Predicting Hurricane Season Impacts

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OVERVIEW

Every year the Gulf Coast is impacted by numerous tropical weather systems. The deadliest and most damaging of these being hurricanes. A single hurricane can cause damages of $50 billion plus and rack up a hefty death toll. Currently, Gulf Coast states don't have a way to assess or forecast potential impacts for the upcoming hurricane season. Having a predictive model for hurricane season impacts would aid states in allocating resources and budgeting for probable damages.

INTERESTED PARTIES

The federal, state, and local governments, especially those along the Gulf Coast, would be interested in a way to predict the impact of upcoming hurricane seasons. This would allow the governments and citizens to better gauge the necessity for hurricane damage mitigating resources. More importantly, this would also help in decreasing the loss of life associated with hurricanes. In addition, this would also aid in budgeting, preventing over or under budgeting.

DATA

The National Oceanic and Atmospheric Administration has many databases readily and openly available concerning historical atmospheric, weather, and oceanic data. The data includes many interesting properties related to atmospheric and oceanic properties such as: temperature, salinity, pH, climate, waves, oxygen, biology data, ocean currents, and many more that could prove to be relevant. Moreover, the NOAA National Hurricane Center archive will be used for historical data corresponding to hurricanes category, landfall location, total number in a season, and other relevant features.

SOLUTION APPROACH

First, the useful information from the databases needs to wrangled and formatted into one consistent datetime indexed pandas dataframe. From here, a time series evaluation can be done. Once correlations and trends are identified, the relevant oceanic and atmospheric properties will be chosen and fed into a machine learning classification algorithm (neural network or logistic regression) set on classifying the impact from the upcoming hurricane season into a category ranging from "Low" to "Severe". Boundaries for each category will be set based on the time series evaluation.

DELIVERABLES

A public GitHub repository will be set up for sharing files related to the project. These include: the code, a final report, and a slide presentation. The report will include information explaining the problem, the modeling approach, and the results and interpretations. Slides will be made to present the project. All material will be available to download from the GitHub repository.