

# Sydney Daily Rainfall



By: Muhammad Fadhil

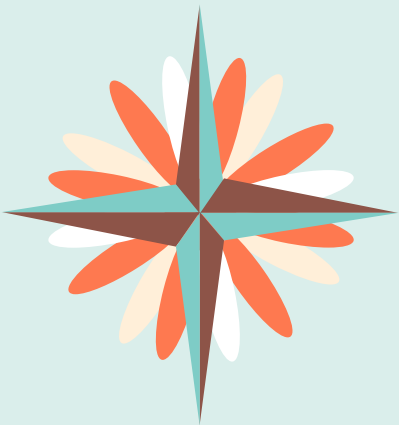
# Table of Contents

Overview 01

EDA 02

03 Models

04 Conclusion



01

# Overview



# Problem Statement

The slide features a light blue background with several white, fluffy clouds of varying sizes. A hot air balloon with orange and white vertical stripes is positioned in the upper right corner, floating above a small orange basket. Small teal wavy lines are scattered throughout the background, suggesting water or wind.

Accurately predict the daily rainfall amount for the city of Sydney

## Context

Human-caused climate change intensifies the heaviest downpours. Every 1°F rise also allows the atmosphere to hold 4% more water vapour.

As such the Department of Planning, Industry and Environment(DPIE) of New South Wales is particularly interested in Rainfall statistics in Sydney. Predicting the amount of Rainfall is imperative to the planning of the infrastructure of the city.

This would aid in the prevention of flooding and the accumulation of stagnant waters.

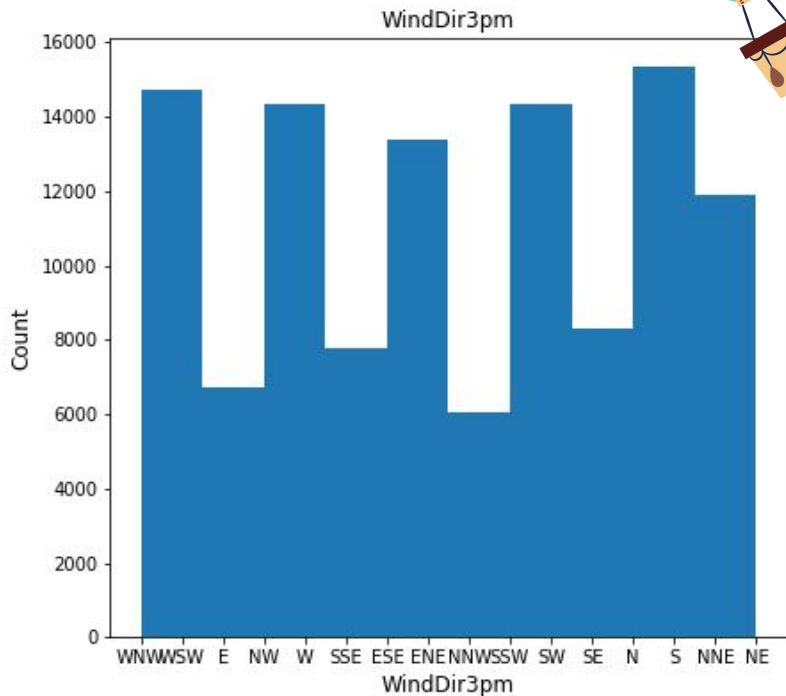
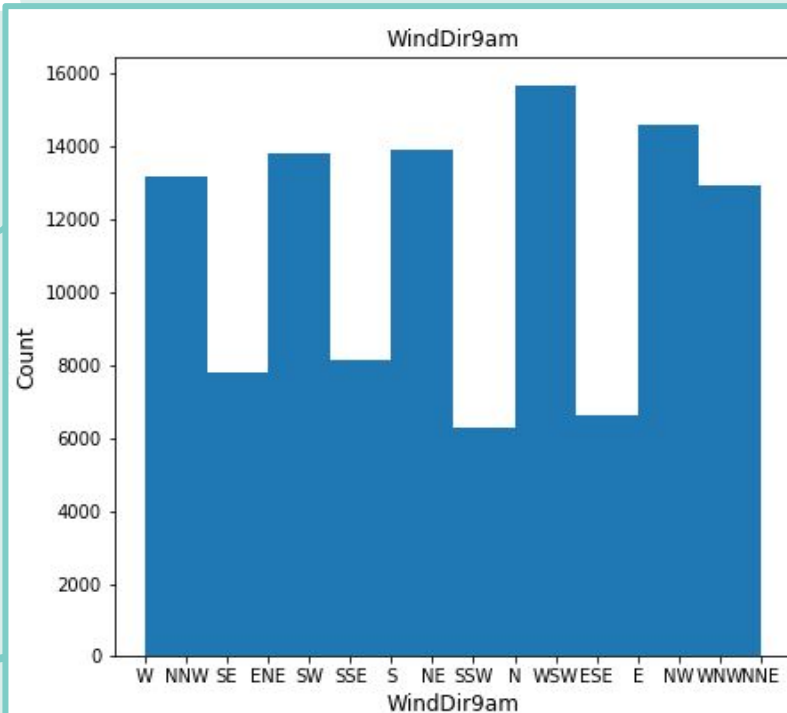
\*dataset was obtained from kaggle and consisted of weather measurements for 49 cities in Australia from 2008 to 2017.

