Austin Green Energy Predictor

UT-Austin Data Analytics Bootcamp, 2020
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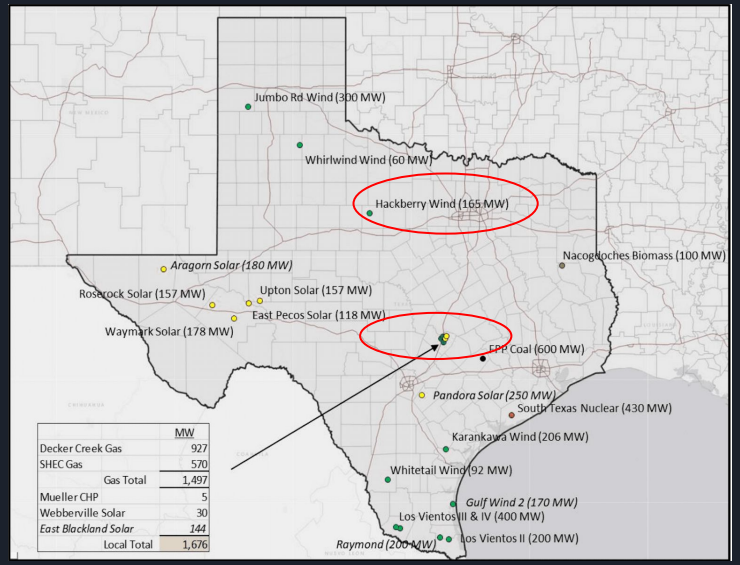
Selected Topic and Purpose

- **Objective:** Austin Energy Predictor outputs forecasted renewable energy (MWH) generated from a wind and solar energy farm in Texas.
- **Model:** Used to predict renewable energy output based on time and weather factors such as temperature, wind speed and cloud coverage.
- **Purpose:** Using data to forecast power generation to get a better understanding of renewable energy as a mainstream power source for a healthier planet.

