This project involved applying RNNs time-series data to improve performance. Multiple methods were used, with their performance being measured by the Mean Absolute Error (MAE) of the test set. The weather data being used was recorded in Jena, Germany from 2009-2016. The data includes various weather measurements such as temperature, wind and humidity. The goal of the project is to improve prediction performance.

Outside of the base model, we incorporated a Long Short Term Memory (LSTM) layer, a dropout regularized LSTM layer, and a stacked Gated Recurrent Unit (GRU) layer. The test MAEs are below.

|  |  |
| --- | --- |
| **Model** | **Test MAE** |
| Base Model | 2.65 |
| LSTM Layer | 2.51 |
| Dropout Regularized LSTM Layer | 2.49 |
| Dropout Layer + Stacked GRU | **2.39** |

Overall, it appears using more complex RNN methods can improve prediction performance. This suggests that additional complexity may be able to better capture trends in the data. The Dropout Layer + Stacked GRU model appeared to perform the best, with a test MAE of 2.39.