GR822 - Consensus of hourly visibility forecast for airports using NWP model and observations

India Meteorological Department (IMD), Ministry of Earth Sciences (MoES).

Presented by
Dots

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Problem Statement

Development of hourly visibility forecast using NWP model products and past observation for the next 12/24 hours using ANN/ML/DL for selected airports in the country.

Input

1. Model simulated Temperature, Wind Speed, Wind Direction, Humidity (ASCII Format)
2. Observed visibility data (Met report) from selected Airport (ASCII)

Output

1. Hourly visibility product for 12/24 hours
2. Format: ASCII
3. Platform: Linux/Windows.

Solution

The main aim is to instantiate and deploy a weather forecasting model.

1. RH_2maboveground - Relative humidity at 2 meter height [%]
2. TMP_2maboveground - Temperature at 2 meter height [Kelvin]
3. DPT_2maboveground - Dew point Temperature at 2 meter height [Kelvin]
4. VIS_2maboveground - Visibility [meter]
5. WIND_10maboveground - Wind Speed
6. WDIR_10maboveground - Wind Direction

- These parametric values are present in both observed dataset and predicted dataset.

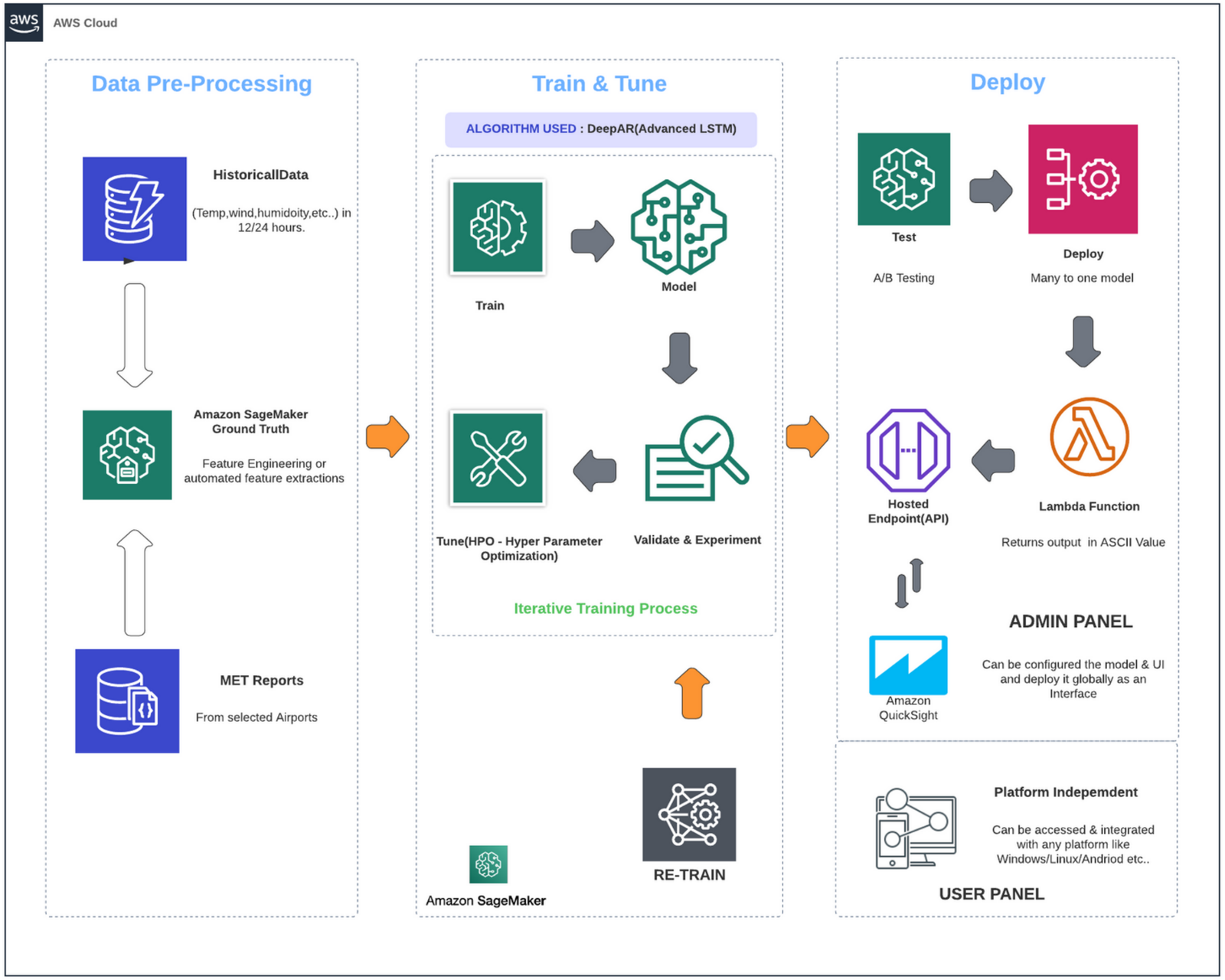
Solution

- Auto Regressor is a Multi Variant model that uses the output of previous iterations as the input of the current iteration which results in better accuracy.
- The output from the Auto Regressor model is compared with the observed value in order to check whether the nowcasted data is accurate.
- The Nowcasted visibility values are plotted against various factors like temperature. time, dewpoint, and humidity which ensures that the user understands the correlation between the various factors that contribute to visibility.
- The predicted data is visualised in the frontend for the user and the data can be also passed using API Keys.