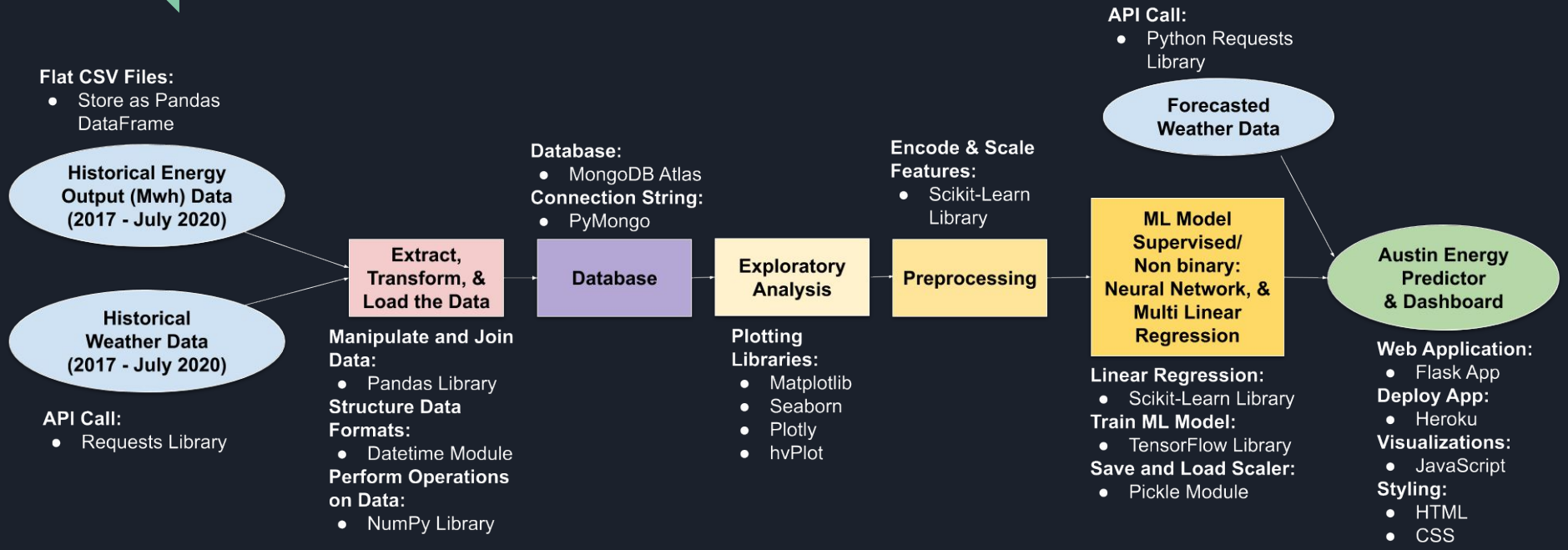
Source Data

Energy Output (MHW) and Weather Parameters



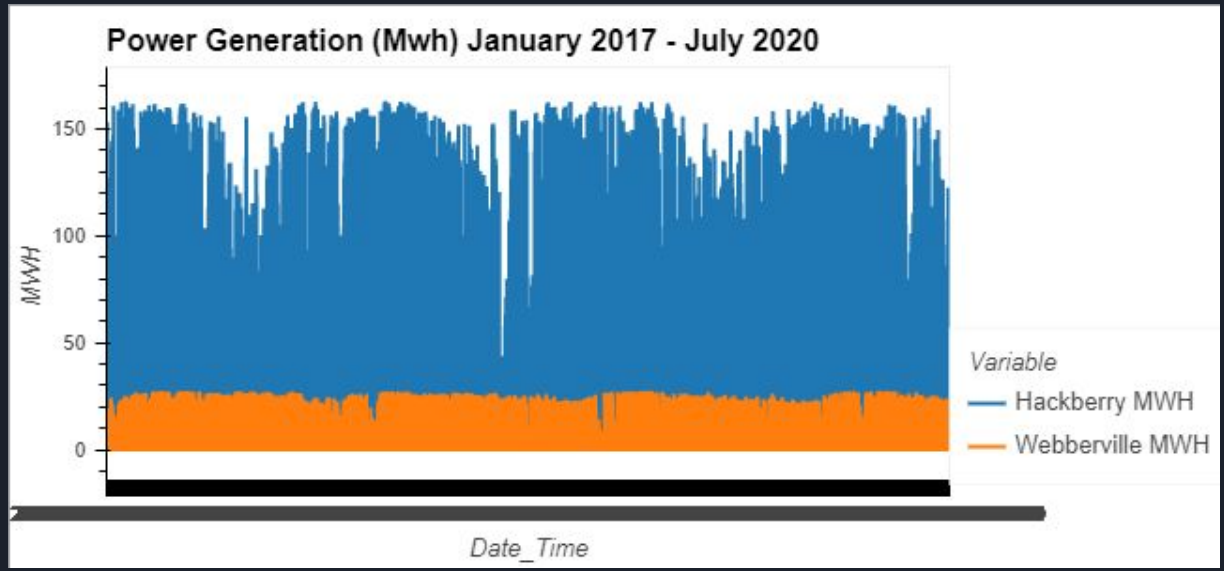
- Flat files from Austin Energy for Hackberry Wind Farm and Webberville Solar Farm with hourly power generated for 2017 - 2020 (July)
- Hourly weather parameters such as temperature (F), wind speed (mph), and humidity (%)

