Development of Empirical models for rainfall prediction

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Abstract: Weather plays an important role in every aspect of the economy from commerce to travel to agriculture to manufacturing etc. Being a natural non-linear phenomenon, predicting rainfall or precipitation is a challenging task for the climate and weather researchers. Accurate prediction implies predicting the exact amount both spatially and temporally, which is complicated because of the multiple weather process and patterns or systems involved. India, primarily being an agriculture economy, accurate rainfall prediction is all the more important for overall wellbeing of the nation. The present work is an attempt to develop and evaluate three common statistical techniques like: Multiple Linear Regression (MLR), Data Mining (DM) and Neural Networks (NN) using observations from Automatic Weather Stations (AWS) collected from National Climatic Data Centre (NCDC) for the period 2000-2014. The three statistical models were developed using SPSS, WEKA &Java and MATLAB, respectively. Past works have commonly used five critical meteorological parameters like: Temperature, Dew Point, Mean Sea-level Pressure (MSLP), Wind speed, Humidity to correlate it with precipitation. In the present study, the data and the techniques were evaluated for four selected cities in India located in four different geographical regions of the country. The results were quite interesting and the rainfall prediction made through Neural Network for all four regions were reasonably accurate compared to the other models.