# Strategizing Racing Tactics for 2023 Singapore Grand Prix

A preliminary study of the Singapore weather

# Problem Statement

- The weather affects a F1 team in a multitude of ways during the strategizing process.
- Temperature of the track surface significantly affects the traction of the tires. Tire selection very crucial to the outcomes of the race.
- Weather plays a huge part in the tactical planning of F1 teams that would make a difference between dominating or getting dominated in the race.

# Project Objectives

Data Visualization

Identifying trends in the data and analyse

Making recommendation based on the analysis

# Background

Traction is plays a huge role in F1. Tire selection, management and timing is key.

3 different types of tires:

- Wet
- Intermediate
- Slicks : Soft, Med, Hard

# Background

If weather is hot, tires wears out easily, might not be able to push the car to its absolute limit, in fear of over heating:

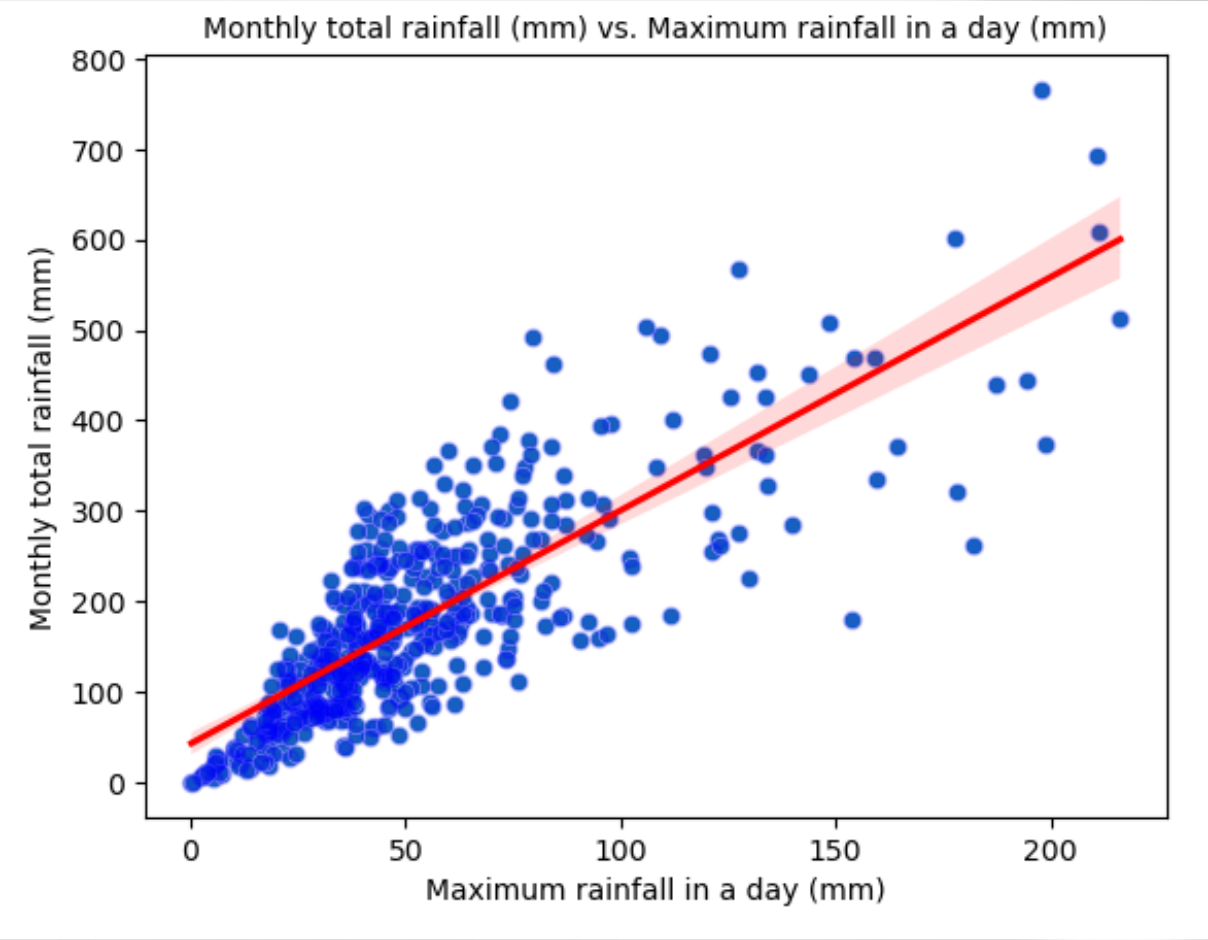


If its raining, traction and visibility is significantly reduced.