Database Structure - MongoDB

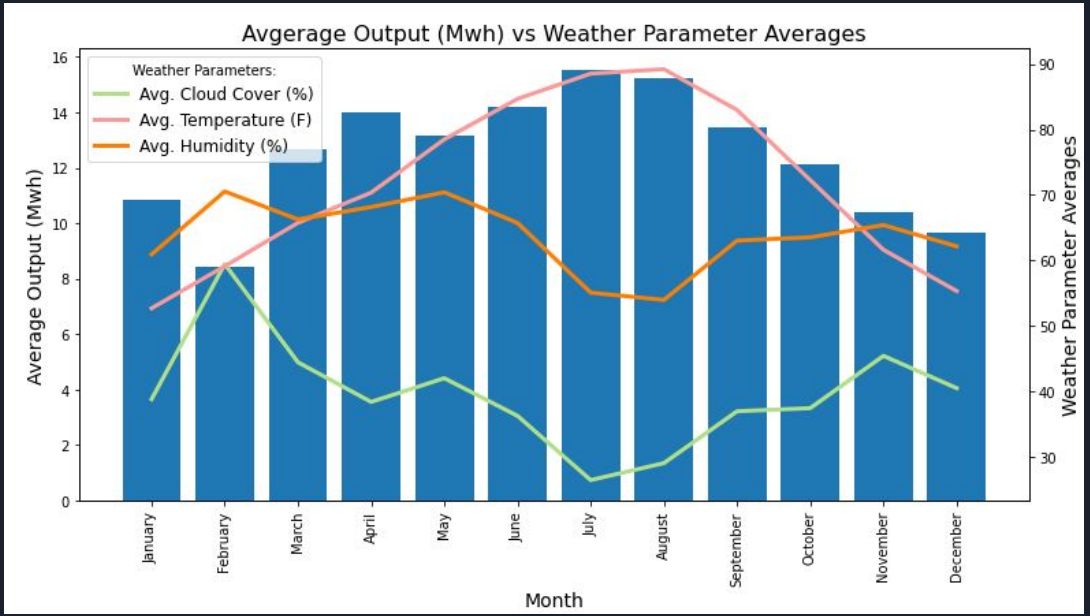


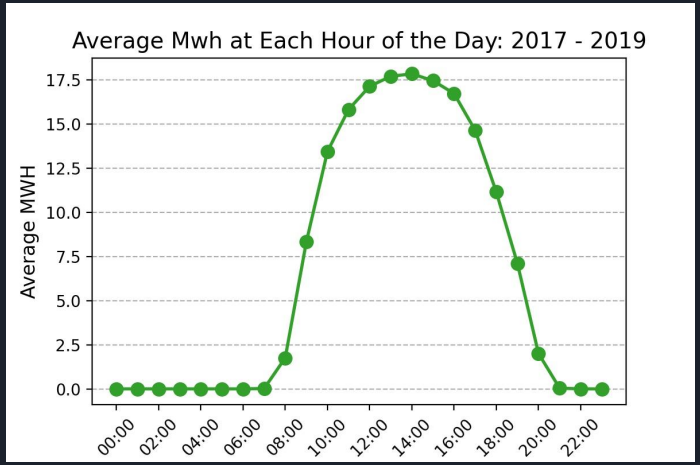
How does Weather and Time Impact Renewable Energy Output ?

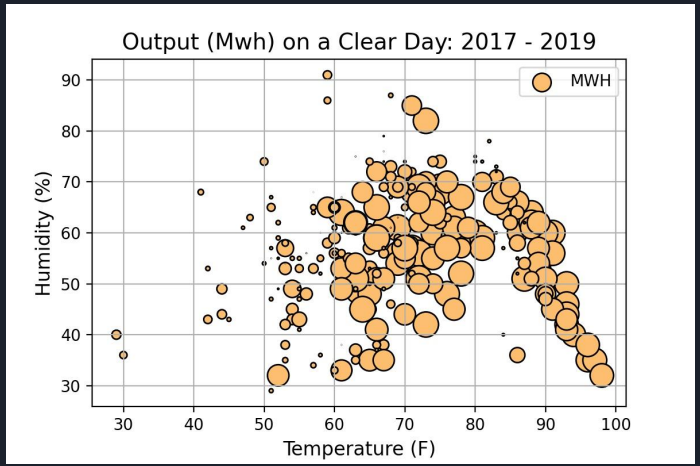
- Solar energy
  - Humidity
  - Temperature
  - Sunlight
  - Time
- Wind energy
  - Wind Direction
  - Wind Speed
  - Humidity
  - Temperature



