Formula AI Hackathon 2022

Formula 1 2021 Weather Data for the Formula AI Hackathon '22 - Challenge 1

Introduction

Formula 1 is one of the most competitive sports in the world. It is the highest class of international racing for open-wheel single-seater formula racing cars.

Engineers and technicians from every team use weather radar screens, provided by Ubimet to the teams, which allows them to track the current weather and make predictions during the race.

Problem Statement

F1 2021, the official Formula 1 videogame developed by Codemasters, uses a physics engine that behaves like the real world.

Points, and even races sometimes, are won and lost based on making sense of what the weather is going to do during a race, and being prepared as a team to act accordingly. Therefore, **weather forecasting takes a big part on the possible outcome of a race.**

Objective

We will develop an Artificial Intelligence model that is able to make accurate weather predictions / forecasts with using historical weather data from the RedBull Racing eSports team.

Indicate the predicted weather type at 5, 10, 15, 30 and 60 minutes after a timestamp, and the rain percentage probability at that time.

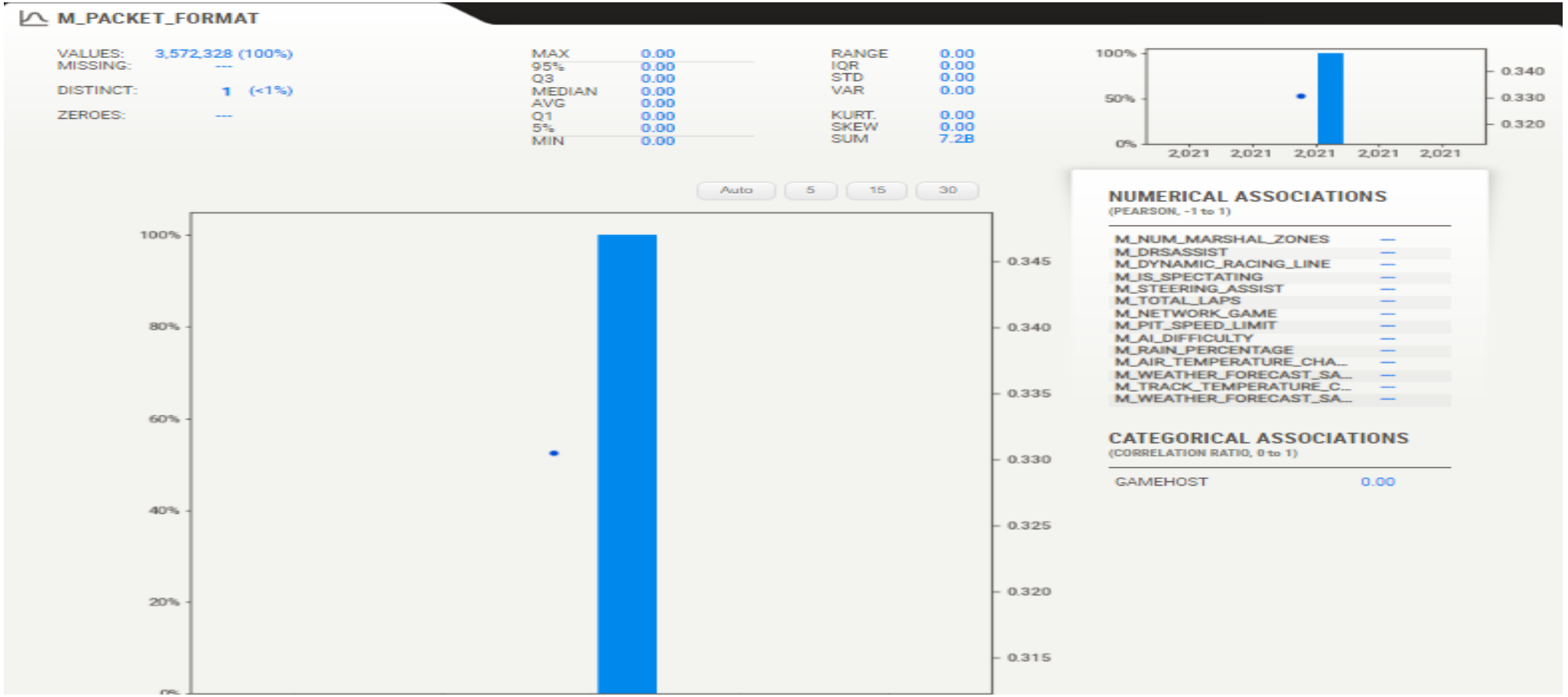
Data

Historical weather data from the RedBull Racing eSports team. It contains one or many weather forecast samples, up to 56. This depends on the duration of the race / grand prix where the data was recorded.