02

EDA



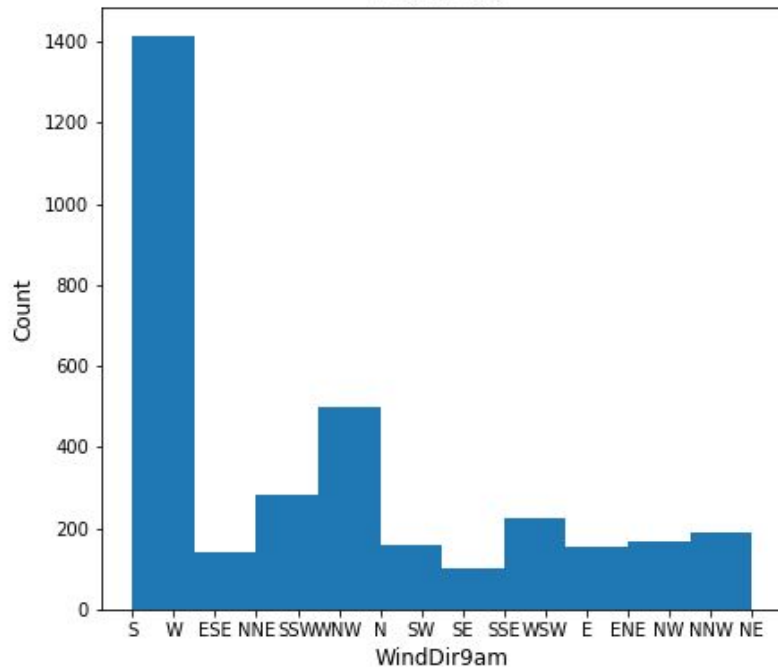
# Australian Winds



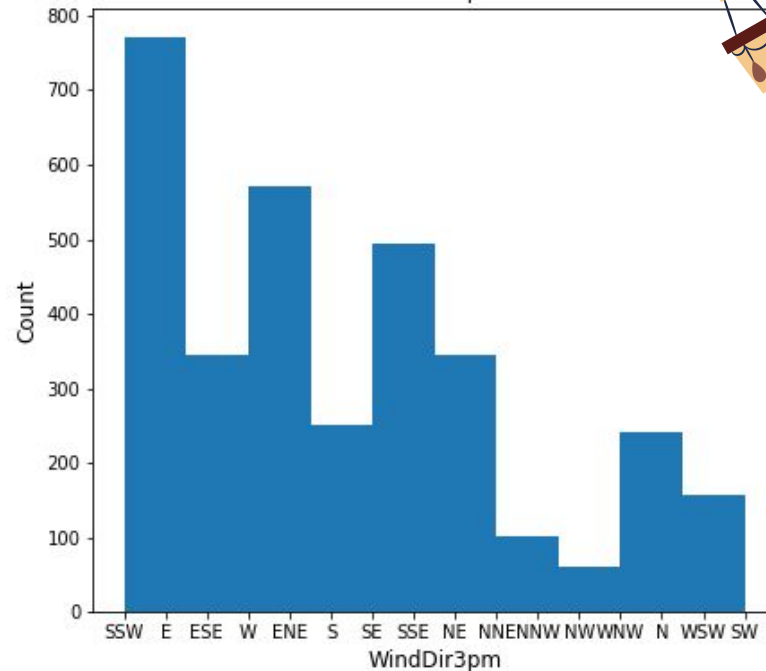
# Sydney Winds



WindDir9am

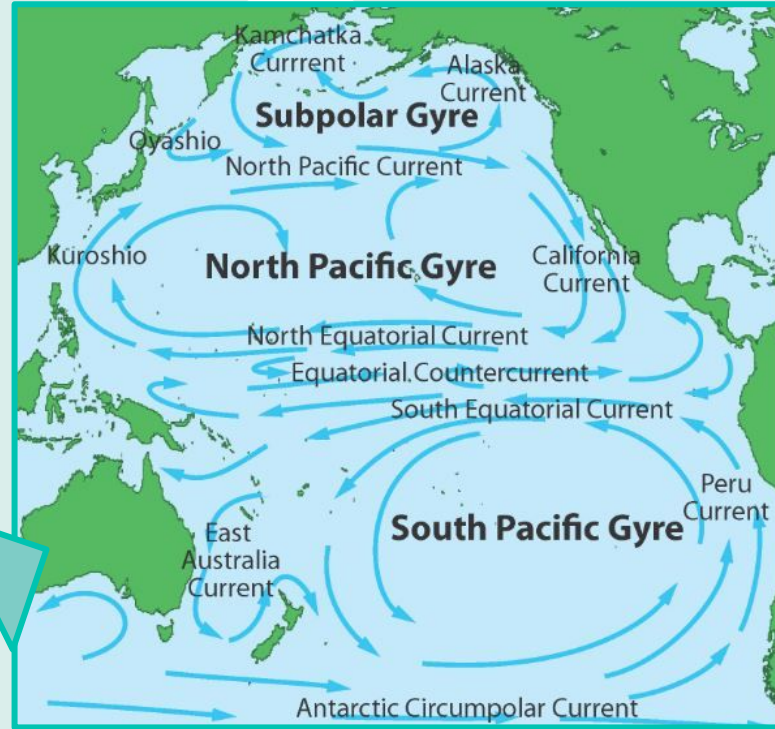


WindDir3pm



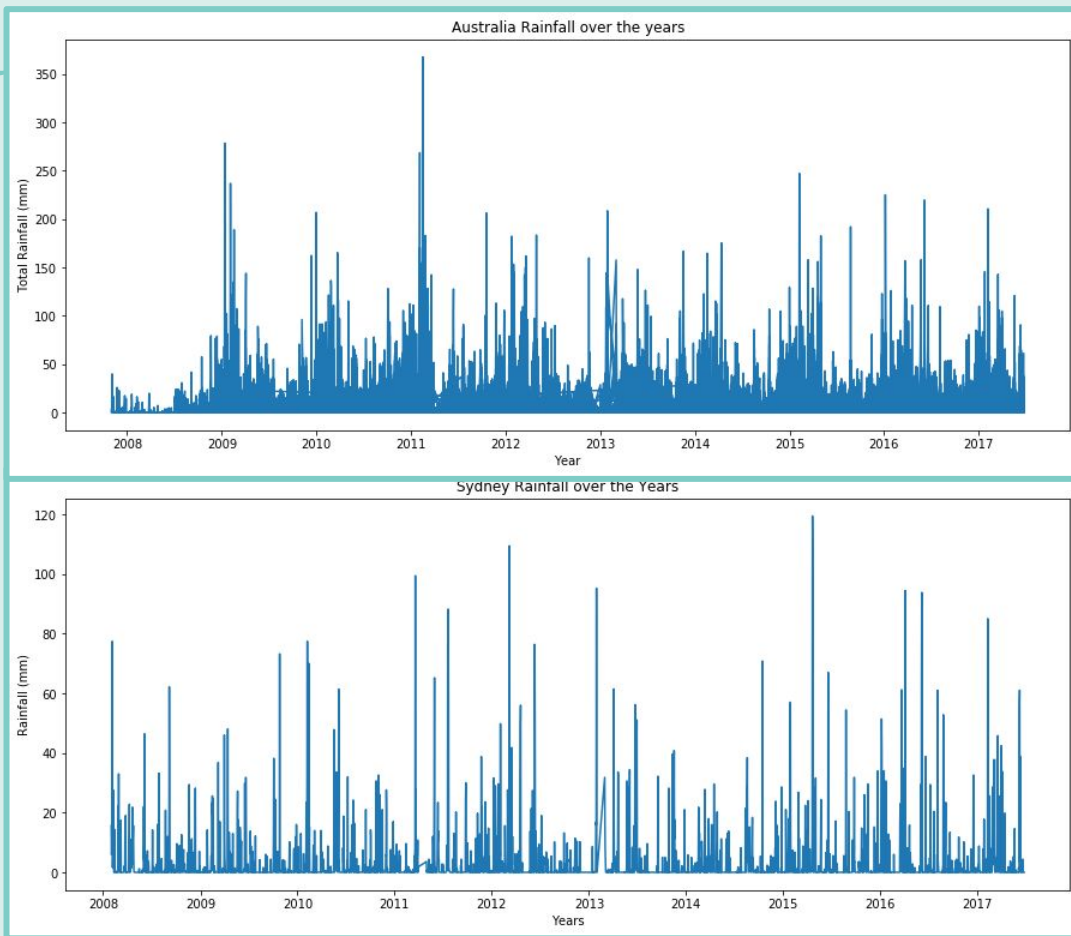