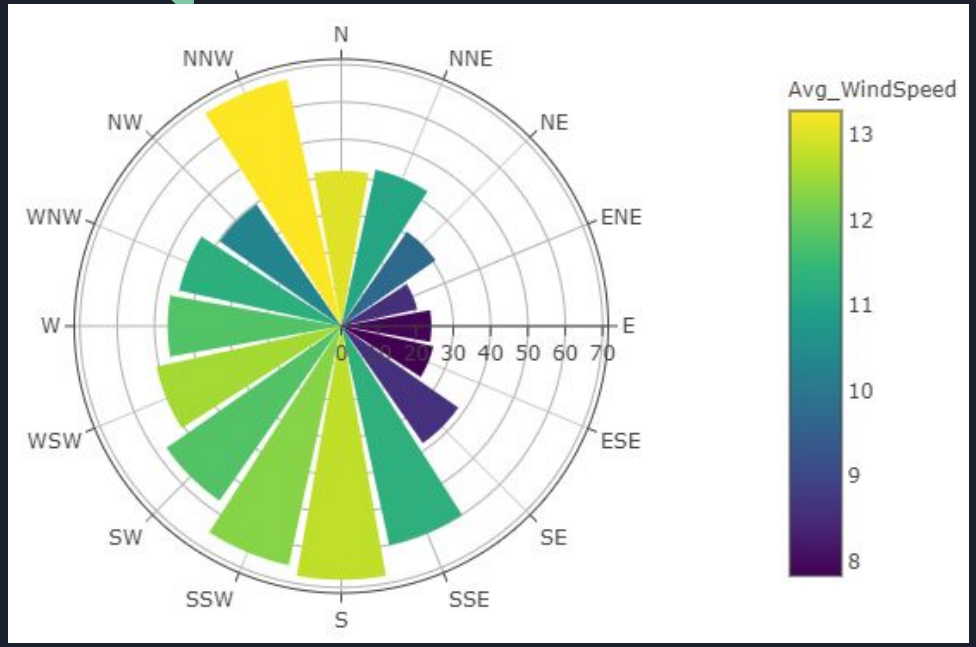
Exploratory Analysis:
Solar

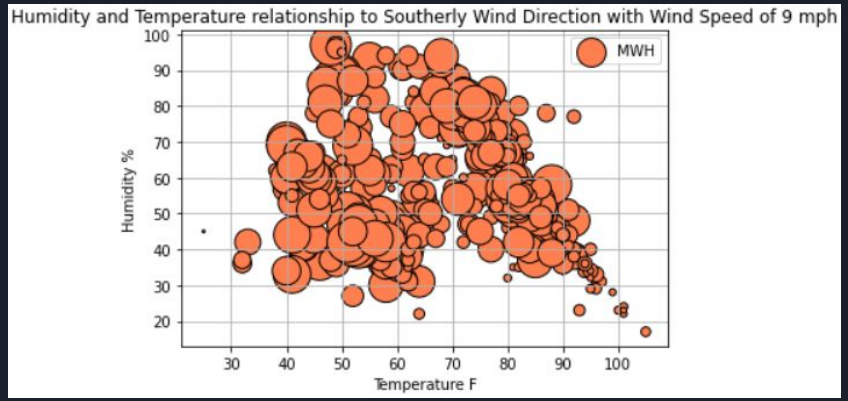






Exploratory Analysis:
Wind

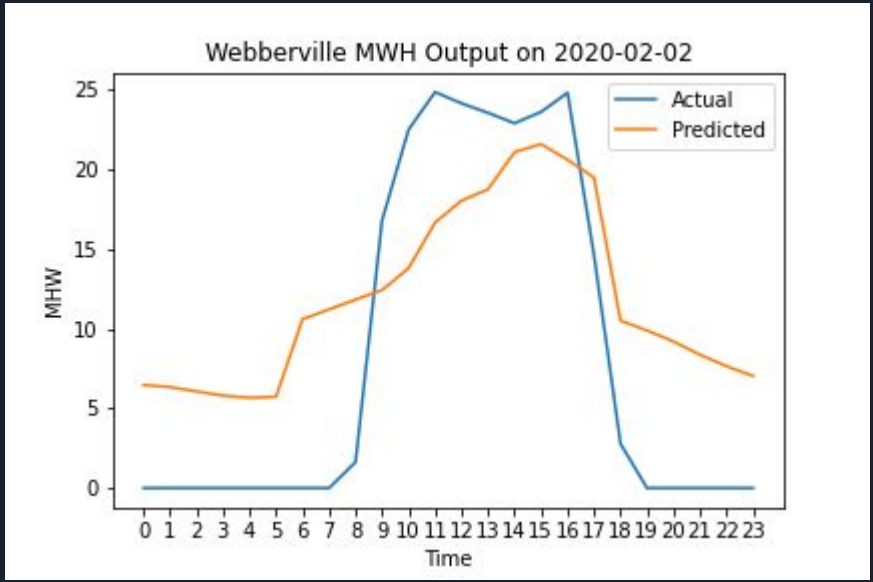