Car height might need to be increase to take into account of standing water on track, reducing aerodynamics

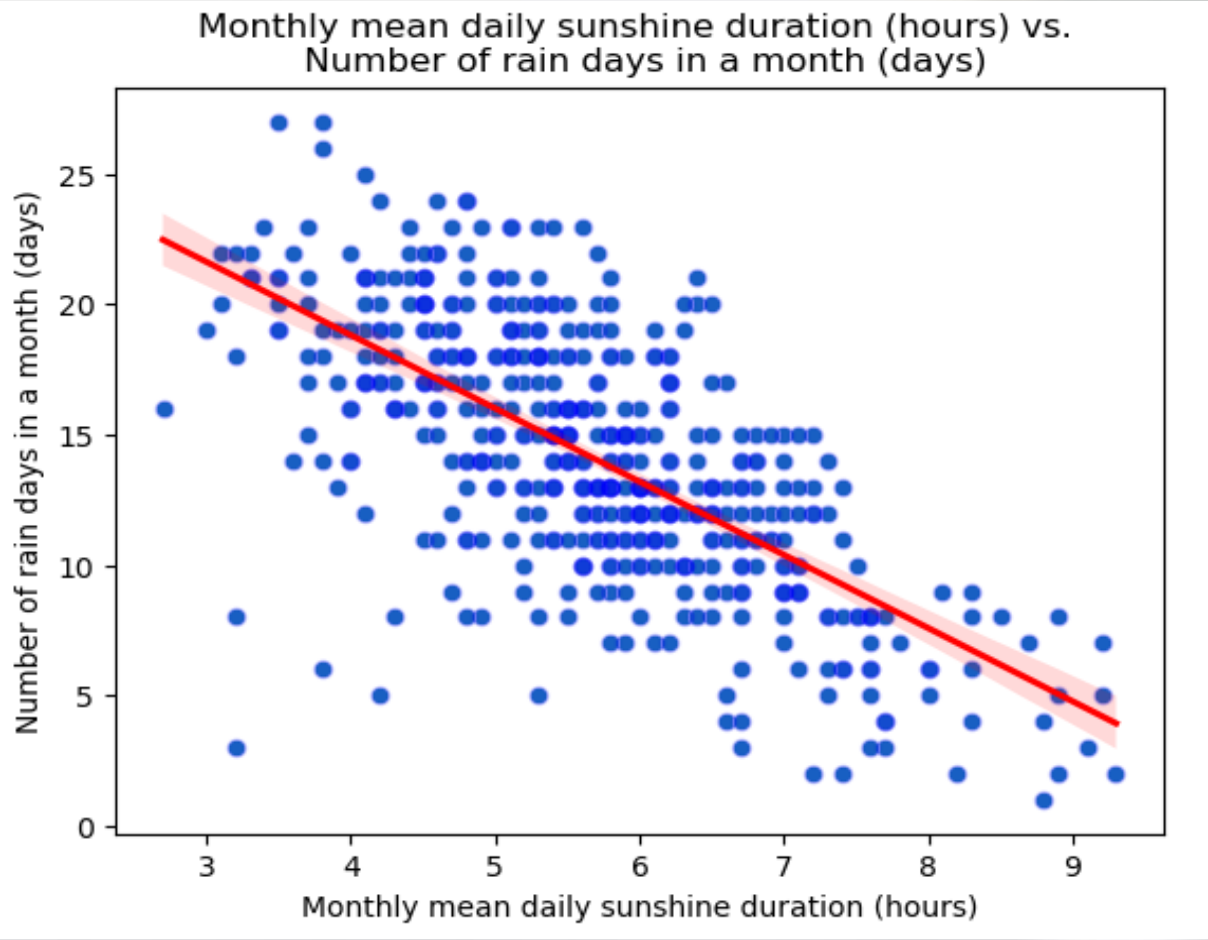
# Weather Analysis: Primary Dataset

- Correlations in primary dataset:
  1. Monthly total rainfall vs Maximum rainfall in a day