# Natural Wind Currents

- Australia is located next to the Pacific Ocean
- Winds are influenced by natural currents
- Explains why there isn't much Northern Winds
- Even more so for Sydney

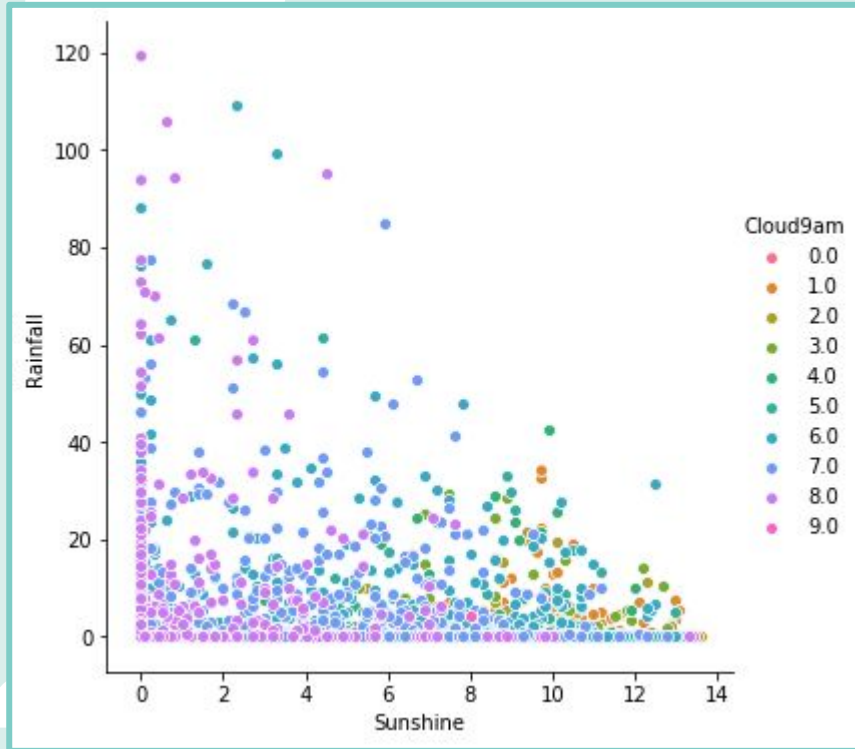




# Australia vs Sydney Rainfall



# Sydney's Cloud and Sunshine



- More Cloud Coverage means less Sunshine
- Sunshine inversely proportional to Rainfall
- Which makes sense intuitively, more cloud generally means higher chance or more rain

