

Predicting severe storm events in Louisiana

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The goal of this capstone project is to predict the number of storm events in Louisiana per month. Building this model can potentially assist states/cities and the general population in preparation for severe storm events (e.g., infrastructure planning, stocking up on supplies, insurance, familiarizing with evacuation routes, etc.). People will likely have experience with these events, but the prevalence is expected to increase with climate change. It is important to begin understanding the rising trends because two or more severe storm events within a small window of time can be exceptionally more devastating (e.g., a severe flooding with a hurricane in the following days with no time to recover from the flood).

The National Weather Service provides storm data containing statistics on personal injuries and damage estimates from 1950 to present (<https://catalog.data.gov/dataset/ncdc-storm-events-database>). These events include, hurricanes, tornadoes, thunderstorms, hail, floods, drought conditions, lightning, high winds, snow, temperature extremes, etc. There are 51 columns including datetime, location, narrative, damage, etc. Due to the large number of types of storm events, initial analysis will use total count of storm events. Exploratory data analysis will begin with looking at the features available in the dataset and determine relevant features to start building the model. This includes visualizing any relationships, as well as the general trends over time per state and overall in the country.

Additional supporting data includes historical meteorological data to analyze any potential correlations. NOAA's National Centers for Environmental Information has a Global Summary of the Month dataset (<https://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.ncdc:C00946>), which includes 48 meteorological variables, from 1891 to present at numerous stations across the state. Primary variables of interest include monthly mean maximum temperature, monthly mean minimum temperature, average monthly temperature, total monthly precipitation, and monthly average wind speed.

Because this dataset is relatively extensive, the initial goal is to predict the number of storm events per month. Depending on the outcome of the project, this may be extended to a higher resolution spatially and/or temporally. Jupyter Notebooks with code and explanations, an interactive map on my personal website, and a blog post will be the final products for this project.