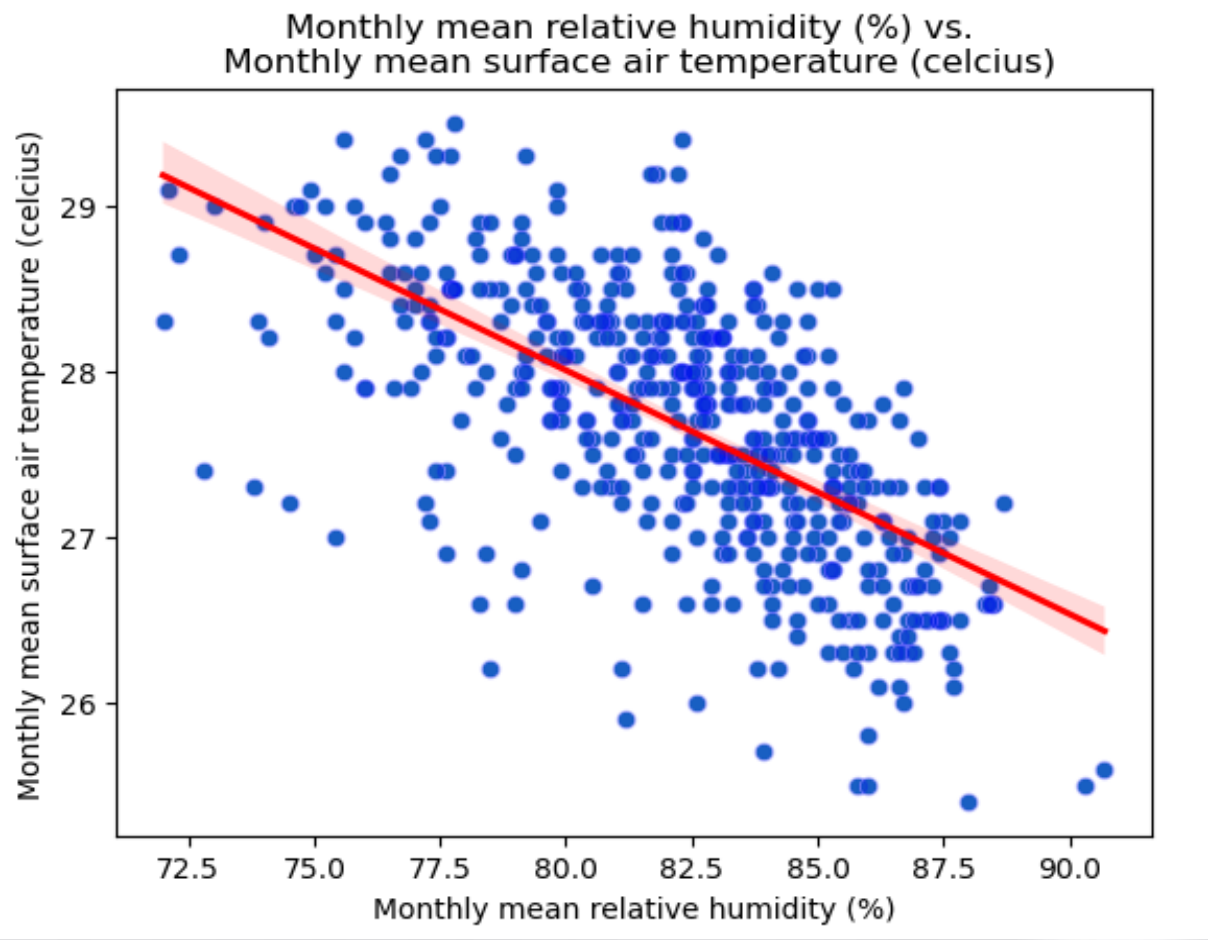
# Weather Analysis : Primary Dataset

- Correlations in primary dataset:
  2. Monthly mean daily sunshine duration vs Number of rain days in a month