03

# Modelling



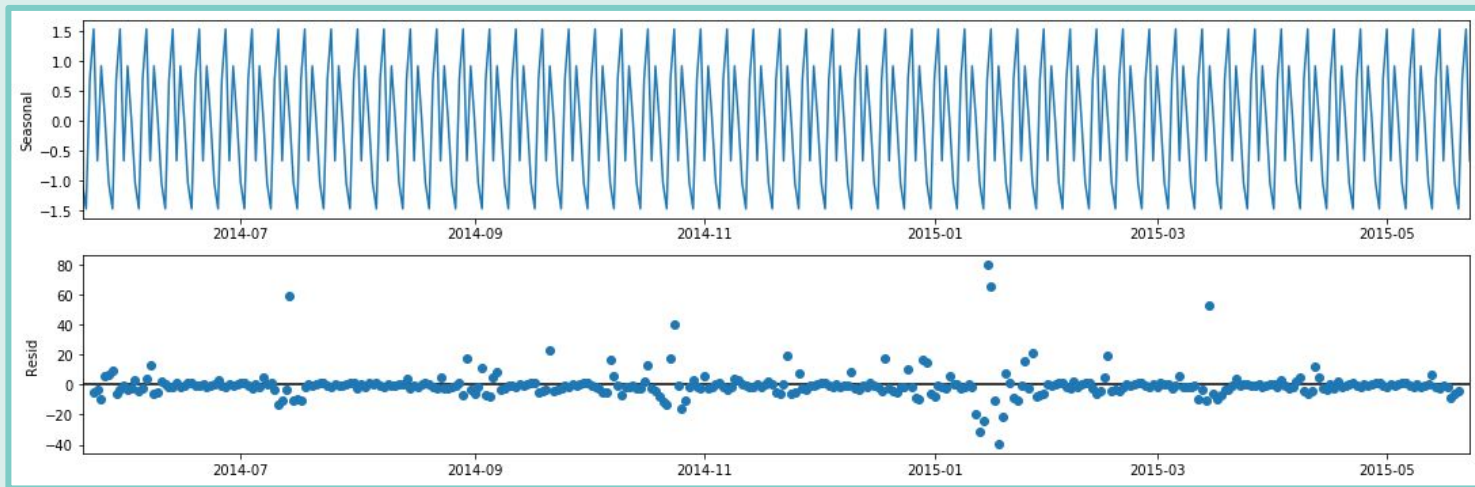
# 3 Models



- SARIMAX
- Facebook's Prophet
- Gated Recurrent Units

# Seasonality

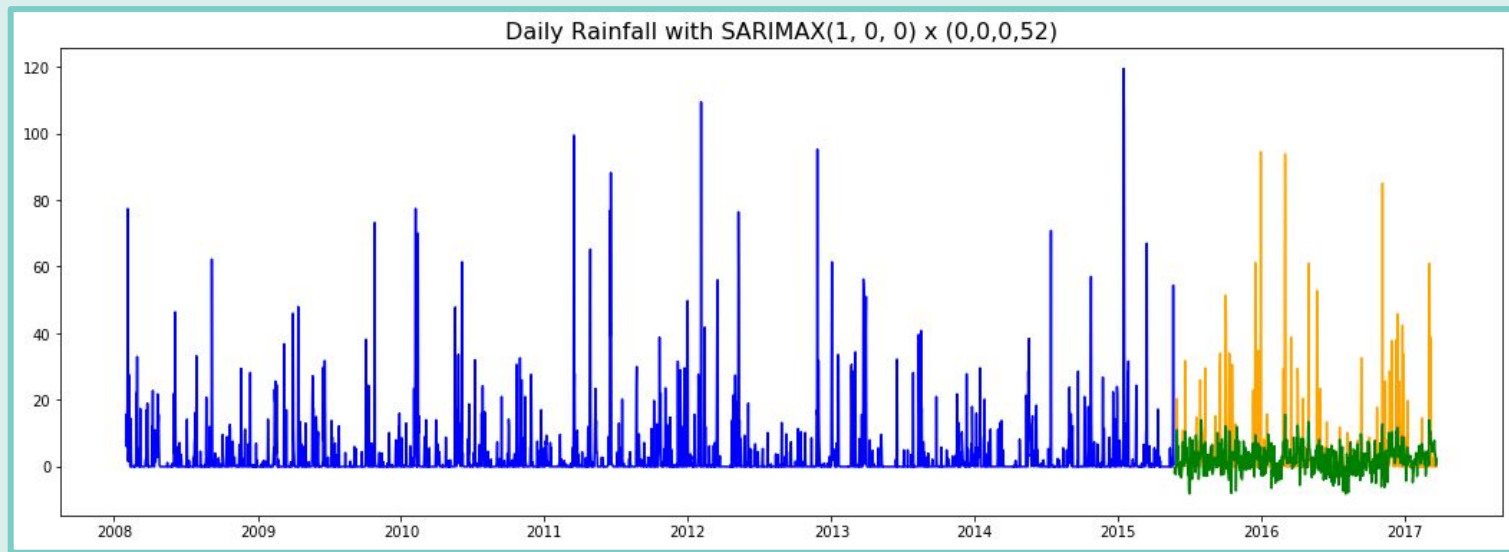
Statsmodel decompose



Weekly Seasonality