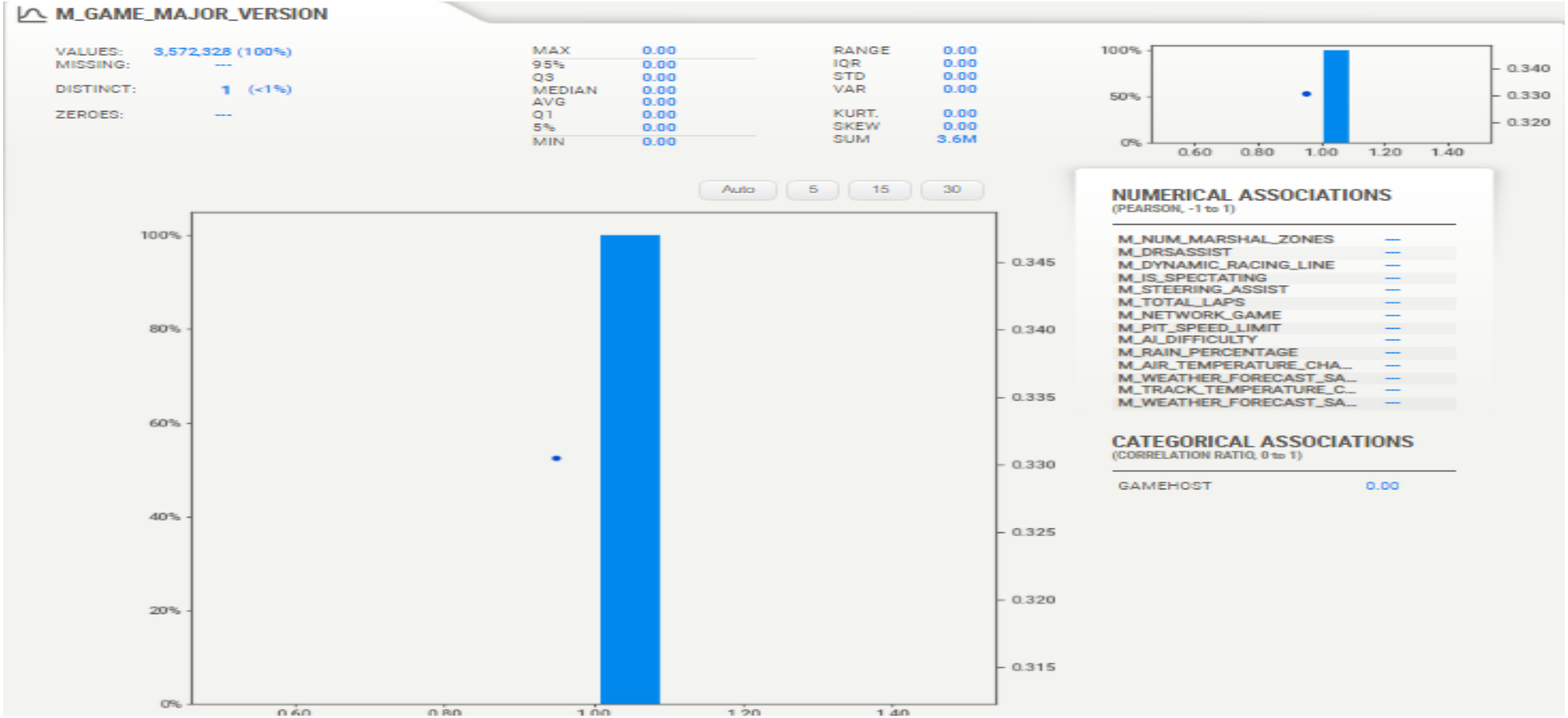
We have 58 input features for each sample.

