A Framework for Visualizing Software Development Project by Layered Mapping based on the Deliverables

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Abstract

In software development, many software problems still exist. One of the main cause of these problems is the fact that progress management of software development project is difficult for someone to do because of software invisibility. Software cannot capture construction progress, unlike hardware. In this research, we propose a framework to visualize the project progress, focusing on deliverables. Deliverables directly represent progress to the goal of the project, and it is easy to understand for all project members. We aim for the realization of an analysis environment that has high visibility to precisely investigate the whole software development project and its progress. Our approach is hierarchical visualization by three layers consist of a concept, a model and a product layer on time-line.

1. Introduction

In the ever-growing current information driven society, the demand for software development is increasing year by year. However many software problems such as system down at banks or failures of crucial airport systems, still remain. One of the main reason for these problems is that collaborative work is difficult because the turnover of participants such as a programmer or team leader departure as the project has progressed. The other reason is the fact that progress management of software development project is difficult for someone to do because of the software invisibility [1]. So unlike hardware, software can hardly capture construction progress.

Normally, progress of a project is managed using some charts such as WBS (Work Breakdown Structure)
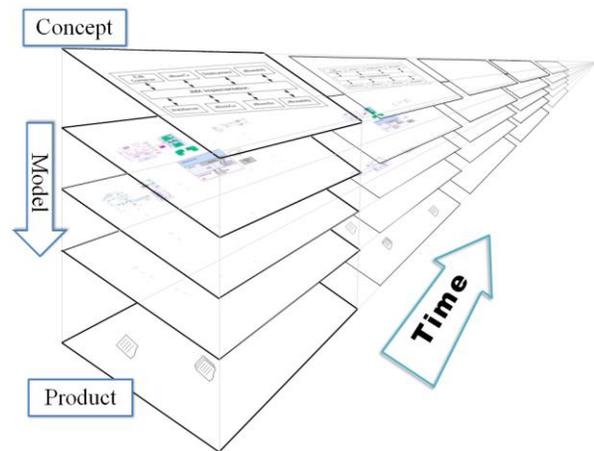

Fig.1 Schematic overview of our framework

[2] or Gantt chart [3]. These methods focus on people (task time). Schedules estimated by project manager can be visualized, and adjusted using the methods. On the other hand, the deliverables including source code and design documents are mostly managed by each person in charge. Therefore, it tends to create perception gaps between the members.

In this research, we propose a framework to visualize the project progress that focuses on deliverables. Deliverables directly represent from the progress to goal of the project, and it is easy to understand for all project members including the project manager, team leader, and programmer. We aim for the realization of an analysis environment that has high visibility to precisely investigate whole software development project and the progress. Our approach is hierarchical visualization by three layers on time-line. In order to take shape our framework, we

made a prototype of application software based on the framework.

2. Framework

Although various paradigms exist in software development such as Structured Programming or Object Oriented Programming, typically software designing is performed before actual coding regardless of the methods. So, in this research, in order to visualize a software project, we focus on the transition of deliverables. A framework we propose consists of time-line and three layers named Concept, Model, and Product-layer. Overview is shown in Fig.1.

2.1 Concept-layer

Concept-layer is made by the project manager for supporting mutual understanding. This layer is located at the top of three layers displaying an overview of developing a system. Therefore newly added members during development can share a sense of purpose about the project.

2.2 Model-layer

Model-layer is made by team leader. The role of this layer is to show the concrete design of the system. Programmers can easily improvement the development of modules after careful consideration of the relationship between the modules.

2.3 Product-layer

Product-layer is made by programmer. Entity of products, such as source code or joined library, represented as image icons are placed this layer. To browse this layer, not only project manager but also all project members can take stock of the progress of the project.

2.4 Time-line

The view constructed by the three layers is regularly renewed based on a span that project manager decides. To follow the transition of the views (deliverables), managing the progress of the project is supported.

3. Implementation

We made a prototype of tool as web application based on our framework. It is named "LaP-MAP (Layered Project Map)". LaP-MAP has simple
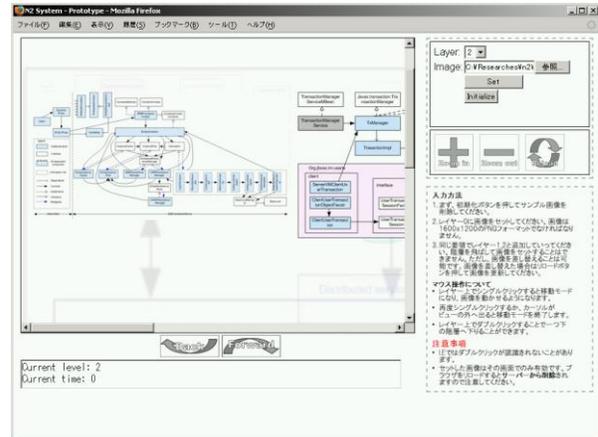

Fig.2 Screenshot of the prototype

interface including a main view, some buttons for moving among the layers and time-line, and image file (corresponding a layer) upload form. Screenshot of this prototype is shown in Fig.2.

4. Further work

We proposed the framework for visualizing a software project. However a concrete procedure to use our framework is not ready yet and these may be more room for improvement. So we will make a guideline/manual for all project members and continue to improve the development of this tool.

Acknowledgements

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