# SARIMAX

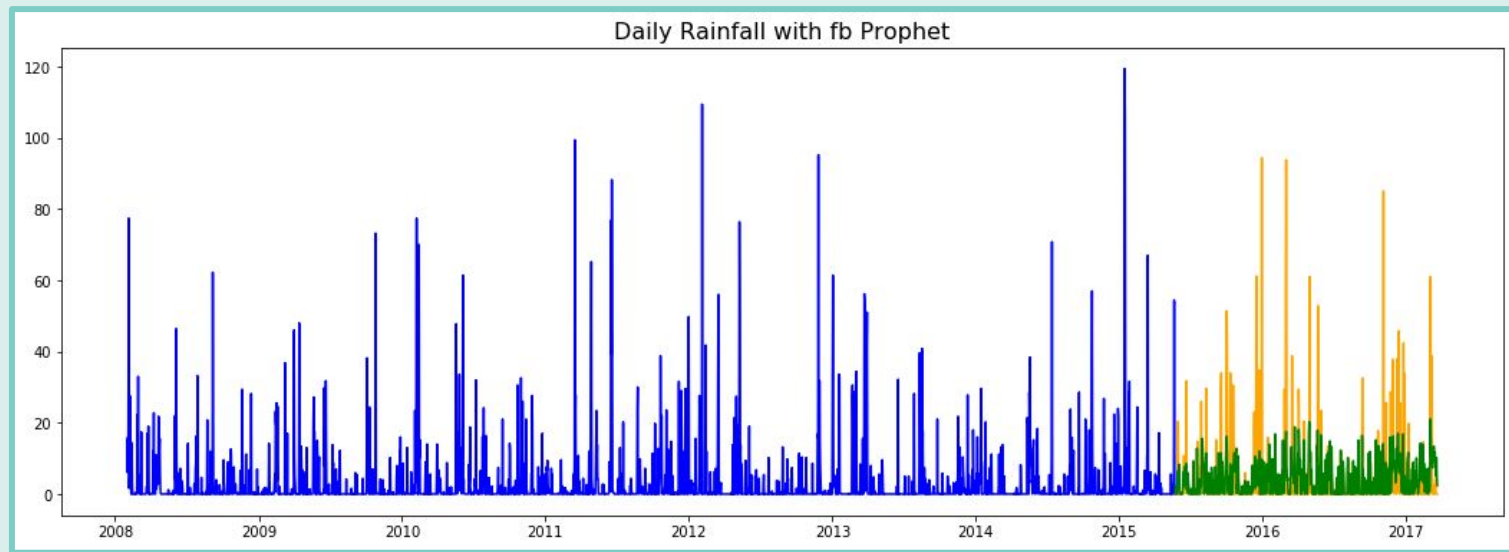
Baseline: 125.6



- SARIMAX did quite well with a Mean Squared Error of **99.1**
- Model produced negative values which doesn't make sense for Rainfall
- Had to impute the seasonality inferred by our statsmodel

