CHAPTER 6

CONCLUSIONS

6.1 SUMMARY OF THESIS

The methods developed in this research are important as they provide effective means to resolve the failure-process problem and the better measurement of software reliability. It is fitted by one suitable software reliability model selected from the pool of the NHPP software reliability models.

In this thesis, we prepare and analyze an array of different procedures related to software reliability based on two step approach. A chapter by chapter summary is presented below.

Chapter One contains an introduction which covers the Motivation, Significance, Organization of the research; a brief review of software reliability concepts, NHPP based software reliability growth models, least Squares Regression, Statistical Process Control, SPRT, Model under consideration, and the analysis of failure data.

Chapter Two covers a review of software reliability modeling, including basic definitions, concepts, terminology, fundamentals of reliability. This chapter incorporates some important concepts used in reliability studies and literature review on software reliability models, which include non-homogenous Poisson process (NHPP) Models.

Chapter Three shows that, linear regression methods can be effectively used to fit the model to different failure data sets. This approach is motivated through a transformation. Linear regression approaches to software reliability models encompass our contribution of regression approaches to the HLSRGM. Some numerical examples have been presented in the thesis to illustrate the goodness of fit and the future reliability of the software by analyzing the failure data.

Chapter Four demonstrates, How the control chart based on NHPP software reliability models has been proposed and implemented to reveal the failure-process change by monitoring the failure curve. By using this chart the
failure process is monitored and the process change is detected. Hence, any
general NHPP model can be conveniently used to assess software reliability.

The chart has been developed based on the cumulative distribution
function of the model associated with NHPP software reliability model. The
control limits for the models are derived by estimating the parameters using two
step approach. The outcome shows that the chart has successfully detected the
time point of the failure-process. On the whole, the chart is effective in detecting
failure process. The effectiveness of the chart for the HLSRGM is substantiated
by real datasets.

Chapter Five

The use of Sequential Probability Ratio Test in detecting the deviation of
the failure process has shown that, the drawing of conclusion can be attained
without waiting for the last sample making use of the parameters of similar such
projects.

6.2 LIMITATIONS

All of these methods are data specific. There is not a single method that is
superior to all data sets. Any other methods should be compared to the results
obtained through the regression models. There is no way to select a single best
Software Reliability Growth system based on the properties of a data set. Our
results show that by investigating the Growth Model that can be applied to all
software failure data sets to make accurate results under all circumstances seems
to be difficult to achieve.

6.3 FUTURE RESEARCH

The methods studied in this research are proved to be effective to solve the
failure process problem. The studies of using the control-chart technique in
software reliability measurement are still few. In further studies, other major
NHPP models should be tried considering other parameter estimation methods.
Grouping of failure data when the failures are frequent and use of SPC techniques
is still a problem of research to be investigated.