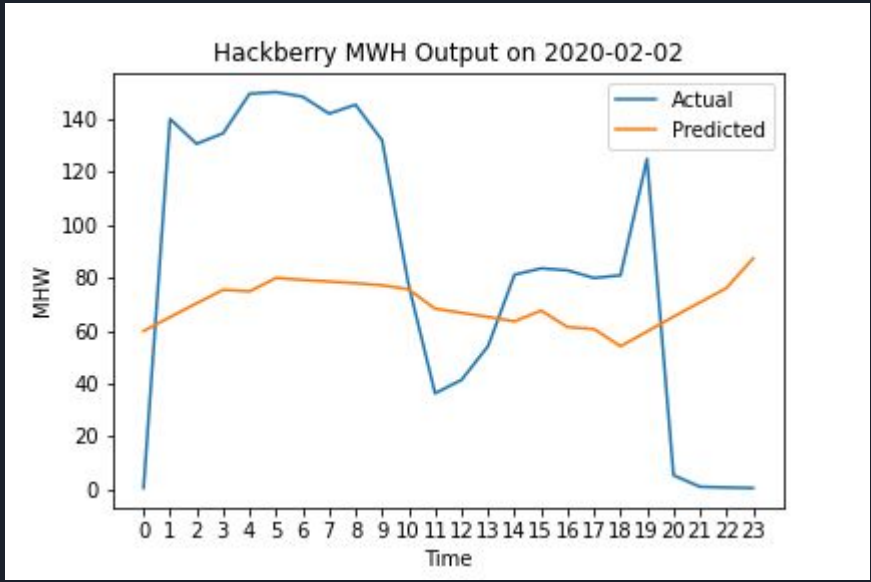


Data Analysis/ Machine Learning Model

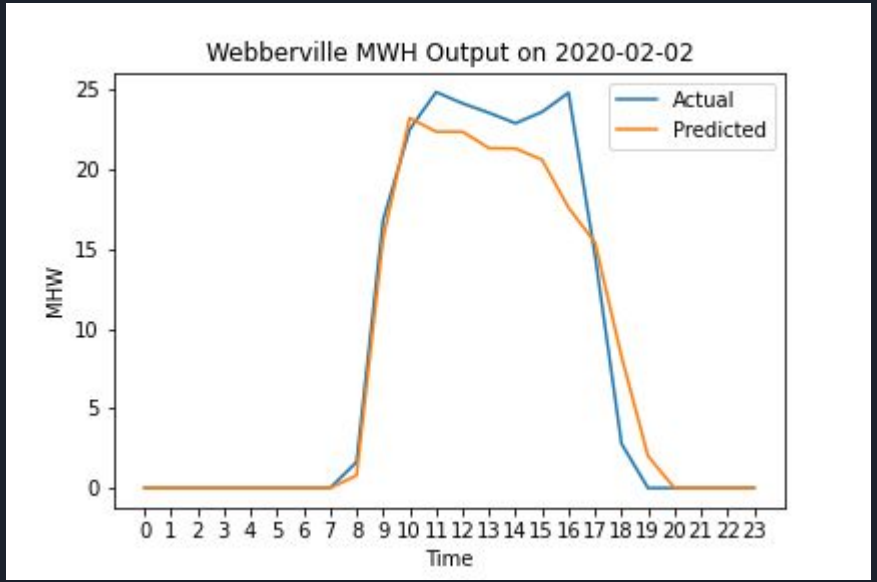
- Problem
- Type of Model Needed
- Linear Regression vs Neural Network
- Scaling Data
- Train Test Split