# Weather Analysis : Primary Dataset

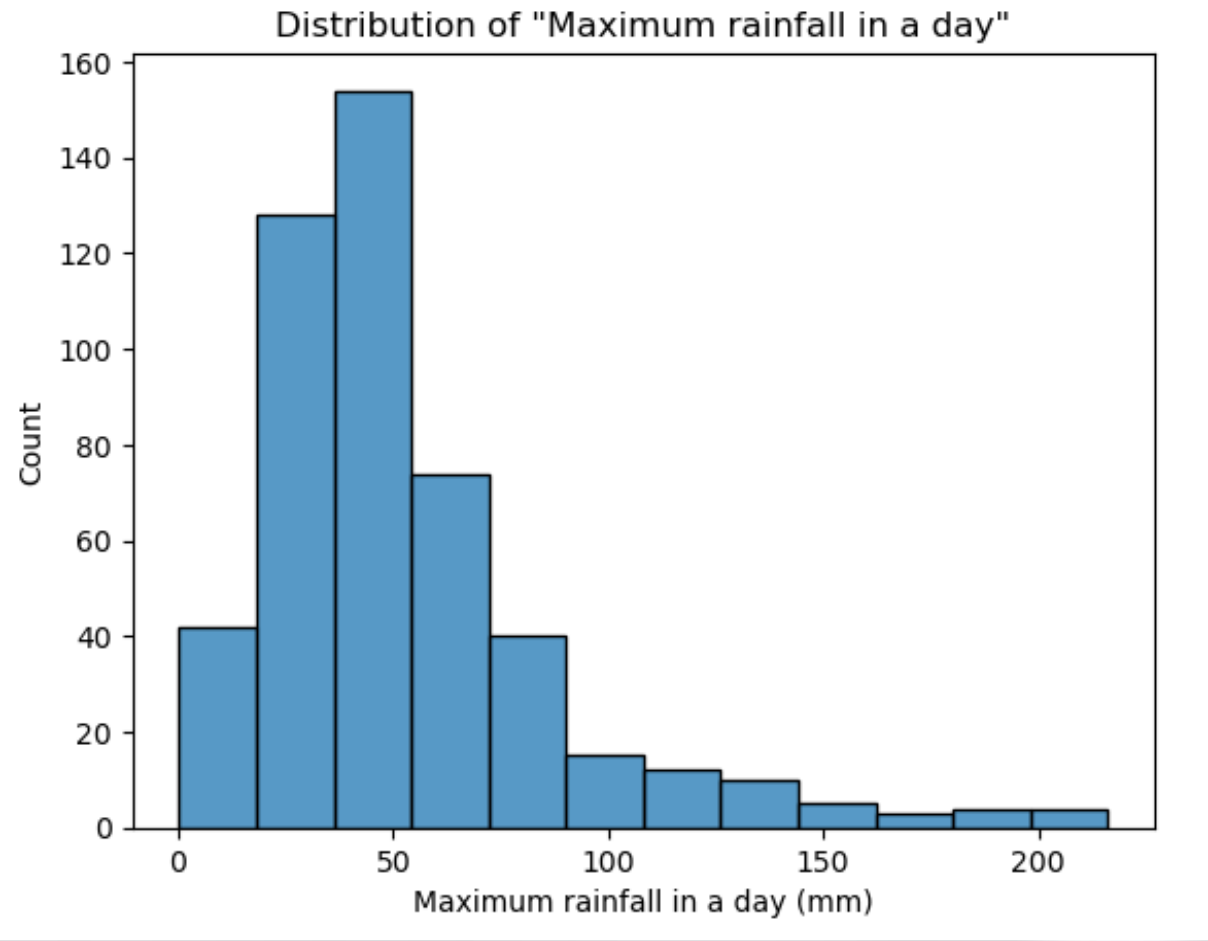
- Correlations in primary dataset:
  3. Monthly mean relative humidity vs Monthly mean surface air temperature



# Weather Analysis : Primary Dataset

- Distribution of “Maximum rainfall in a day”:

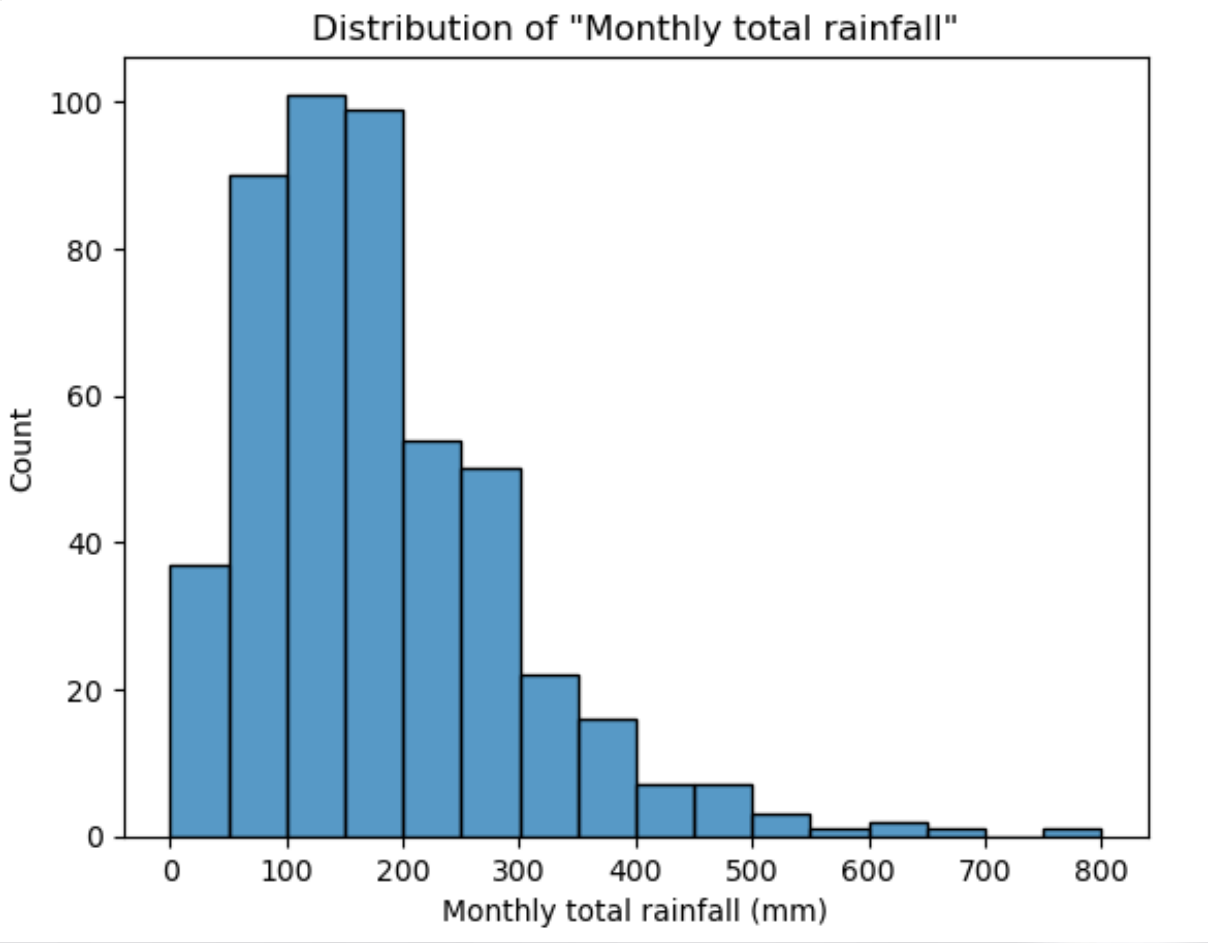
  Histogram of “Maximum rainfall in a day”



# Weather Analysis : Primary Dataset

- Distribution of “Monthly total rainfall”:

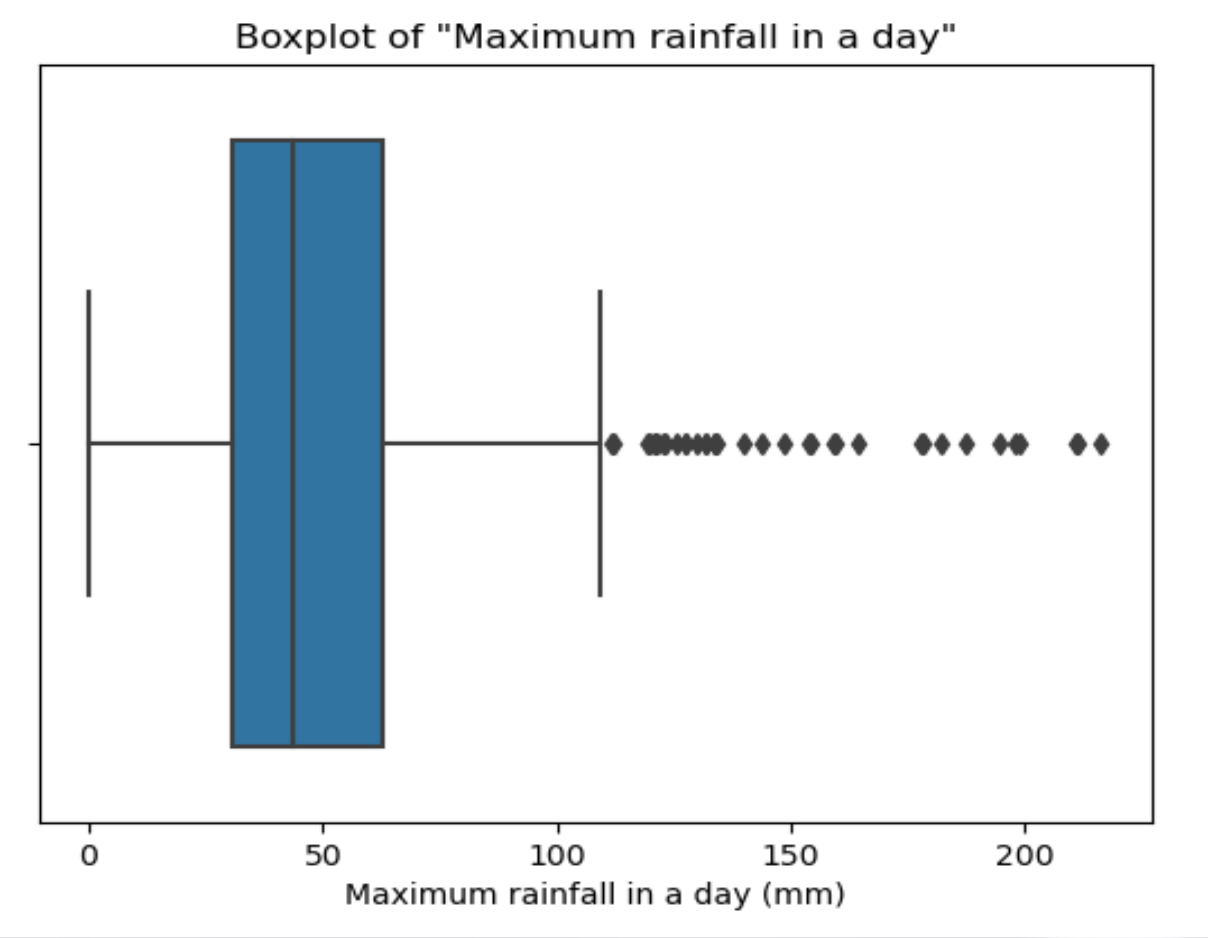
  Histogram of “Monthly total rainfall”



