Software (OSS), Usability, Users' feedback, Usability assessment

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BEST PRACTICES FOR IMPROVING USER INTERFACE DESIGN

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ABSTRACT

A rich and effective computational system must have a friendly user interface with appealing usability features that provides excellent user experience. In order to develop interactive systems with the best user experience, an innovative iterative approach to user interface engineering is required because it is one of the most challenging areas given the diversity of knowledge, ideas, skills and creativity needed for building smart interfaces in order to succeed in today's rapidly paced and tough, competitive marketplace. Many modeling aspects including analytical, intuitive, artistic, technical, graphical, mathematical, psychological and programming models need to be considered in the development process of an effective user interface. This research examines some of the past practices and recommends a set of guidelines for designing effective user interfaces. It also demonstrates how UML use case diagrams can be enhanced by relating user interface elements to use cases.

KEYWORDS

Design principles, Unified Modeling Language (UML), use case diagram, user experience.

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