PREFACE

Predictive time series data mining analysis the available data to make predictions about future. These predictions help in making decisions in various applications. The objective of the thesis is to devise prediction models using data mining techniques to forecast various types of time series data. This research includes one-step ahead and multi-step ahead forecasting using both linear and non-linear model variants of ARIMA, ANN and GARCH. To achieve this objective the thesis is divided in to eight chapters which are as follows.

Chapter one introduces TSD, some of the data mining concepts and prediction models used in this research are discussed along with the evaluation prediction models using error performance measures.

Chapter two presents a detailed literature survey on prediction of TSD originating from different applications, various prediction models such as ARIMA, GARCH and ANN models, along with their hybrids and variants.

Chapter three explains proposed hybrid model-1: A MA filter based hybrid ARIMA-ANN model for forecasting TSD. The steps involved in modeling and forecasting TSD using this model is discussed in detail.

Chapter four compares and evaluates four different hybrid ARIMA-ANN models along with individual ARIMA and ANN on internet traffic data. The models compared for comparison are proposed MA filter based hybrid ARIMA-ANN model (2014), multiplicative model by Wang et.al (2013), Khashei and Bijari's hybrid ARIMA-ANN model (2011) and

Zhang's hybrid ARIMA-ANN model (2003).

Chapter five presents proposed model-2: A hybrid model based on ARIMA and GARCH for multi-step ahead forecasting. A qualitative analysis of this model is presented explaining why this model is more efficient compared to other individual models. Prediction steps along with the results are presented.

Chapter six explains the prediction of average global temperature using ARIMA, trend-based ARIMA and wavlet-based ARIMA models. On rainfall data, the results of applying ARIMA, GARCH and ANN are presented.

Chapter seven presents the conclusions and future scope of this research work. The various findings of the thesis with regard to prediction of TSD originating from various applications are also mentioned.