# Weather Analysis : Primary Dataset

- Outliers check for “Maximum rainfall in a day”:

  Boxplot of “Maximum rainfall in a day”



# Weather Analysis : Primary Dataset

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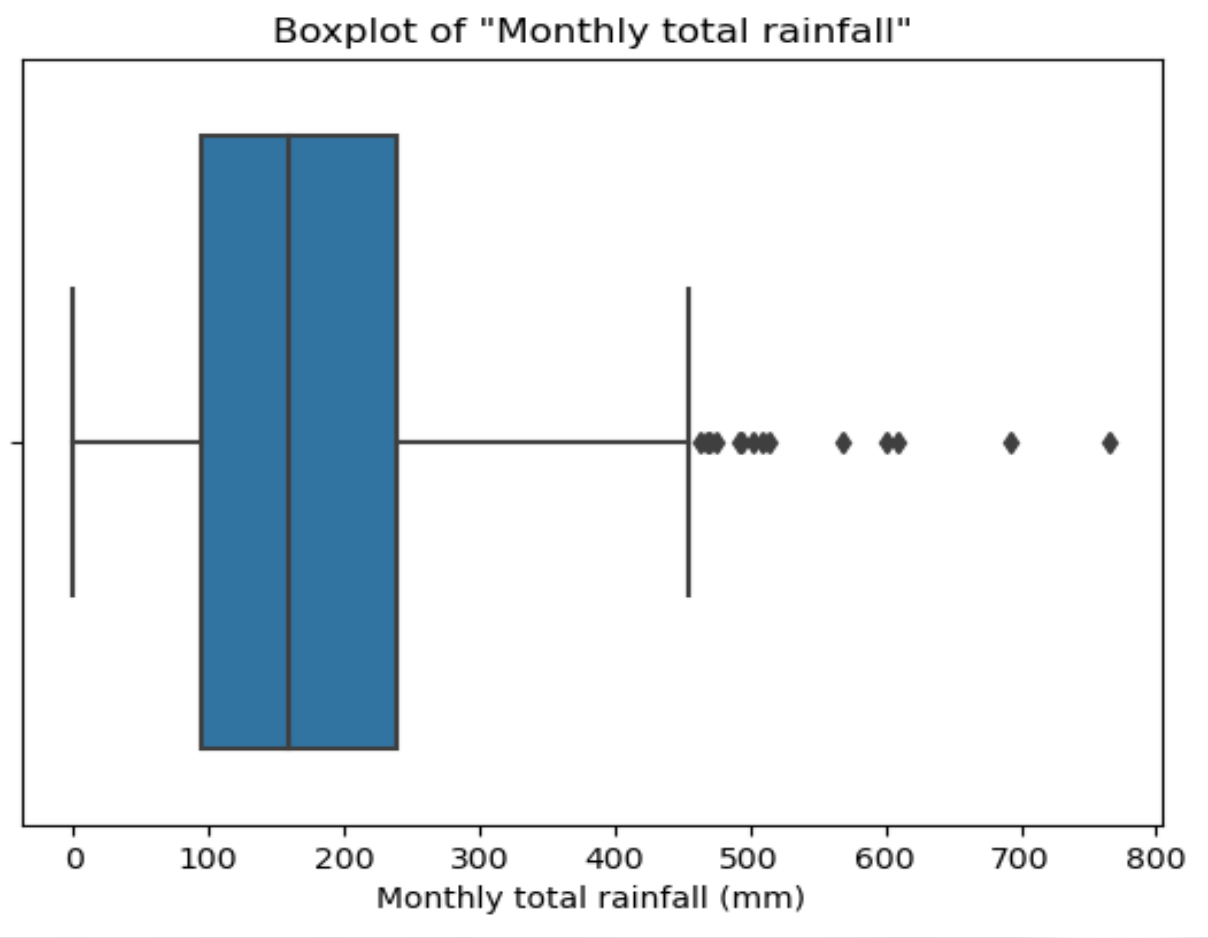
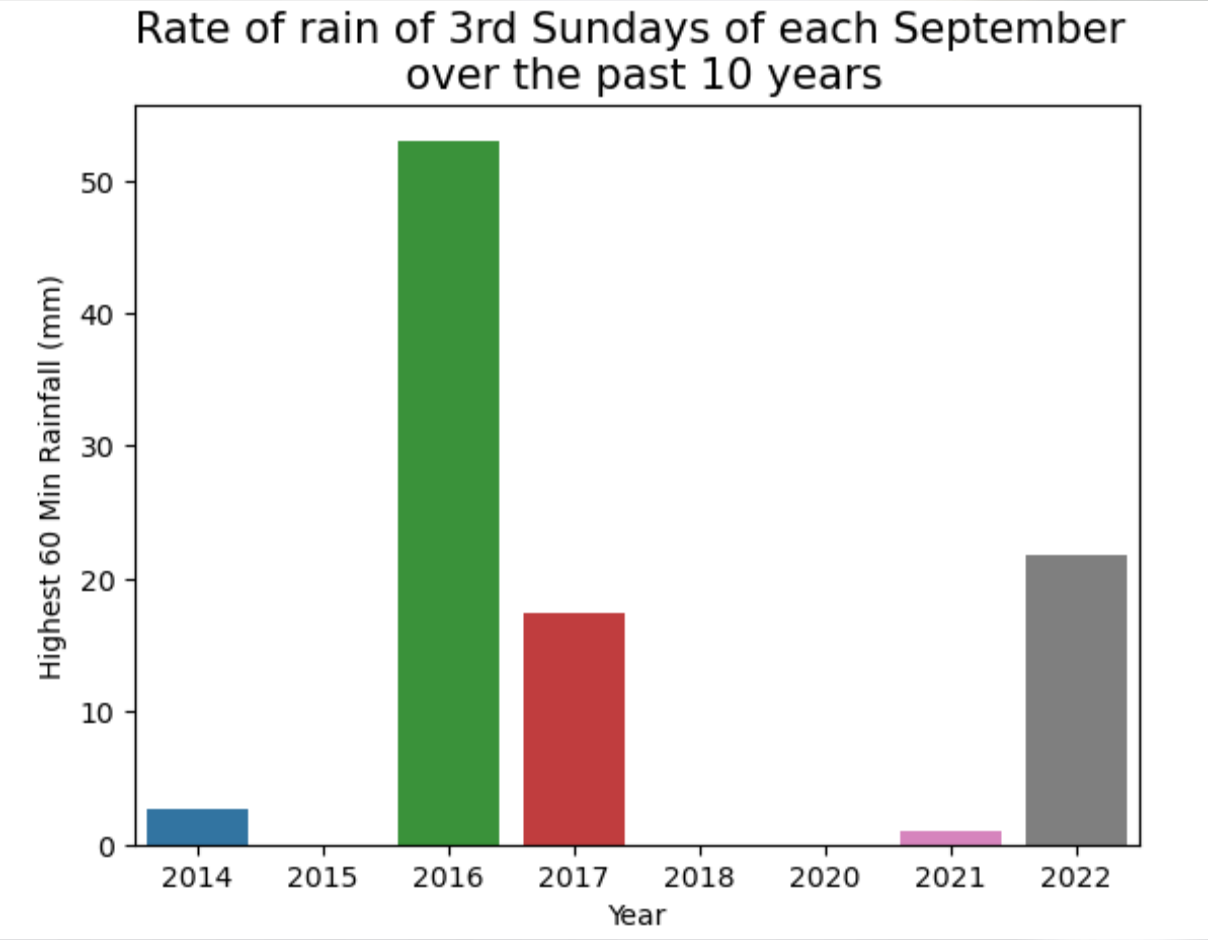
  Boxplot of “Monthly total rainfall”



# Weather Analysis : Secondary Dataset

- Rate of rain:

