Boston Weather Forecasting

CIS 4680

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Weather may seem unpredictable, especially temperature in the future. It could be cold today and hot tomorrow, or we have a brief period of sun during a rainy day. But it is wrong to say that we can’t predict weather. So for this project, our group has decided to try to forecast Boston weather. For this project, we have used the SARIMA (Seasonal autoregressive integrated moving average) model for forecasting. The main reason we chose to use the SARIMA model was because the model takes past data and seasonality to help make predictions in the future.

Our logic when building the model was this: today's temperature is based on yesterday's temperature, and yesterday's temperature is based on the day before. Therefore, tomorrow's temperature is based on today's temperature and the day after tomorrow is based on tomorrow's temperature, and etc. After all, while a huge temperature difference is possible, it’s not likely. In addition, the more data we feed to the model, the more the model is able to predict such dramatic temperature changes. So we found a 10-year dataset based in Boston and used it to build our prediction model. In addition, it also had data that included temperature average, which was the main feature that we used to build and train our model.

The first model that we built was the Sarima model, and it worked out great. After creating and optimizing our basic variables for the Sarima model, our RMSE error is only 3.76% which is great for us. After that, we had to find the smallest AIC combo to optimize the model itself. To do this, all we did was to create a for-loop that went through every possible 7-digit combination until we arrived at the smallest AIC combo. And after that, we just built the Sarima model.

And upon graphing our results, we found out that we did a great job in creating a forecasting Sarima model. Although the graph isn’t 100% accurate, it does a great job in predicting the general temperature, whether the temperature will fall, or rise. As a matter of fact, if we look at the temperature more closely, we can see that the predicted trend is almost the same as the actual trend. And upon looking at a monthly or daily weather forecast, my group noticed that the difference between the predicted temperature and actual temperature is only a few degrees different. Because of this, my group and I have determined that we have created an effective forecasting model. 



