ABSTRACT

The planning, monitoring and control of software development projects require that effort and cost be adequately estimated. However, some forty years after the term — software engineering was coined, effort estimation still remains a challenge for practitioners and researchers alike. The existing models, which are being currently used by different groups and in different domains, have still not gained universal acceptance. As the role of software in the society becomes larger and more important, it becomes necessary to develop a model which is used to estimate effort within a short period and accurately. The models and techniques that have been proposed and developed so far include software size as an important parameter.

The objective of the research is to develop a new hybrid model to estimate the effort in the early phase of software development. The hybrid tool proposed in the thesis focuses on three basic parameters. 1. Software effort estimation, 2. Benchmarking and 3. Risk Assessment. The hybrid tool uses Use case method (UCP), Function Point with quality parameters and traditional cost estimation models such as COCOMO and Function Point for estimating effort.

Software effort estimation by Use Case Point Method estimates software development effort in early phases of software project development life cycle. UCP is measured by counting the number of actors and transactions which are included in Use case models. Several tools to support calculating
UCP have been developed. However, existing UCP Tools extract only actors and use cases and the complexity classification of them are done manually.

The research proposes to automatically classify the complexity of actors and use cases by developing a new tool called UCP tool. The UCP tool developed and used in the hybrid model automates use case measurement. The Model has been applied to the actual use case models and examined the difference between the value given by the tool and the one given by the experts from the software industry. It has been determined that the effort measured by the UCP tool is similar to the effort determined by the project manager.

In the existing traditional Function Point analysis method, the estimations are more concentrated on the development of software systems alone and not on the quality coverage. An exhaustive literature survey reveals that attention is not paid on the quality factors when estimating the effort for software. Thus the hybrid tool estimates effort by combining function point, COCOMO classes of systems and ISO9126 quality factors.

The hybrid tool also proposes to integrate risk with the estimated effort to provide a more accurate estimation method. Risk assessment estimates the needed contingency due to the impact of anticipated risky events. Risk identification’s goal is to identify project specific risk items for risk analysis. Risk analysis finds the probabilities and the magnitude of potential loss, and then the Risk Exposure.
The tool helps to set a benchmark for estimated effort by providing a comparison between the efforts determined by all of the above methods. The comparison is done graphically to enhance user experience.