CONCLUSION
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In this thesis a novel approach of assessing the quality of software used in intelligent systems using the neural networks and fuzzy logic has been depicted, using flight software used in satellite launch vehicles as a typical example.

A quality model for evaluating the quality attributes like functionality, reliability, maintainability, efficiency and portability is developed and the various verification and validation activities carried out to evaluate these attributes are defined. The defects detected in different development life cycle phases of the software from different projects have been carefully analyzed to find out the root cause of these defects. In this research it has been found that technology and complexity of the problem, documentation correctness and adequacy, programmer/tester’s experience and domain expertise has an impact on the quality of the software product realised. These factors have been transformed into data that can be used to predict the defects that are likely to occur when a new software is developed in a similar environment.

The defects detected along with these input factors have been used to train four neural network based defect prediction models for the four phases of software lifecycle. Feed forward neural network is set up and back propagation algorithms are used for the training. The defect prediction models in the four phases has been validated by perturbing the input data by different factors. It was found that for upto 5% variation in most of the inputs factors, the models predicted the defects with very small deviation. But complexity of the problem had an impact in the requirements and design
Conclusion

phase. When that factor alone was perturbed, the variation in output was significant. Also the human factor had a large impact in coding and testing phase. These models can be used in early phases of software development to predict the defects that are likely to occur. The management can deploy the verification resources suitably to tackle the error prone products.

From the defects predicted, using a neuro-fuzzy model, the quality of the software was assessed as excellent, good, fair and poor. Based on the quality of the software, the risk in using that software can be assessed. This quality assessment model based on neuro-fuzzy technology, which produces automatic, expert tools for evaluations of software quality, will enable the Space industry to generate powerful models of software product quality. The use of this unique modeling approach for software quality assessment results in improved quality by identifying and analyzing defective and high-risk software products and processes early in the development and production cycle, and addressing the underlying causes for defects. Early prediction of defects will help in eliminating the causes that contribute to these costly errors.

Future work planned is to refine the input factors to the defect prediction model so that not only the number of defects, the types of defects also can be predicted by the defect prediction model. Also from the impact a defect in the requirement specification or design has on the quality index, assign suitable weightage to defects in different phases and tune the quality index computed by the quality assessment model.