Data Analysis

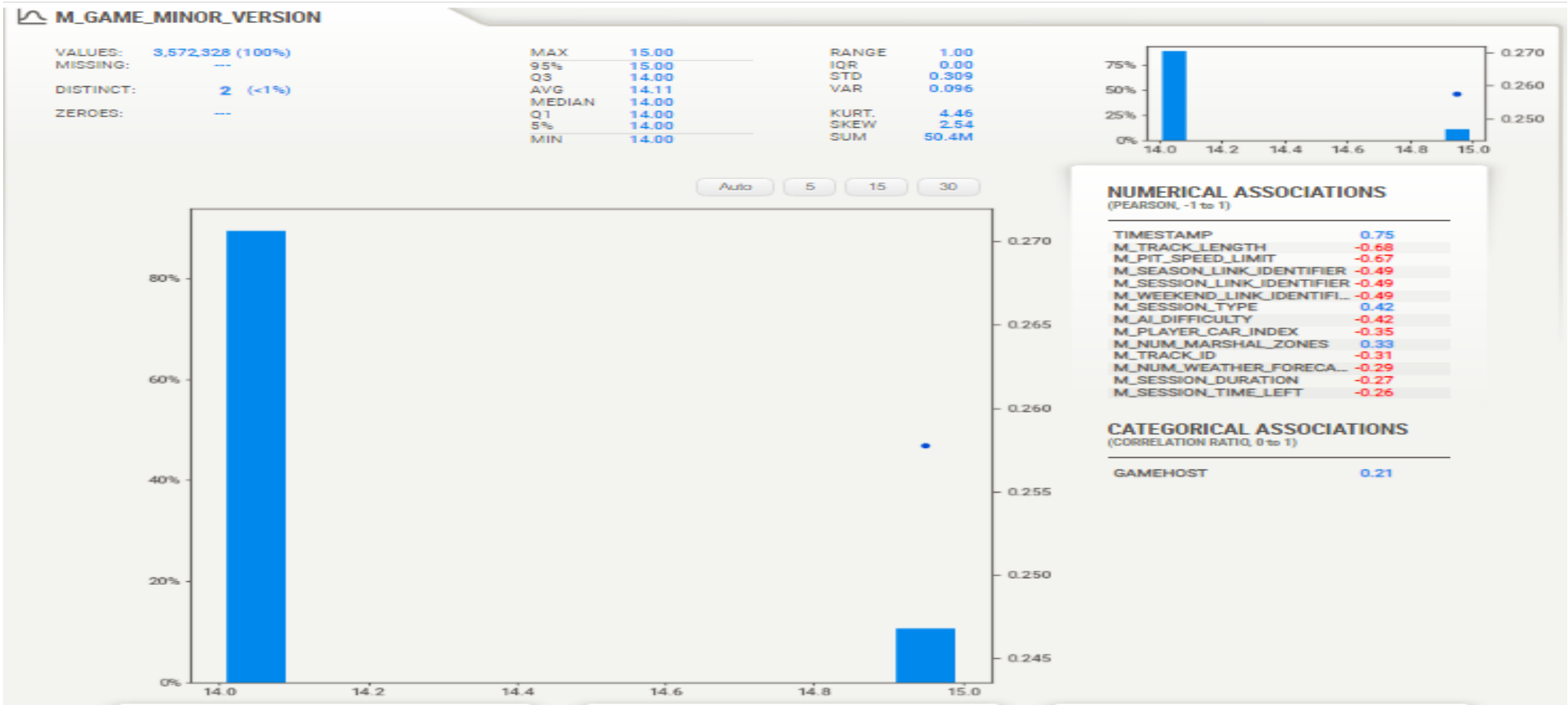
Data Analysis



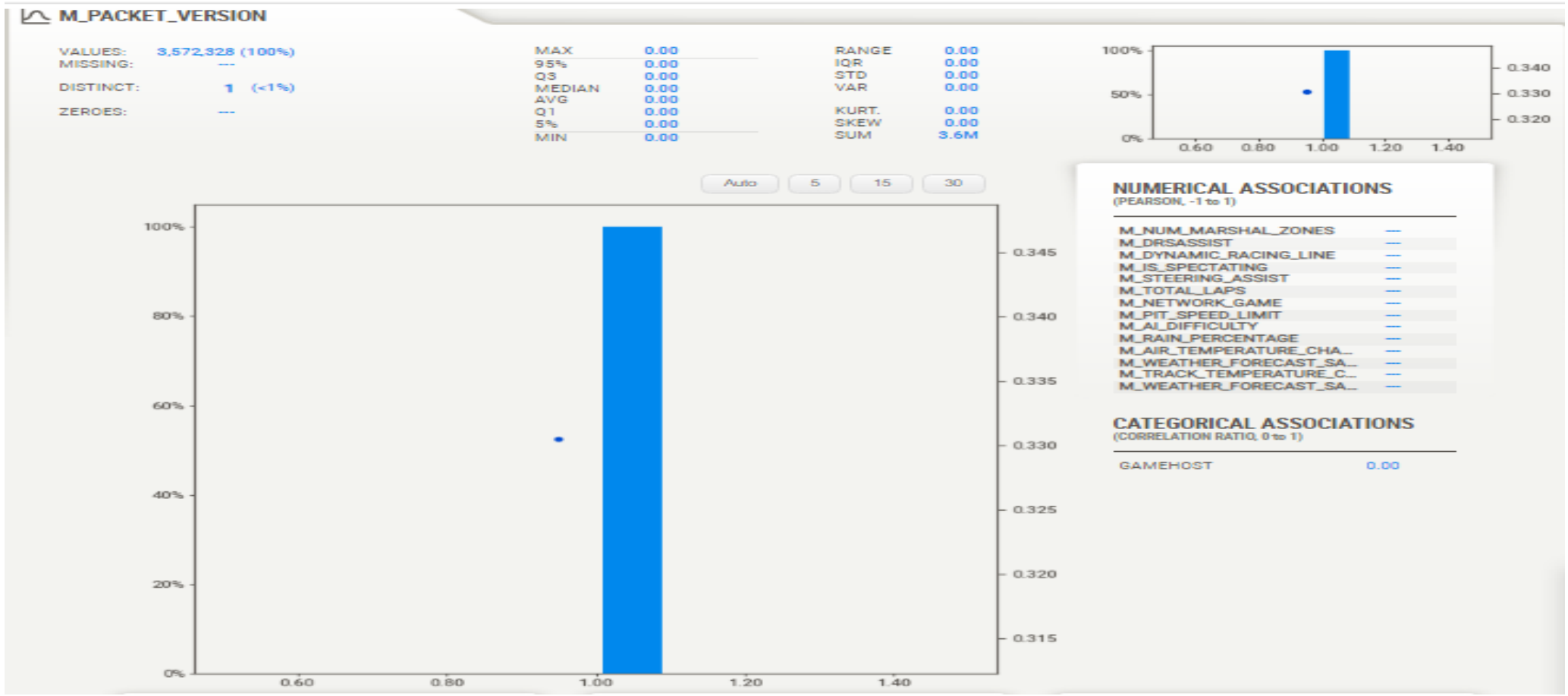
Data Analysis



