

An Integrated Approach Towards Software Requirement Elucidation Using Mindmap

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ABSTRACT

In software development process it is difficult to understand requirement specifications which end up with scope creep, expensive rework, delayed releases, or even abandonment. Exploring the user requirement through mind map is more useful for the software developers for understanding user requirement more clearly and accurately than the text document. In order to resolve this, proposed research work aims to elucidate the software requirements from text document using mind maps.

1.0 INTRODUCTION

Requirements gathering or in an agile context, gathering user stories is always a challenging phase in software development. The term requirements gathering is used in books and research to raise the fact that good requirements cannot just be collected from the user, as would be indicated by the name elicitation. Requirements elicitation

practices include interviews, questionnaires, user observation, workshops, brain storming, use cases, role playing and prototyping. Before requirements can be analyzed, modeled, or specified they must be gathered through an elicitation process. Requirements elicitation is a part of the requirements engineering process, usually followed by analysis and specification of the requirements. Commonly used elicitation processes are the stakeholder meetings or interviews. For example, an important first meeting could be between software engineers and customers where they discuss their perspective of the requirements.

This research uses mind maps that focus on those factors when exploring user wishes, then it takes the concepts one step further and models the results with UML. Also it proposes a novel approach for elucidating software requirements using mind map. It is an intelligent tool for exploring user requirements before it is

written into a form of requirements. The highlight of this research work is the easier understanding of the user requirements in the form of UML diagram.

The proposed work aims to focus on requirement factors when exploring user wishes, which takes this concept one step further and models the results with UML. This project consists of four phases. In the first phase a text document is given as an input and the NLP processor identifies the verbs and nouns then compared with the predefined mind map. In the second phase, if the verbs and nouns match with the predefined mind map then it is converted into domain specific mind map. In third phase, the mind map will be extracted. In the fourth phase, the extracted mind map will be converted into UML diagram.

The advantages of this research work are as follows

- To note everything down it requires a lot of time and energy. In a mind map user only need to note 10% of normal amount of text, although user will get a better overview and can be more detailed.
- With a mind map user can easily do project management.

- The next level of easy understanding of the text would be the uml representation.

A **mind map** is a diagram used to outline the information visually. A mind map is often created around a single word or text, placed in the center, to which associated ideas, words and concepts are added. Major categories radiate from a central node, and lesser categories are sub-branches of larger branches. Categories can represent words, ideas, tasks, or other items related to a central key word or idea.

Some of the properties of mind maps that make them so effective include

- Keyword Orientation--The structural elements of mind maps are not sentences but keywords.
- Loose Syntax and Semantics-- Association is the only relationship between linked keywords.
- Fast and Easy-to-use--You can use mind maps as real-time shorthand minutes for meetings, interviews, and other conversational sessions.
- High-Level View--You can overview a whole mind map in a glance.
- Evocative--A mind map evokes the context of the scene in which it was created.
- Semi structured--A mind map can have a template structure but it can

grow branches on demand to capture real-time verbal communication in semi structured interview.

In the existing system, documenting the user requirements is always challenging phase in software development. There are no standard icons or symbols defined and the only understanding is that the primary factors that make this activity effective are communication and facilitation skills.

This section 1.0 focuses the introduction of the proposed work. Section 2.0 describes on literature survey. Section 3.0 focuses the proposed system for proposed system for elucidating user requirements using mind map. Section 4.0 focuses on the result of the proposed system.

2.0 LITERATURE SURVEY

This section focus on literature survey of the project.

James E. Tomayko, "Engineering of unstable requirements using agile methods", [1], discussed the experiences at suncrop highlight some of the issues faced when using agile methods both for large System implementations and in large organization.

Johan peters, "Agile Security Requirements engineering"[2], proposed to extend agile practices to deal with security

in an informal, communicative and assurance driven spirit. Here the abuser stories are a non-invasive extension to agile practices providing security requirements traceability.

J.A Cozens, "Implementing an enterprise system at Suncorp using agile development", [3], describes sucrose's experiences and lessons learned implementing a core system replacement using an agile developing method.

Kenji Hiranabe, "Exploring User Requirements through Mind Mapping", [4] Introduced a new methods of exploring user requirements by "user wish mind map". mind mapping offer the interviewer a semi-structured format of inquiry that supports asking important questions as well as accommodating unexpected topics. It also helps eliminate communication errors and captures a soft structure of user wishes at a high-level view.

In Julio Ariel Hurt ado Alegria and Mar Cecilia Bastarrica, "Implementing CMMI using a Combination of Agile Methods ", [5], explores the possibility for software companies of getting a CMMI certification of their processes by applying agile practices. The major disadvantage in the existing system is that it requires more time and energy to note everything in a paper. Moreover it is difficult to go through every page in the text document.

3.0 Proposed system for Elucidating

user requirements using mind map

The research work can be studied in detail by elaborating the process part of the project architecture. The level wise flow diagrams are given below to easily grasp the flow of the project through step by step in detail.

