

# A UI-Driven Lightweight Framework for Developing Web Applications\*

Keeyoull Lee<sup>1</sup>, Sanghyun Park<sup>1</sup>, Chunwoo Lee<sup>1</sup>, Woosung Jung<sup>1</sup>,  
Wookjin Lee<sup>1</sup>, Byungjeong Lee<sup>2,\*\*</sup>, Heechern Kim<sup>3</sup>, and Chisu Wu<sup>1</sup>

<sup>1</sup> School of Computer Science and Engineering, Seoul National University, Korea  
{kylee, zez4shy, oniguni, wsjung, duri96, wuchisu}@selab.snu.ac.kr

<sup>2</sup> School of Computer Science, University of Seoul, Korea  
bjlee@venus.uos.ac.kr

<sup>3</sup> Department of Computer Science, Korea National Open University, Korea  
hckim@knou.ac.kr

**Abstract.** Due to the increasing complexity of Web applications, systematic processes and supporting tools are required for the development of Web applications. In this paper, we propose a UI-driven lightweight framework for building Web applications. This framework is based on an incremental and iterative process that covers the whole development phases. Each identified stakeholder carries out their activities in a collaborative and parallel manner. In the proposed framework, a UI prototype and a conceptual model are produced in the early phase of the development.

## 1 Introduction

As Web applications are becoming larger in size and complexity, ad-hoc Web development methods are not suitable for developing high quality Web applications. Therefore, several Web application development methods and processes have been proposed [1, 2, 3, 4]. These methods, however, define too many artifacts or focus on only design phase of the whole development lifecycle. In this paper, we propose a systematic and practical framework for developing Web applications.

## 2 UI-Driven Development Framework

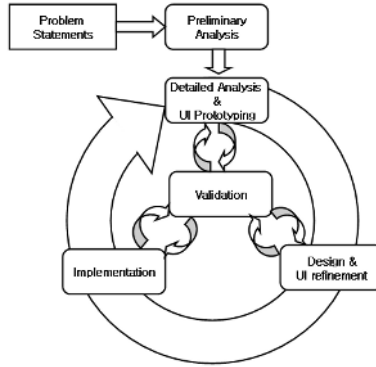
Our framework is based on an incremental and iterative process that covers each and every development phase and supports quick development processes. The process is lightweight rather than heavyweight such as RUP. Our framework supports reuse of components identified in component identification activity. Also, it supports parallel and collaborative development of Web applications. The stakeholders of Web applications include domain experts, software analyzers, UI designers, component developers, DB developers, resource managers, testers and project managers. UI designer builds user interface of Web applications and writes Web pages.

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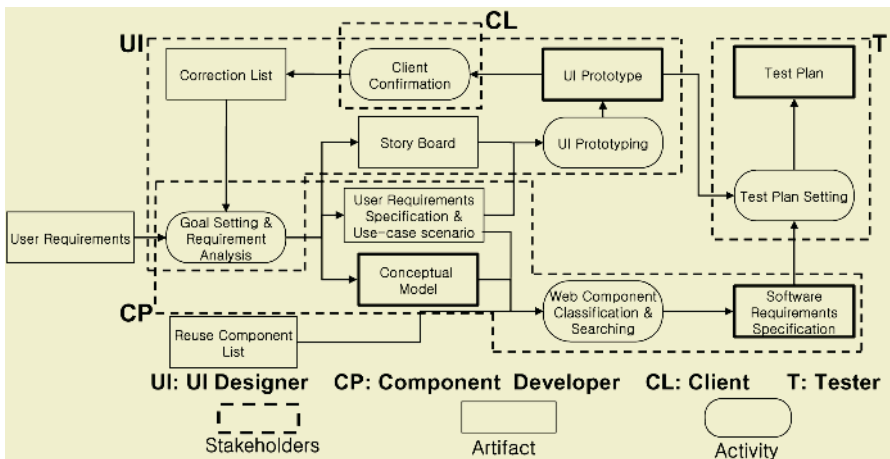
\*\* Corresponding author

The overall process of the proposed framework can be summarized as follows: Given the problem statements of the client, the stakeholders first perform Preliminary Analysis. Then, a Detailed Analysis and UI prototyping is performed, following by the Design and UI refinement, Implementation and Validation which are executed iteratively and incrementally ( see Fig. 1).



**Fig. 1.** Web Application development process

The basic elements of a UI are identified and refined from the early phase of a development lifecycle. The navigational structure and the interaction between the UI and clients can be designed with the UI prototype relatively early in the process. Clients effectively communicate with other stakeholders by using the UI prototype. So it reduces waste of developer’s resources, times, and efforts invested in the project.



**Fig. 2.** Detailed Analysis and UI Prototyping

Figure 2 shows the activities and related artifacts of the Detailed Analysis and UI Prototyping phase. In this phase, a goal of the current development cycle is set. Then Requirement Analysis, UI Prototyping, Web Component Classification and Searching, Client Confirmation and Test Plan Setting are executed.

The UI designer develops a UI prototype by using the storyboard from Requirements Analysis. This UI prototype shows the decision hold in the storyboard, and continues to evolve and becomes an actual UI of Web application. In Web component classification and searching activity, the reusable components and components to be developed are identified based on conceptual model, user requirements, and the list of reusable components.

Figure 3 shows the activities and related artifacts of the Design and UI Refinement phase. Due to the limitation of the page length, we have omitted the details of the phase.

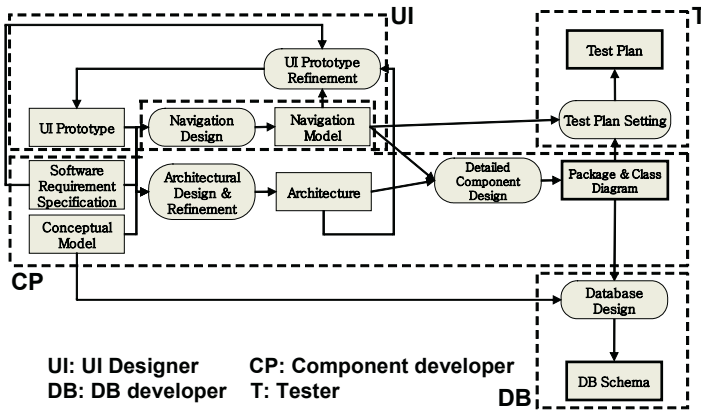


Fig. 3. Design and UI Refinement

### 3 Conclusion

In this paper, we have proposed a UI-driven lightweight framework for developing applications. In the future we plan to refine the models and processes in our framework and develop supporting tools. Finally, we will perform empirical studies.

### References

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