# Fb's Prophet

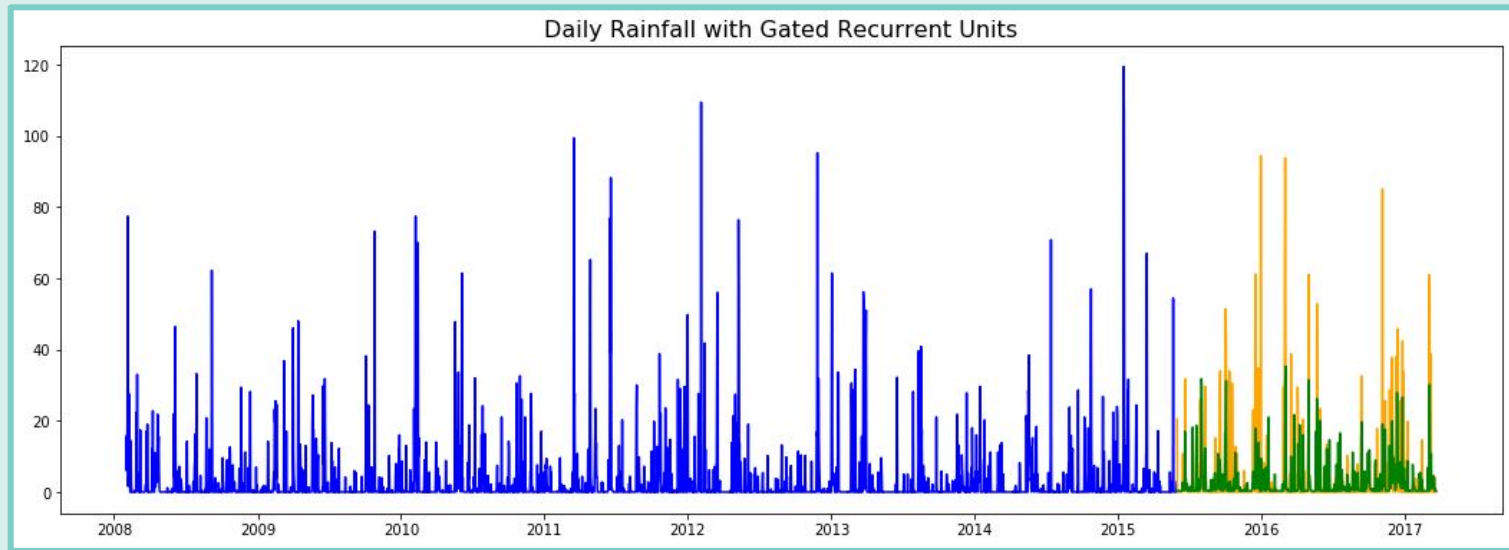
Baseline: 125.6



- Prophet did not do as well with a Mean Squared Error of **104.2**
- Seasonality is inferred by Prophet and does not require imputation

# Gated Recurrent Units

Baseline: 125.6



- GRU did a lot better with a Mean Squared Error of **87.9**
- Seasonality is inferred by GRU and does not require imputation
- More Complex than our conventional time series



04

# Conclusion



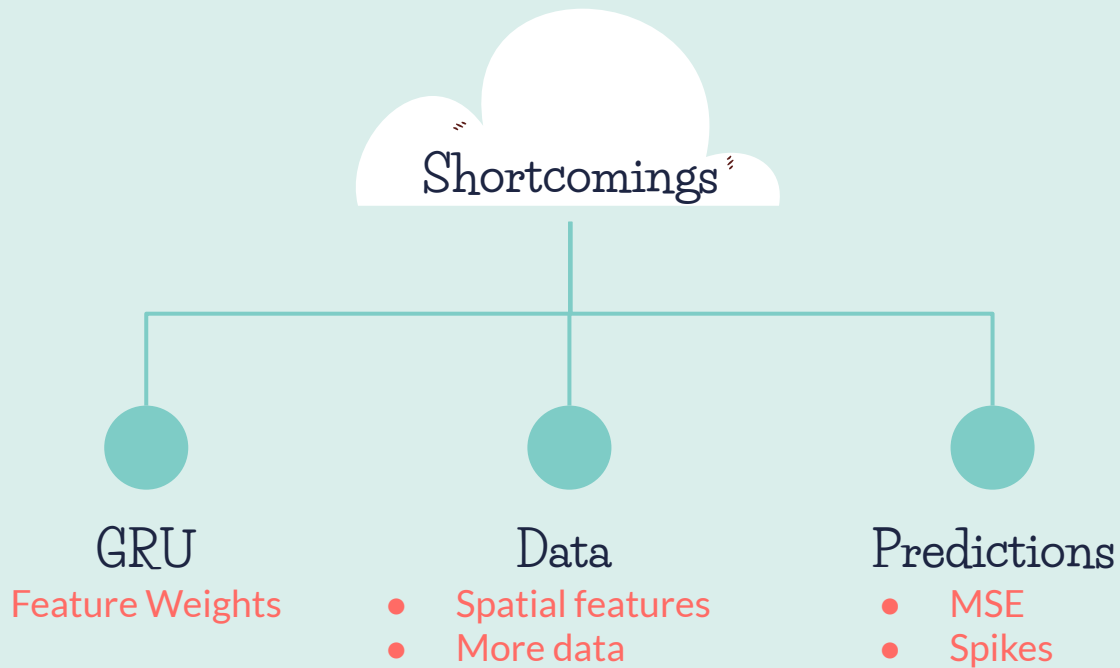
# Summary



| Method     | Mean Squared Error |
|------------|--------------------|
| Baseline   | 125.6              |
| SARIMAX    | 99.1               |
| Prophet    | 104.2              |
| <u>GRU</u> | <u>87.9</u>        |



# Limitations



# Thank You!

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