CHAPTER 9

CONCLUSION AND FUTURE DIRECTION

Currently, there is no systematic method of determining software metrics even though almost all software companies require an accurate measurement of the metric. It is almost always subject to individual knowledge and opinion based on past project history. Metrics are determined predominantly based on how the similar past projects have performed.

The hybrid tool proposed in this thesis is the first method to calculate the effort value which is used for analyzing the estimation for developing software automatically by using the use case diagram and the flow events file and it also adopts a systematic approach to determine software metrics by having the earlier traditional methods as the basis. The past project data is collected through questionnaires from the project managers, project planning team etc and stored in the database. Based on these values and using the concept of UML, the hybrid tool proposes metrics for the upcoming projects. Thus, it completely automates the process of software estimation by introducing the concept of UML for estimating software. In addition to estimating software metrics it also integrates the risk along with the estimated value. This is a great advantage as the existing system does not factor risk into its software estimation, but calculates risk as a separate.

Software companies use traditional functional points to determine productivity. The traditional functional point approach does not take quality parameters into account. The hybrid tool proposed here combines quality parameters along with function points to give a much more accurate measurement of productivity.
The hybrid tool, apart from calculating software metrics using the new mentioned techniques also gives the software metrics using existing techniques like COCOMO, Function Point & LOC. Thus it provides a comparison of metrics to the user enabling him to choose the most suitable metrics for his project. It also allows the user to arrive at an averaged estimation value as well. Additionally, it enhances usability by providing a graphical representation of the metrics proposed by the existing metrics systems and the hybrid tool.

The hybrid tool has been validated from project managers of Infosys Systems Pvt. Ltd., by using the data from their past projects. The software metrics determined by the hybrid tool matched the metrics of the past projects which were used for testing. By thus validating the output of the hybrid tool, it has been determined that this hybrid technique accurately estimates various software metrics like effort, risk, defects and cost.

An early project estimate helps managers, developers, and testers plan for the resources a project requires. The UCP method can usually produce an early estimate within 20 percent of the actual effort, and often, closer to the actual effort than experts and other estimation methodologies. Moreover, in many traditional estimation methods, influential technical and environmental factors are not given enough consideration. The UCP method quantifies these subjective factors into equation variables that can be tweaked over time to produce more precise estimates. The UCP method is versatile and extensible to a variety of development and testing projects.

Future work shall focus on revamping the use case model. The original UCP method proposed in the thesis has been trained with a minimal set of keywords and parameters and uses three degrees of complexity. First, the tool should be further trained with more keywords and parameters to cater to the needs of very complex projects. Secondly, the complexity of the use
case should be calibrated using the neuro fuzzy approach. Finally, future work should focus on how extend and include use cases should be considered during estimation.

The function point estimation method in the hybrid tool includes some Quality parameters like functionality, reliability, usability, maintainability, efficiency & portability. It should be further developed to include additional quality parameters. This research has developed the basic model by integrating the effort estimation with the risk exposure, to give more accurate effort estimation. It deals with risk to effort quantization. In the immediate future, researchers should explore methods to extend risk assessment to include, risk to duration, risk to development and risk to planning as additional features.