The conceptual design of the project is presented in Figure 1. The conceptual diagram shows how the system works, the components involved in the system and the integration of components that works simultaneously.

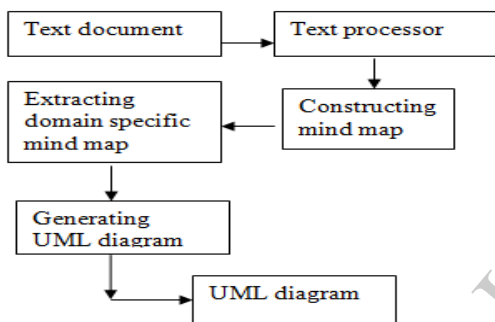


Figure 1 Conceptual Diagram for Elucidation using Mindmap

3.1 DETAILED DESIGN

The design explains various models of the project, overall architecture of the project, workflows and dataflow of the project etc. Detailed design will explain the software components in detail. This will help in the implementation of the system. Moreover, this will guide the further changes in the system to satisfy the future requirements. Based on the requirement

specification, the proposed system can be visualized to be consisting of the following functionality distinct modules. The entire application is divided into three modules.

This research work is divided into following parts such as

- Text Processor
- Mind Map Construction
- Extractor
- UML-mind mapper

The user requirement specification is represented in the form of text document is given as an input. The text document is read the nouns and verbs present in the text document are analyzed and tokenized by using NLP. The identified verbs and nouns are compared with the predefined mind map. If it matches with the predefined mind map, then it will be converted into domain specific mind map. The constructed mind map will be extracted as a domain specific mind map. Extracted mind map is converted into UML diagram.

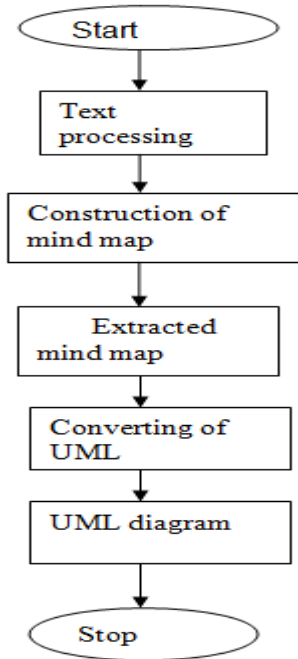


Figure 2 Flow chart for UML- mind mapper

4.0 RESULT

The result of the research is the domain specific mind map. Figure 3 shows the mind map representation of the user specified requirement. Figure4 shows the hierarchical representation of mind map specification.

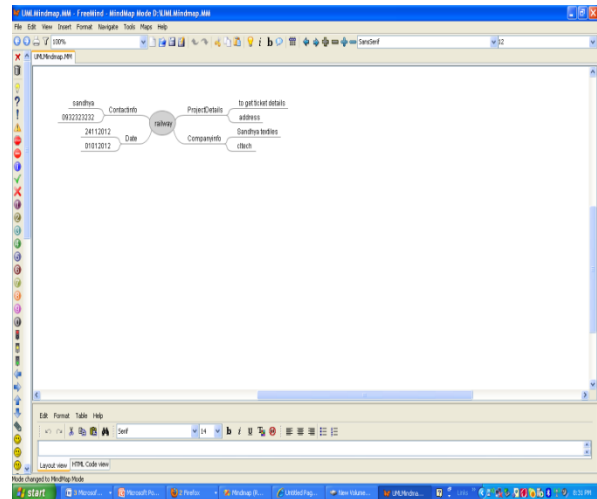


Figure 3 Screenshot for Mindmap

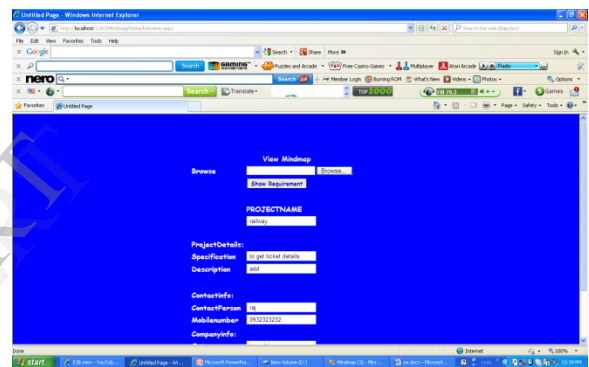


Figure 4 screenshot for hierarchical order

5.0 CONCLUSION AND FUTURE ENHANCEMENTS

The research paper “An integrated approach towards software requirement elucidation using mind map” has been partially implemented. This research work includes text processing, mind map construction, extractor and UML mind mapper phase. These phases are used to present knowledge and concepts in a visual form. The status of this research work is completed with the mind map construction

module, where the given text is converted into mind map. Going forward the mind map will be converted into UML diagram. Future researches should consider factors that lead users to use the mind map to construct the UML diagram.

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