ABSTRACT

DISSERTATION/THESIS/RESEARCH PAPER/CREATIVE PROJECT: Modeling Road Accident Data of Saudi Arabia

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Road accident is considered as one of the major problems in the Kingdom of Saudi Arabia. This motivates us to do research on this particular area. In our research the prime objective is to find the most appropriate models for analyzing Saudi Arabia road accident data. Since Saudi Arabia has several regions we model the data for the entire country and also for the different regions. It is more likely that Box-Jenkin's integrated autoregressive moving average (ARIMA) models should fit the data. But the existence of missing values for each variable makes the analysis part complicated since the estimation of parameters in an ARIMA model does not converge when observations are missing. As a remedy to this problem we estimate missing observations first. We employ the expectation maximization (EM) algorithm for estimating the missing values. But since our data are time series data, any simple EM algorithm is not appropriate for them. Hence we consider robust EM and bootstrap algorithms to estimate the missing values. A study based on cross validation determines which the missing value estimation techniques are the best for these data. Since we study time series data we employ a variety of

ARIMA models for fitting and forecasting the number of accidents in Saudi Arabia and based on a series of graphical and analytical tests finally determine which ARIMA model(s) are the best.