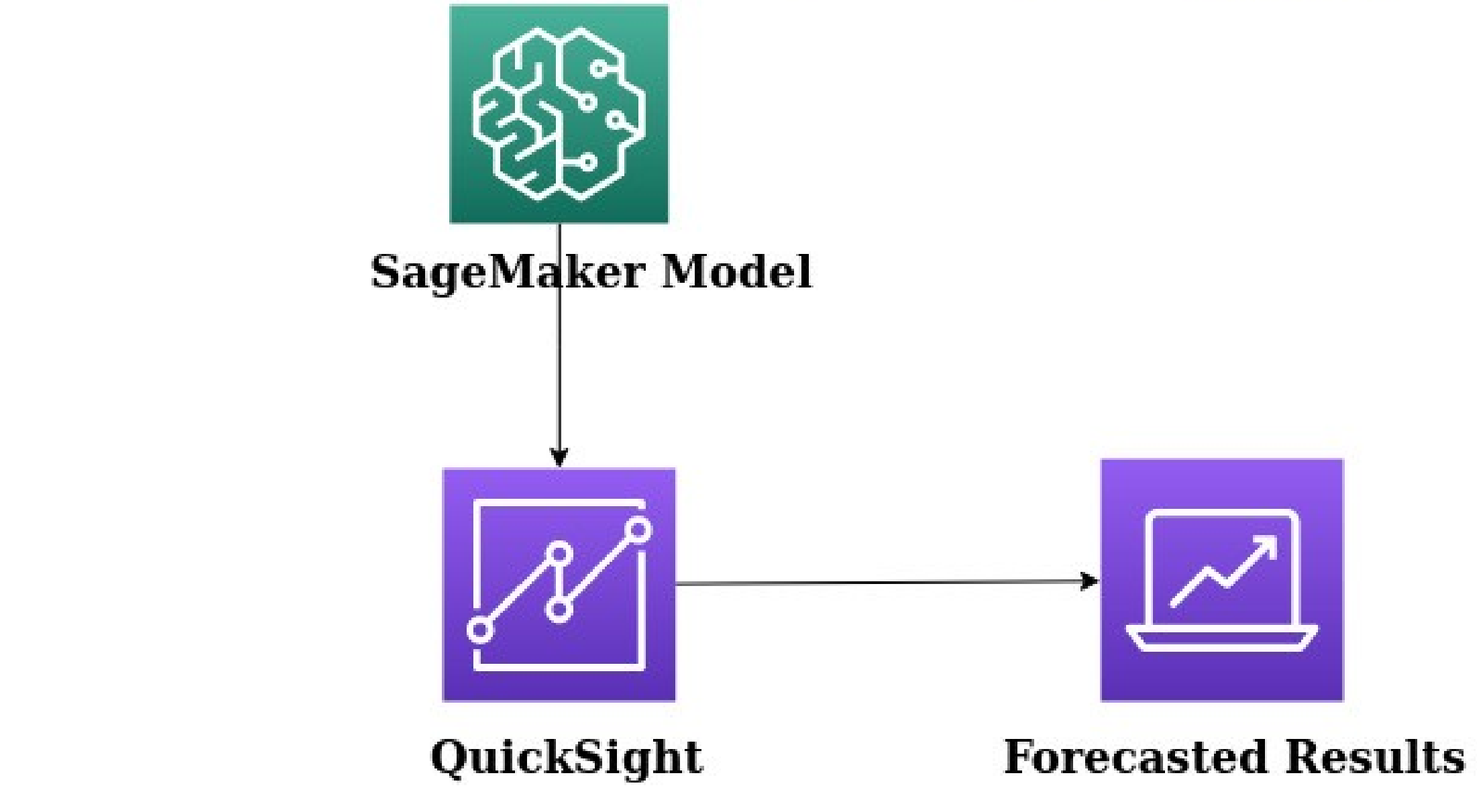
Features

- The entire solution is cloud-based making the model and the UI robust, elastic, scalable, and platform independent.
- Auto Regressor has been proven to be very accurate for nowcasting purposes which makes our model more accurate than traditional models.
- The process of training and visualization is automated, meaning that, the model is automatically trained and visualized when there is an updation in data.
- The UI provides a no-code solution for the users meaning that a large number of customers can access it hassle-free.
- The Geolocation tagger enables the user to predict fog in more than one location, meaning that it can be used by anyone with just the co-ordinates.
- API Keys are generated from the model's output with can be integrated with any pltform or services.

