ABSTRACT

The software effort and cost estimation is essential to provide key information about project planning and control. An accuracy of estimates is one of the most important factors for projects’ success. In the research literature, number of estimation models, methods, techniques and tools have been proposed. However, their accuracy of estimates can be challenged for complex real world projects.

This thesis systematically reviews different software effort estimation model, methods, technologies and tools. Theoretical analysis and empirical experiments show that the persistent problems in software effort estimation is not only technical one, but also fundamental theoretical, where new theories and mathematical models still need to be sought such as what dominates development effort in a large group ? How labor is traded with time in a project ? What is the optimal organization form of a large software project ?.

The survey has been conducted, where software project managers were asked to respond to the questionnaire. This survey has provided important input to understand pain areas and decide research focus.

This thesis also presents comparative analysis of various estimation models and underlying AI techniques and technologies. The assumption is made that software project life cycle is divided in early stage, intermediate stage and final stage.

At early stage, Request for Proposal and Software Requirement Specification documents are available. Similar project identification technique is presented which involved LSA and ontology for finding semantically similar documents. The AI model has been proposed to mimic human expert estimator, who applies the experience and estimates by referring textual information of project requirements.

During Intermediate stage, requirements are clear as well as analysis and design models are available. COCOMO II in combination with AI technologies such as neural networks, fuzzy logic and neuro-fuzzy inferencing system are evaluated. The modification in GUI of existing model resulted in improved accuracy of estimates. To avoid drastic difference in estimates, combination of various estimation methods based on sizing approaches are evaluated. It has
been revealed by experimental result that AI models for software estimation improves accuracy of estimates if enterprise-wide knowledge-base is maintained. There is scope for further evaluation and modification since new software project management methodologies, process models and technologies are being evolved.