

ABSTRACT

DISSERTATION/THESIS/RESEARCH PAPER/CREATIVE PROJECT: Prediction of Rainfall in Saudi Arabia

STUDENT: Hadi Obaid Alshammari

DEGREE: Master of Science

COLLEGE: Sciences and Humanities

DATE: May, 2015

PAGES: 112

Climate change has been one of the major concerns of the world. Saudi Arabia is not free from this concern. Saudi Arabia does not have enough rain and for this reason most of its area is desert. But some cities of Saudi Arabia are now experiencing frequent rainfall. But infrastructures of these areas are not designed for rainfall. So rainfall often causes lots of damage and casualties in Saudi Arabia. For this reason it is very important us to forecast future rainfall in Saudi Arabia. In our study we analyzed a group of climate data from 1986 to 2014. We had one year's information missing, so we estimated that missing value first. At first we try to fit and predict rainfall using regression. But we did not get very good fits. The main reason is that our response variable, the total amount of yearly rainfall, was not correct. We observe from the rainfall data many years with total zero mm rainfall, but the data reports contradictory picture as the total number of rainy days in such years were quite high. So we tried to fit and predict rainfall using a mediation technique. In our study we consider the number of rainy days as the mediator variable for rainfall. Since rainfall data is a time series data we employ ARIMA models to fit the data. We did a cross validation study to evaluate forecasts and it came out that the mediation method predicts the rainfall data in the best way. Finally we present the future trend of rainfall for the major cities of Saudi Arabia.