Model Architecture

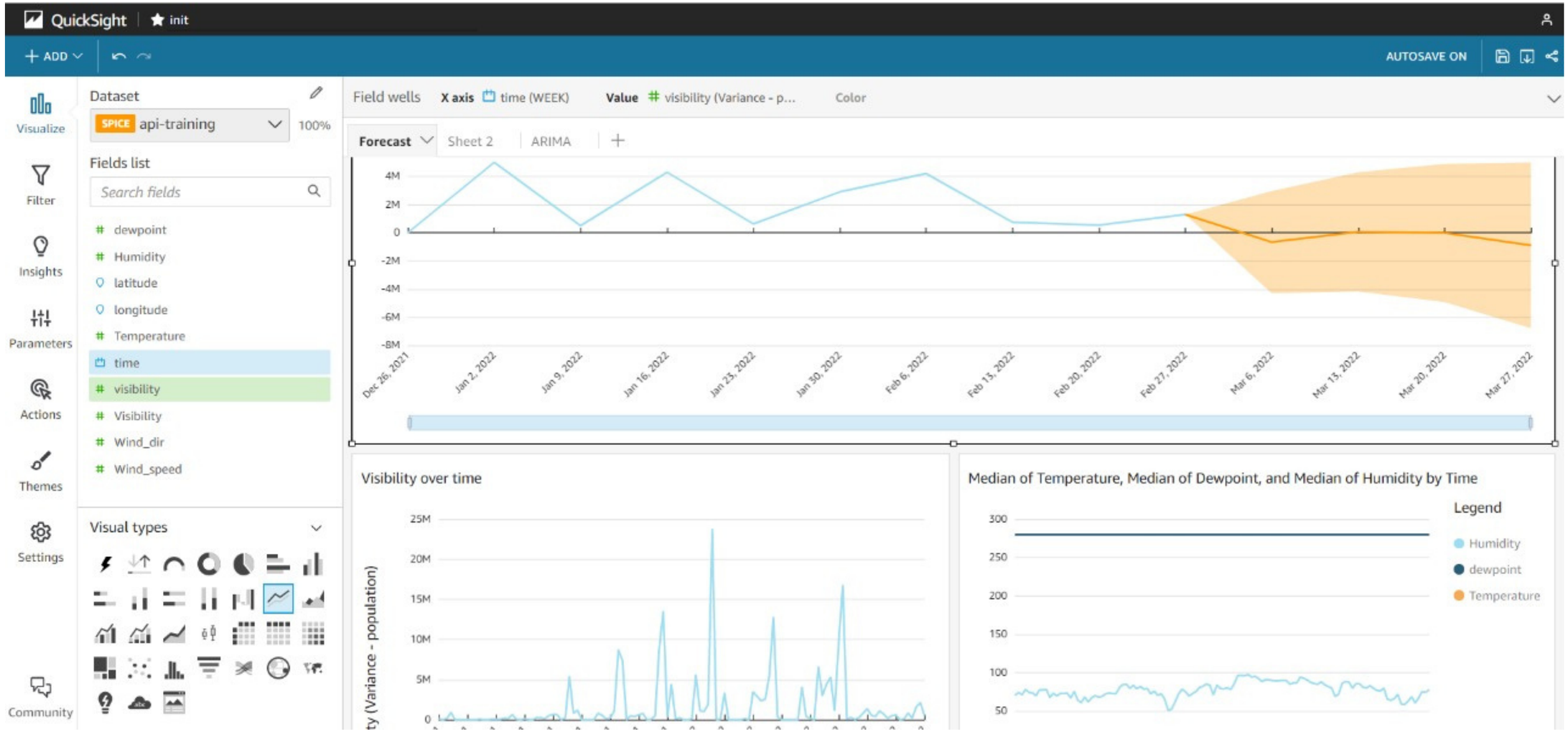


App Integration

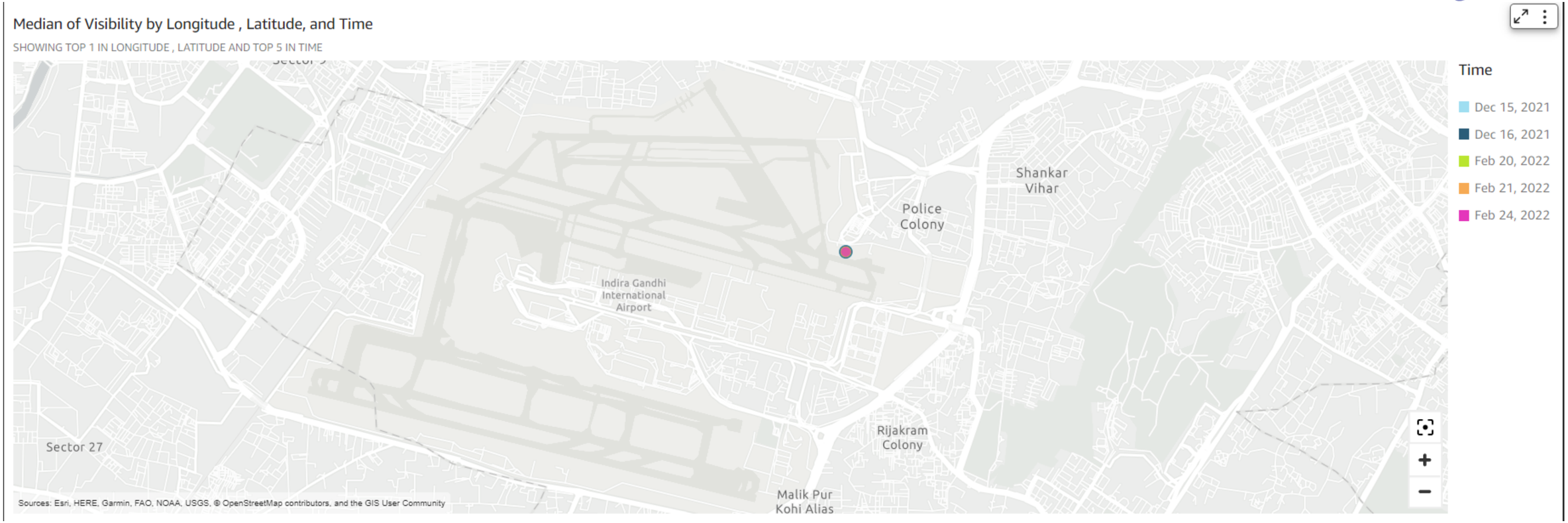


