CHAPTER VII

SUMMARY

This thesis is the outcome of a wider research aimed at identifying suitable priors to represent the real life situations and including it in statistical model to represent the Bayesian Analysis of Normal Sequence. Subsequently Bayesian methodology has been used in making inferences about the parameters of the probability model using various combination of priors. This thesis has seven Chapters and one Appendix.

The first chapter of the thesis provides, an introduction to the Bayesian analysis in which prior information/distribution plays an important and key role in finding typical Bayesian solutions for complicated real life problems in the modern computerized world.

In Chapter II, a detailed survey of literature regarding the already established and tested priors from a priors which have been studied and reported by various authors in the past. In this chapter, a review of 100 and more priors has been done and choice of specifications of prior parameter values are reviewed and reported.

Chapter III contains the Bayes Estimates of Normal sequence using different combination of priors. In order to represent several practical situations, several suitable priors have been assumed and obtained the Bayes Estimates of location and scale parameters of Normal sequence.

Chapter IV provides the Bayes Estimates for the location and scale parameters using mixture of priors. In real life, certain complex situations cannot be described with a single prior how so even good it may be and therefore a mixture of distribution as the prior was considered and Bayes estimates carried out for known and unknown cases of parameter values.
In Chapter V, a new algorithmic procedure (VN-ALGORITHM) for the Bayes estimates of posterior mean, mode and variance has been developed. Using the new algorithmic procedure, a typically complicated numerical integration problem of a parameter with infinite range has been solved and solutions obtained. Using this procedure, certain numerical illustrations are elaborated.

In Chapter VI, for various combination of priors numerical solutions were found and comparative analysis done on the basis of measures like MSE, RMSE and AMSE for the Bayes Estimates. From the overall results obtained, the prior combination DE and HN for location and scale parameters respectively behaves more realistically as compared to all the other cases. In particular, if $\mu$ and $\sigma$ increase in size, then MSE of $\mu$ and $\sigma$ also increase compared with less $\mu$ and $\sigma$ values. In all the cases, when $\sigma$ is fixed for varying $\mu$, there is not much of difference in MSE. Almost in all cases, posterior mode for the mean parameter has less MSE compared with the MSE for the mean using Double Exponential prior. In general if $\sigma$ is increased, then the MSE of the estimates for $\mu$ and $\sigma$ also increase.

Regarding further extension of this work a more realistic representation of the real life problem and its solution could be attempted with Multivariate Laplace distribution, a scale mixture of Gaussian distribution as prior distributions which can more suitably describe the situations for the mean parameter of Multivariate Normal sequence and Multivariate Linear Regression Models and its Bayesian analysis.