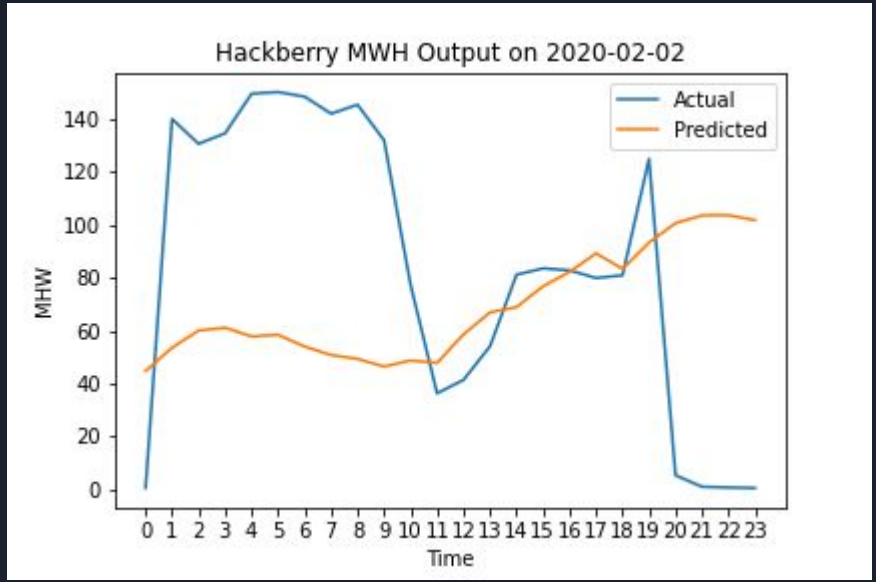
Linear Regression





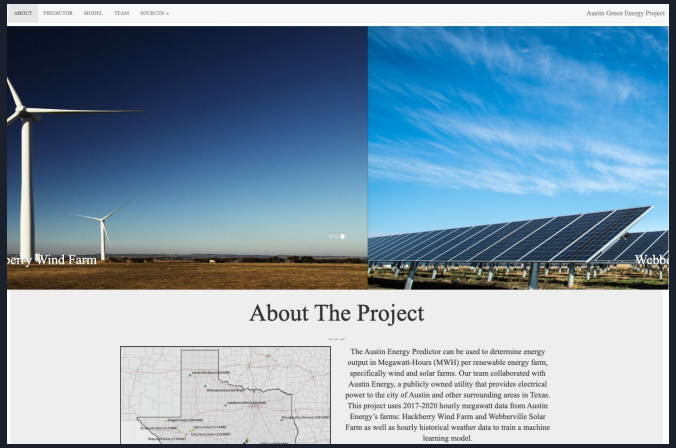
Neural Network



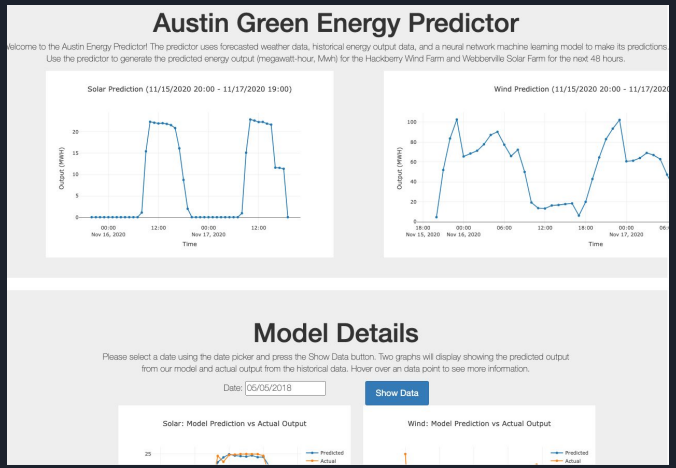


Dashboard

- Framework built with **HTML, Flask, CSS**, **JavaScript**
- Tested throughout development locally
- Deployed as a production ready app via Heroku
  - Allowed for secure handling of API keys, usernames, and passwords
  - Interactive elements have seamless integration into the static app content
  - Allows for future scalability



[Heroku | Dashboard App]



Future Analysis & Recommendations

- Incorporating other weather characteristics
- Adding more features to the model
- Developing a more advanced model for wind and solar

The Team

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