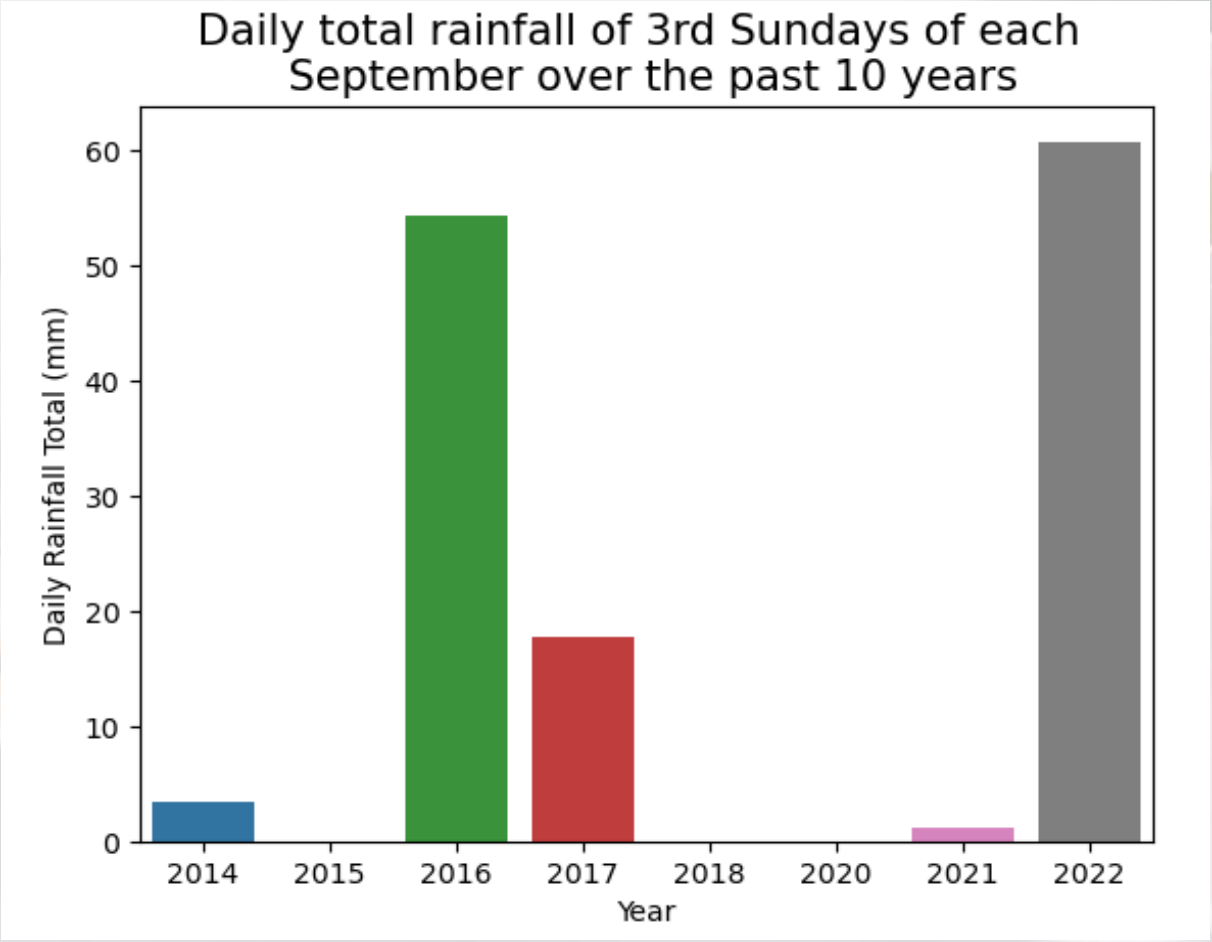
  Bar chart of “Highest 60min Rainfall” over the past 10 years



# Weather Analysis : Secondary Dataset

- Daily total rainfall:

  Bar chart of “Daily Rainfall Total” over the past 10 years



# Conclusion and Recommendation

- There were a lot of outliers from the primary dataset, indicating extreme weather changes.
- Recommended for F1 team to prepare for a intermediate / wet condition racing for the 2023 Singapore Grand Prix, with a high possibility of the race being delayed in the mid of the Grand Prix due to rain.
- The secondary data indicated rainfall that somewhat coincided with El Nino Southern Oscillation (ENSO) records over the years.

# Key Limitations

- Secondary data was only obtained up till 2010, with numerous missing entries in the early years

- Due to time constraint, was not able to study into the El Nino Southern Oscillation (ENSO) year records to determine if there are more correlation that would help us to potentially predict the weather for the 2023 Singapore Grand Prix with a higher degree of certainty.

- Current analysis and recommendations are made under the assumption that the future will repeat similar trends from the past.