OUTPUT VISUALIZATION

Postmann API Output

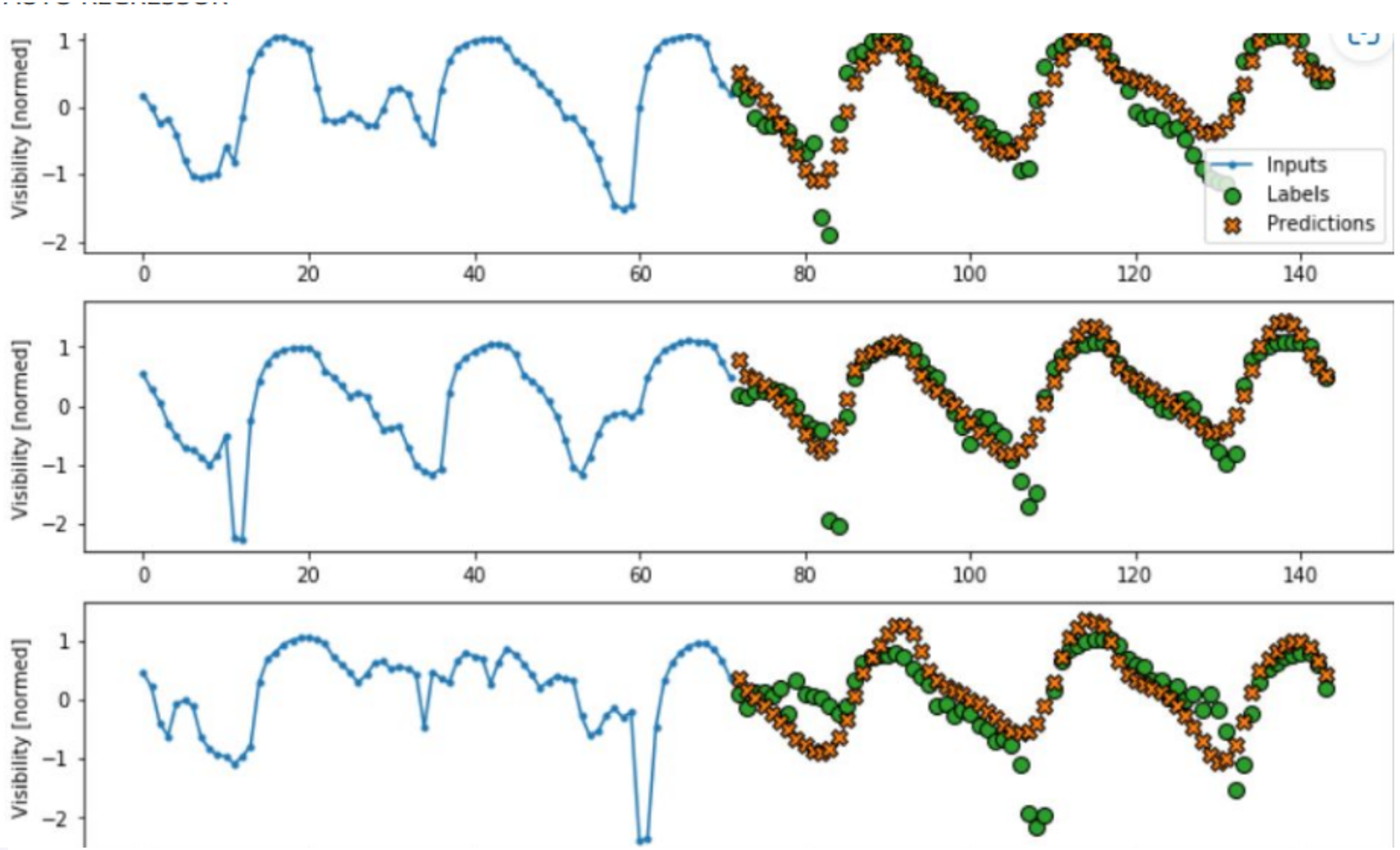


GeoLocation Tagging

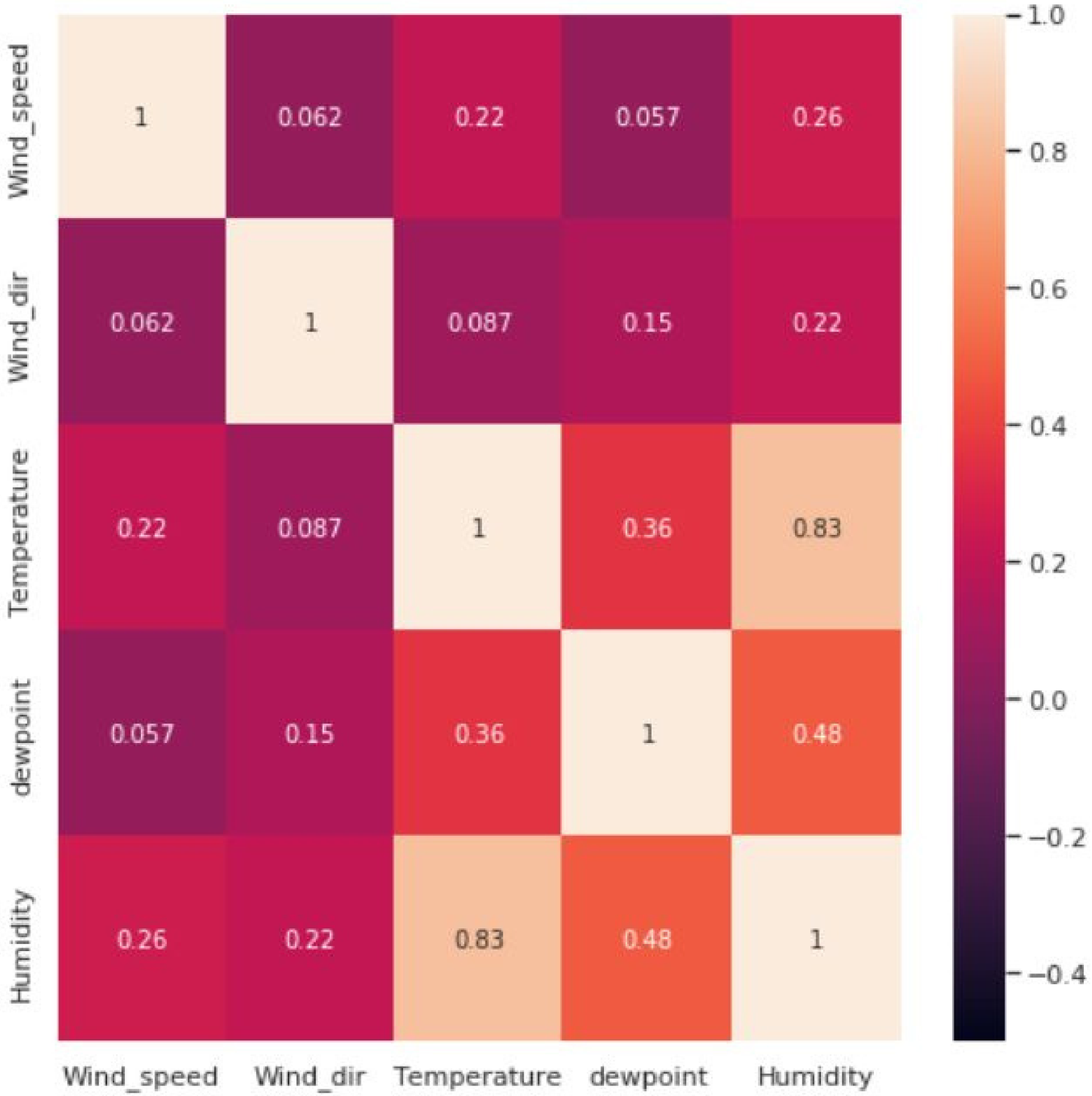