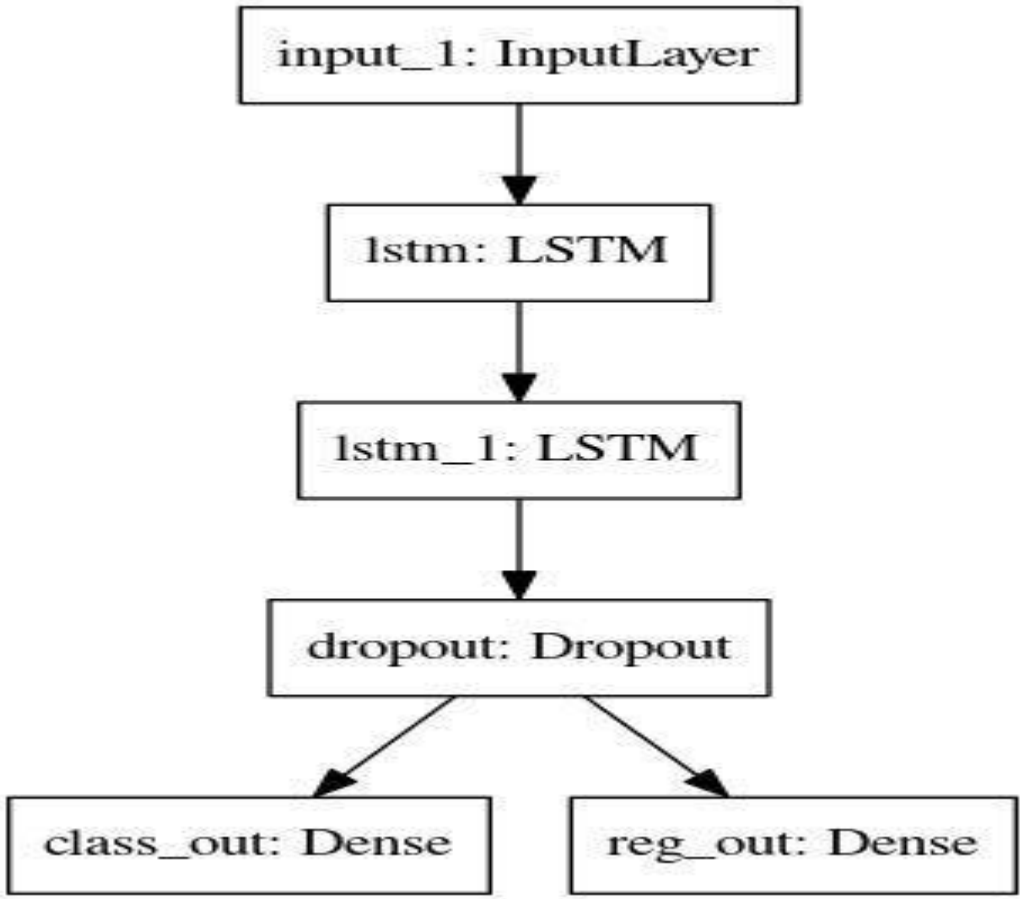
Data Analysis



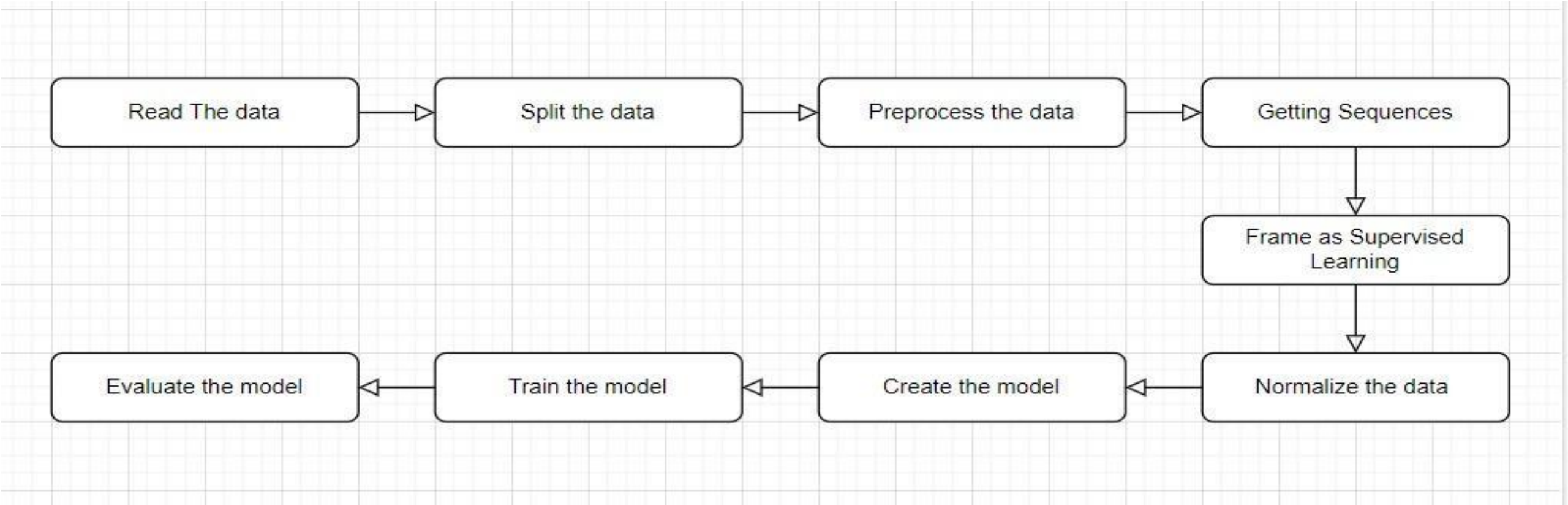
Data Analysis



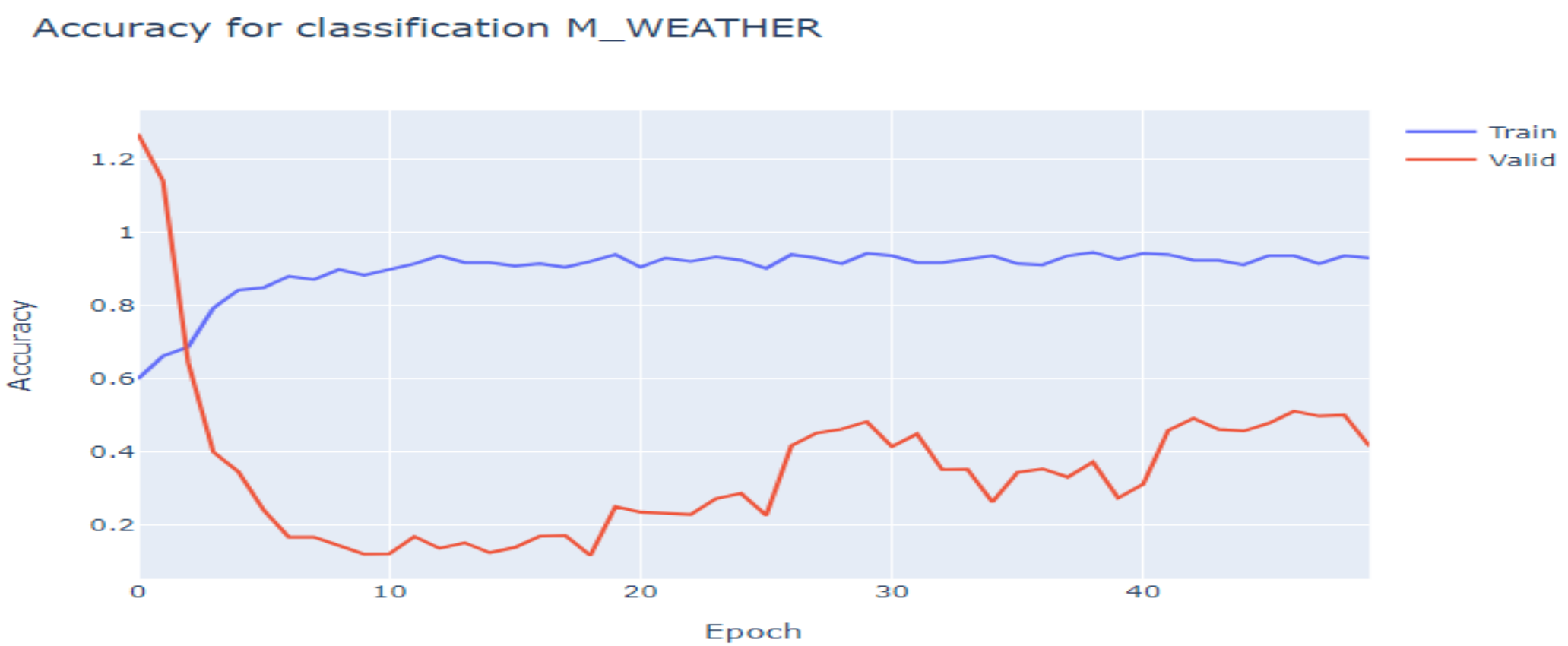
