

Designing Dependable Business Intelligence Solutions Using Agile Web Services Mining Architectures

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Abstract. Next generation Business Intelligence web application development uses integrated and intensified technologies like Web 2.0 architectures, Agile Modeling, and Service-orientation (or Web Services). Applying Web Services Mining strategies to Agile Modeled Web architectures will eventually provide valuable insights to Business Intelligence users, Operational Business Decision makers, and more importantly Web application architects. These insights are important in maintenance of these developed applications and also in their scalability purposes. Our research focuses on applying Mining for Software (or Web) Engineering for designing dependable solutions for these integrated technologies, which will eventually improve the Web Engineering process in terms of architecture, its security, requirements etc. In this paper, we discuss about our Mining approach for Business Intelligence to improve insights of Web Engineering applications. We validate our approach with a suitable exemplar.

Keywords: Web Mining, Business Intelligence, Agile Modeling, Web 2.0 architectures, Web Services Mining.

1 Introduction to Next Generation Business Intelligence Web Applications

Now a days, most of the Business Intelligence applications are developed as Web based applications with little Web Engineering principles used in developing them. Next generation Business Intelligence applications development are using an integration of specific technologies like Web 2.0 architectures, Agile modeling, and Service-orientation (or Web Services).[1] Our research is based on the premise that, Applying Web Services Mining approaches to Agile Modeled Web 2.0 architectures will eventually provide valuable insights to Business Intelligence users, Decision makers, and

importantly Web application architects. Our research focuses on designing technical solutions for these integrated technologies, which will eventually improve the Web Engineering process in terms of architectures security requirements. When all these different technologies are integrated together for the development of Business Intelligence web based applications, it creates many research challenges pertaining to insights of decision making regarding architectures of the developed application, its inherent security of that architecture or its requirements etc. These insights are required for maintenance of this application or in its future scalability issues. Moreover, Business Intelligence has to be shifted from enhancing the data warehousing and data mining techniques such as OLAP (Online Analytical Processing), OLAM (Online Analytical Mining), multi dimensional modeling, design methodologies, optimization, indexing and clustering techniques, to how to securely protect these knowledge capitals from being tampered with by unauthorized use. [9]

Agile Modeling. Agile modeling embraces change as a part of the software development process.[2] In most approaches, change is usually considered a bad word. Agile developers work in pairs, create many prototypes of their solutions, and incorporate user's feedback throughout the entire process. Agile software development has encouraged developers to tailor their methods to meet their specific needs. Agile modeling using Unified Modeling Language is geared towards small development projects with tight deadlines, like building Web front ends.

Web 2.0 Architectures. The relationship between Web 2.0 design patterns, models, and architecture artifacts are based on Web 2.0 technologies like search engine optimization, web services, wikis etc. to name a few for our consideration. Models guides Reference architectures and finally specialized architectures refines reference architectures, accounts for domain specific requirements, and also enables solution patterns. [3]

Web Services Architectures. Service Oriented Architectures (and their implementations Web Services) uses a series of independent services that can communicate business logic with one another. These services can be used independently or together to form business platforms that come together to form business platforms that come together and provides value.

2 Mining Approaches for These Business Intelligence Applications

Mining Agile Architectures. Agile software development methods are used to build secure systems. There are different methods defined in agile development as extreme programming (XP), scrum, feature driven development (FDD), test driven development (TDD), etc. Agile processing includes the phases as agile analysis, agile design and agile testing. These phases are defined in layers of Model Driven Architecture (MDA) to provide security at the modeling level which ensures that "security at the system architecture stage will improve the requirements for that system".

Mining Web 2.0 architectures. Traditionally, to mine web 2.0 architectures in general, we use the methodology for mining patterns from examples, hence capture the knowledge, and then construct models and architecture based on the commonalities in

the patterns. Design patterns are micro architectures that have proved to be reliable, easy to implement and robust. Three types of Design Patterns i.e. Creational Design Patterns, Structural Design Patterns and Behavioral Design Patterns. Design Patterns are described by listing the intents, motivations, applicability, structure (UML diagrams), participants, collaborations, consequences, implementation details are known as related patterns. The structure of the patterns is represented in Graphs or Matrices (Abstract Class Matrix, Generalization Matrix, Association Matrix etc). The pattern descriptions are easy to modify to suit the needs of users by using Design Pattern Markup Language. Reality Mining is a mashup pattern in terms of MIT which states that, it is the collection of machine-sensed environmental data pertaining to human social behavior.

Web Services Mining Architectures. Web Service mining is a search process aiming at the discovery of interesting and useful compositions of existing web services. Recall is the fraction of relevant services in the collection that were returned by the system and precision is the fraction of the returned results that are relevant. The Business Process Execution Language (BPEL) deals with Web service composition and attempts to solve the problem of composing a number of web services into a business process. In Business Process Query, there is a need to interact with web services. Web services interaction mining provides three levels of abstraction that represent three complementary web services. The levels are Web service Operations level, Web service Interactions level and web service work flow level.

Designing Dependable Solutions for Business Intelligence. Software Engineering problems must be treated by both theoretical and empirical methodologies. The former is characterized by abstract, inductive, mathematics-based, and formal-inference centered studies; while the latter is characterized by concrete, deductive, data-based, and experimental-validation-centered studies. We propose to build a qualitative or descriptive model along with appropriate notation or tool for providing specific solutions with validations of a case study. Dependability attributes can be seen from different perspectives, depending on the application. Eventually dependability is intended to prevent errors from becoming failures.

Insights of Web Engineered Business Intelligence Applications. General Business objectives and their functionality for Rich Security Model that users can administer are: Provide more effective mechanisms to move work between business entities, such as self-service for customers or partners or enabling outsourcing by providing business partners a collaborative environment or business data on an extranet. The valuable insights from this approach include ease of use, scalability, disconnected from processes for these developed applications, improved customer satisfaction, increased business agility, reduced time to market, increased revenue and operational efficiency and improvements.

Implementations and Validations. Software Engineering for Web (Web Engineering) covers the definition of processes, techniques and models suitable for its environment to guarantee quality of results. An important design artifact in any software development project is the Software Architecture. Software Architecture's important part is the set of architectural design rules. A primary goal of the architecture is to capture the architecture design decisions. An important part of these design decisions

consists of architectural design rules. In an MDA (Model-Driven Architecture) context, the design of the system architecture is captured in the models of the system. MDA is known to be layered approach for modeling the architectural design rules and uses design patterns to improve the quality of software system. And to include the security to the software system, security patterns are introduced that offer security at the architectural level. Moreover, agile software development methods are used to build secure systems. We had implemented various case studies like Web Services Mining Dashboard application CRM application with spatial capabilities as primary work. Later on we worked on a case study of Design of Agile Modeled Web Services design for secure stock exchange, with focus on mined security architectures insights. For details of these implementations, please refer to the website <http://sites.google.com/site/upendramgitcse>

3 Conclusions

In this paper we discussed mining approach for Business Intelligence to improve insights of Web Engineering applications. Future work includes developing a formal security plan for every connected computer. Performing security inspections of requirements and specifications. Utilizing high-security programming language such as “E”.

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