CS 334: Machine Learning
Emory University
Fall 2023
Aadi Waghray and Joshua Sun

CS334 Final Report

Aadi Waghray and Joshua Sun

Abstract

Abstract text

Introduction

Predicting the weather has always been an important task in everyday life. From a simple decision of bringing an umbrella, to more complicated decisions of watering crops for agriculture or evacuating citizens for a flood, predicting precipitation is an important objective. Prior studies into predicting rainfall have been successful. The studies used models and techniques such as SVMs, Extreme Gradient Boosting, Decision Trees, and LSTMs. [3, 1, 4] We planned to use similar models in our study. The studies, however, usually only focus on data from a single location.

Our study is using the NOAA quality controlled datasets. [2] The dataset is split up into monthly, daily, hourly, and sub-hourly datasets. Each dataset collects various atmospheric and earth data from various weather stations across the US. Compared to the previous studies, we attempted to predict precipitation values from a variety of locations and air and ground data. This is a novel approach, since we are generalizing precipitation to not a single location, but based on many locations.

Methodology

Methodology text

Results

Results text

Conclusions

Conclusions text

Code

Code text

References

[1] Ari Yair Barrera-Animas et al. "Rainfall prediction: A comparative analysis of modern machine learning algorithms for time-series forecasting". In: *Machine Learning with Applications* 7 (Mar. 2022), p. 100204. ISSN: 26668270. DOI: 10.1016/j.mlwa.2021.100204. URL: https://linkinghub.elsevier.com/retrieve/pii/S266682702100102X (visited on 12/07/2023).

[2] Howard J. Diamond et al. "U.S. Climate Reference Network after One Decade of Operations: Status and Assessment". In: *Bulletin of the American Meteorological Society* 94.4 (Apr. 1, 2013), pp. 485–498. ISSN: 1520-0477. DOI: 10.1175/BAMS-D-12-00170.1. URL: https://journals.ametsoc.org/doi/10.1175/BAMS-D-12-00170.1 (visited on 12/07/2023).

[3] Chalachew Muluken Liyew and Haileyesus Amsaya Melese. "Machine learning techniques to predict daily rainfall amount". In: *Journal of Big Data* 8.1 (Dec. 2021), p. 153. ISSN: 2196-1115. DOI: 10.1186/s40537-021-00545-4. URL: https://journalofbigdata.springeropen.com/articles/10.1186/s40537-021-00545-4 (visited on 12/07/2023).

[4] Atta-ur Rahman et al. "Rainfall Prediction System Using Machine Learning Fusion for Smart Cities". In: *Sensors* 22.9 (May 4, 2022), p. 3504. ISSN: 1424-8220. DOI: 10.3390/s22093504. URL: https://www.mdpi.com/1424-8220/22/9/3504 (visited on 12/07/2023).