Time Series Modeling



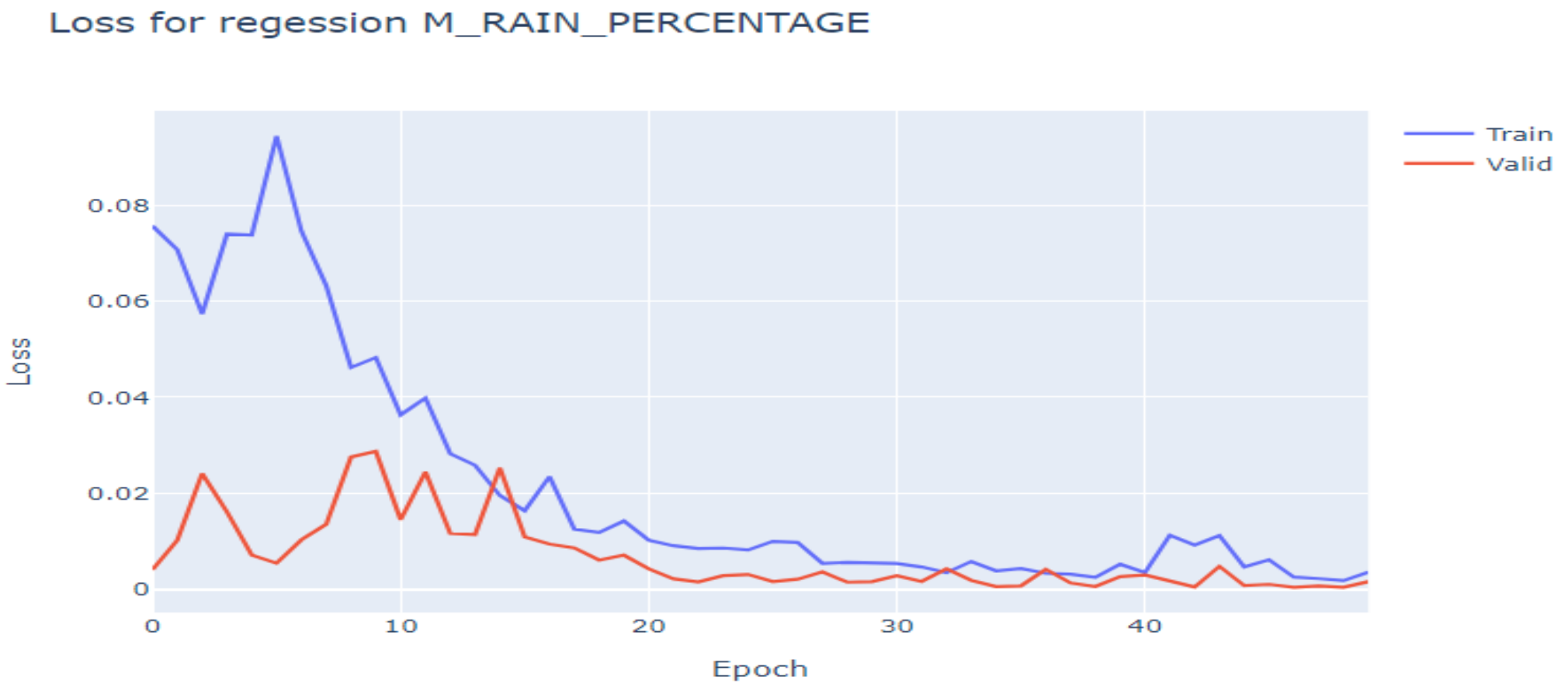
Model Structure



Results


Accuracy for classification M_WEATHER
Train
Valid
Accuracy
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Epoch

Results


Loss for regession M_RAIN_PERCENTAGE
Train
Valid
Loss
0.08
0.06
0.04
0.02
0
0
10
20
30
40
Epoch

Used Tools

Team members

- Afnan Hamdy
- Ali Hassanin
- Aya Abd Elmonem
- Mohamed ElMesawy
- Mohamed Samaha
- Rawan ElMahalawy

Thank You..!