MCS

Requirements Engineering for Web applications

CS-477 Web Engineering

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MCS

Outline

1 Introduction

2 RE methods adaptation

Requirements Engineering

- Requirements play an important role in system development
- RE deals with the principles, methods, and tools to identify, describe, validate and manage requirements in system development (Grunbacher, 2006).
- RE for standard applications need to be adapted for Web applications
- This can not be done unless various aspects, attributes and characteristics of Web applications are not understood.

RE Fundamentals I

Definition

"Requirements engineering is the branch of software engineering concerned with the real-world goals for, functions of, and constraints on software systems. It is also concerned with the relationship of these factors to precise specifications of software behavior, and to their evolution over time and across software families."- (Zave, 1997).

Sources of requirements

- The objectives and expectations of stakeholders provide initial requirements
- Stakeholders have direct/indirect influence on the requirements of the proposed system

RE Fundamentals II

- Important stakeholders are customers, users, and developers.
- Diversity in stakeholders' objectives is the cause of diversity and conflict in the software requirements
- A Requirement describes a property to be met or a service to be provided by a system
- A requirement document defines all requirements and constraints agreed between the contractor and the customer
- RE an iterative process i.e., getting complete requirements at the beginning of the development not realistic

RE Activites I

RE consists of different activities:

- Requirement elicitation and negotiation
- Requirement documentation
- requirement verification and validation
- requirements management

Requirement elicitation and negotiation

- Requirements are gathered by frequent interaction with various stakeholders
- Negotiation is an important activity for creating consensus among the stakeholders on requirements
- Communications and knowledge exchange is important for RE

RE Activites II

- Different tools can be used i.e., scenario-based methods, multicriteria decision processes, interviews or document analysis

Requirement documentation

- A requirements document contains refined and detailed description of agreed requirements
- The degree of detail and formality of the document depends on the nature of the project
- Relevant techniques: Informal descriptions (user stories) and semi-formal descriptions (use cases)

Requirements verification and validation

- Validate requirements
  - Did we specify the right thing?

RE Activites III

- Verify requirements
  - Did we specify things correctly?
- Traditional methods of v&v i.e., reviews, inspections, and prototyping
- For Web applications we can use online feedback

Requirement management

- Change an important part of requirements
- RE management tools support both addition of new requirements and changes to existing requirements
- Tools can help to manage the impact of changes by the analysis of inter dependencies of requirements

RE methods adaptation

- Existing RE methods need to be adapted to fit the specifics needs of Web application development
- Specifically, following three aspects of RE need to be considered:
  - Requirement types
  - Methods to present, describe and document requirements (notations)
  - RE tools

Requirement types I

- Two major types of requirements are functional and non-functional requirements
- Functional requirements define system capabilities and services
- Non-functional requirements defined the properties of capabilities and desired level of services.
- Relevant requirement types of Web applications are:
  - Functional requirements
  - Content requirements
  - Quality requirements
  - System environment requirements
  - User interface requirements
  - Evolution requirements

Functional requirements

Requirement types II

- Functional requirements specify the capabilities and services a system is supposed to offer (e.g., a user can select different payment options at the time of checkout)
- Functional requirements can be defined by using use case scenarios and formatted specifications

Content requirements

- Content requirements specify the contents a Web application should present
- Contents can be presented in the form of a glossary

Quality requirements

- Quality requirements define the level of quality of services and capabilities
- Also define important system properties

Requirement types III

- Software quality can be described by six quality characteristics:
  - Functionality
  - Reliability
  - Usability
  - Efficiency
  - Maintainability
  - Portability

System environment requirements

- How a Web application is integrated into target environment
- interaction of Web application with the external components, i.e., legacy systems, COTS components and special hardware

User Interface requirements

Requirement types IV

- these requirements define how a Web application interacts with different classes of users
- Define the navigational and content aspects
- Create scenarios with the involvement of users to present how users will perform various tasks

Notations I

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Requirement types

Notations

Tools

Different notations are available to describe, define and present requirements

Relevant notations are discussed below:

Stories

Stories are informal descriptions of desired properties

These are useful in developing a common understanding between the customer and developers

Itemized requirements

These are simple specifications in natural language

each requirement has a unique identifier

Formatted specifications

Notations II

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Tools

Formatted specification use a well defined syntax

Natal-language descriptions can be used within this frame

Examples:

UML use case descriptions

Formal specifications

Formal specifications are written in a language that uses formally defined syntax and semantics

Examples include "Z".

Requirement Elicitation tools

Requirement Elicitation tools

- Easy winwin

Requirements validation tools

- Online feedback systems

Requirements management tools

- Can store requirements in a database

Self Study
Section 2.3: RE Specifics in Web Engineering
Section 2.4: Principles for RE of Web Applications