Tagged location is Indira Gandhi Internation Airport, New Delhi

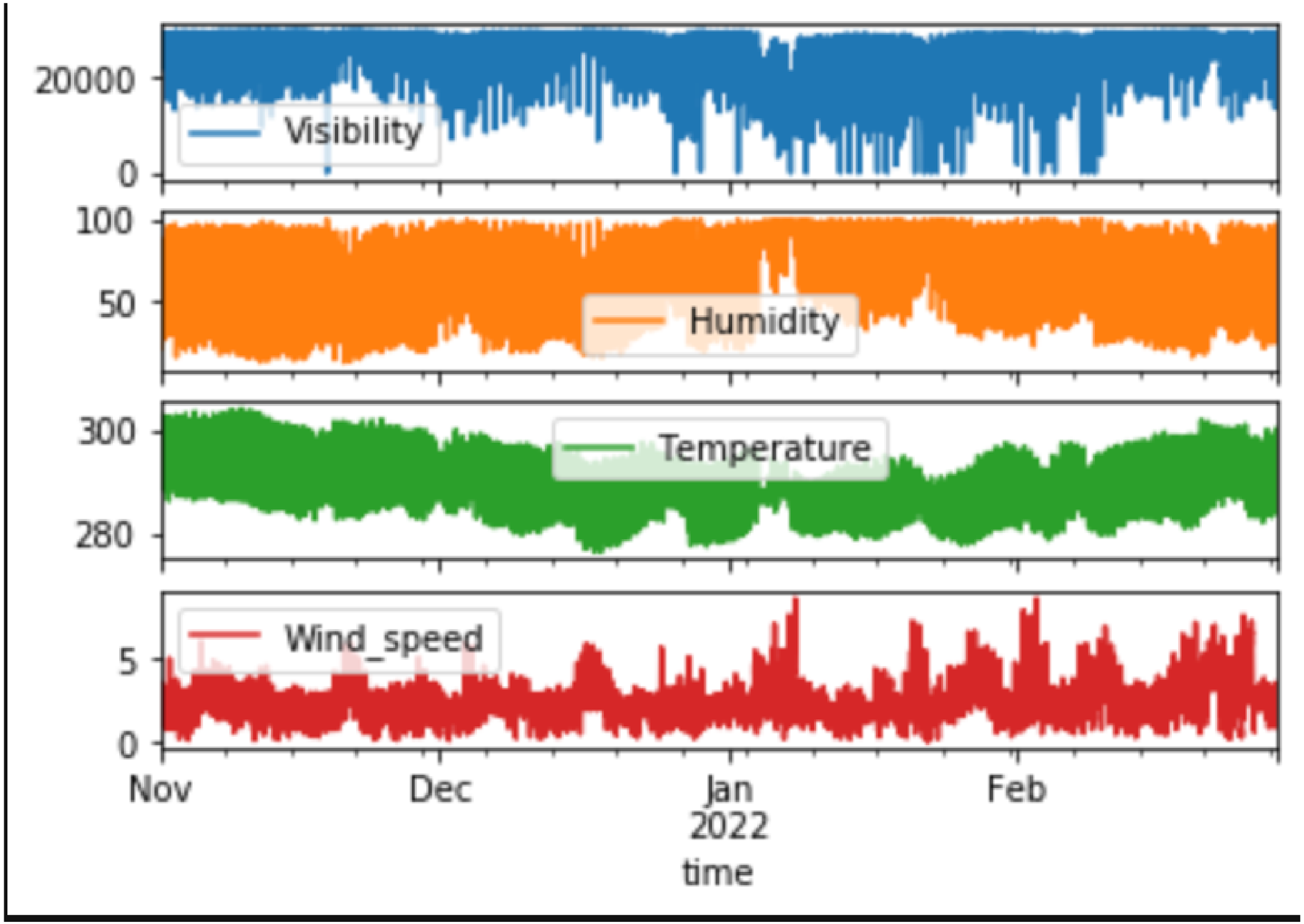
Auto Regressor Output



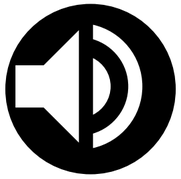
Heat Map of Covariance of Parameters



Parameter Analysis



THANK YOU!!



We are innovating and trying to push forward

For Documentation,
Read,

https://github.com/magesh-sundar/DOTS_GR822/blob/main/README.md