



NASA SPACE APP CHALLENGE 2019

SERENDIPITY

Surface -To - Air (Quality) Mission



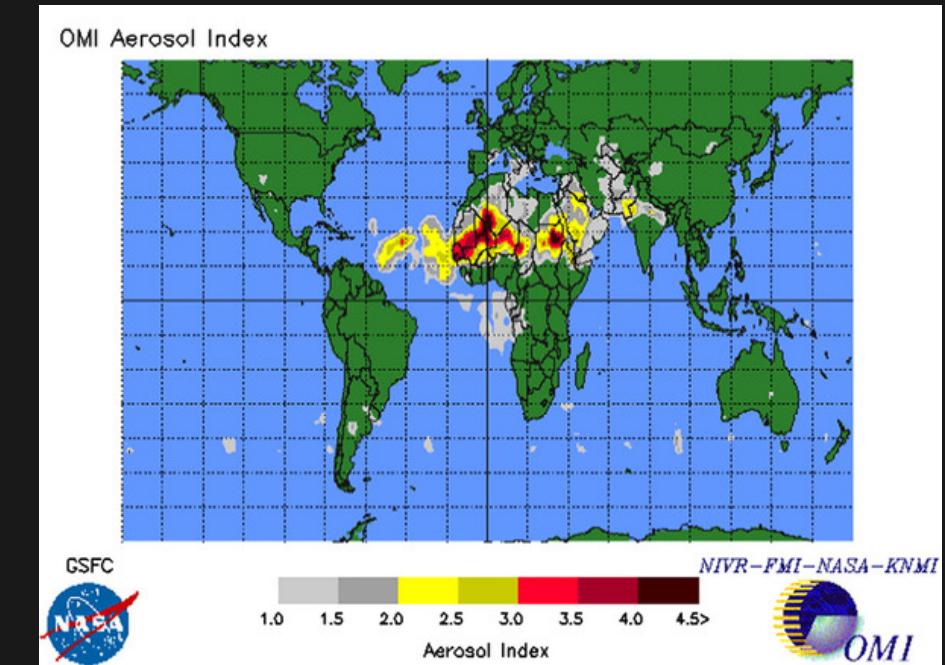
PROBLEM STATEMENT

Surface -To-Air (Quality) Mission

- Your challenge is to integrate NASA data, ground-based air quality data, and citizen science data to create an air quality surface that displays the most accurate data for a location and time.
- Create algorithms that select or weight the best data from several sources for a specific time and location, and display that information.

COLLECTION OF DATA FROM
DIFFIRENT SITES USING API

NASA DATA



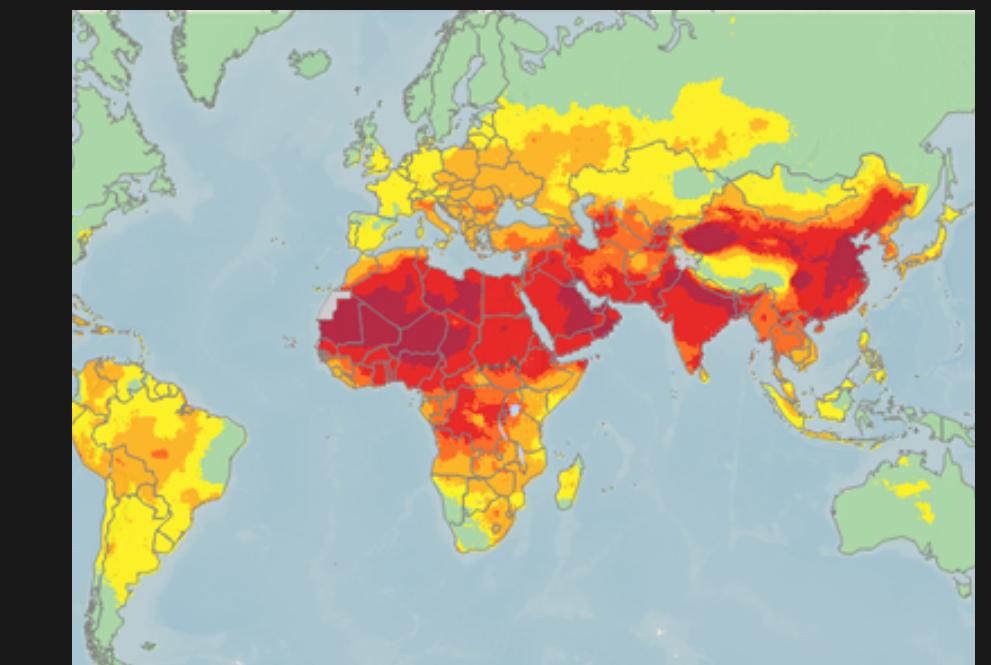
BREEZOMETER



AIR-VISUALS



URBAN GEO DATA



OUR
SOLUTION

WHAT KIND OF DATA ARE WE USING?

HOW DO WE KNOW WHICH ONE IS ACCURATE?

HOW DO WE PRESENT IT TO THE USER?

QUESTION THAT ARISES?

- **REAL TIME DATA**

All the data we received are real time/ run time data max of one hour difference.
We culture these data using RNN.

- **PLOTTING ON GRAPH**

The optimised data received from the regression model.
For the user to see the deflection.

- **BEST SUITED DATA**

After these data are cultured we apply Regression Algorithm for optimisation.

- **PLOTTING OF DATA**

On receiving the optimum data after deploying the regression these data are plotted on world map.
Making it user friendly.

WHY SERENDIPIITY?

- **SIX DIFFERENT DATA AT REAL TIME**
- We are collecting real time data through six different sources which are being stored in server.

- **OPTIMISATION FACTOR**

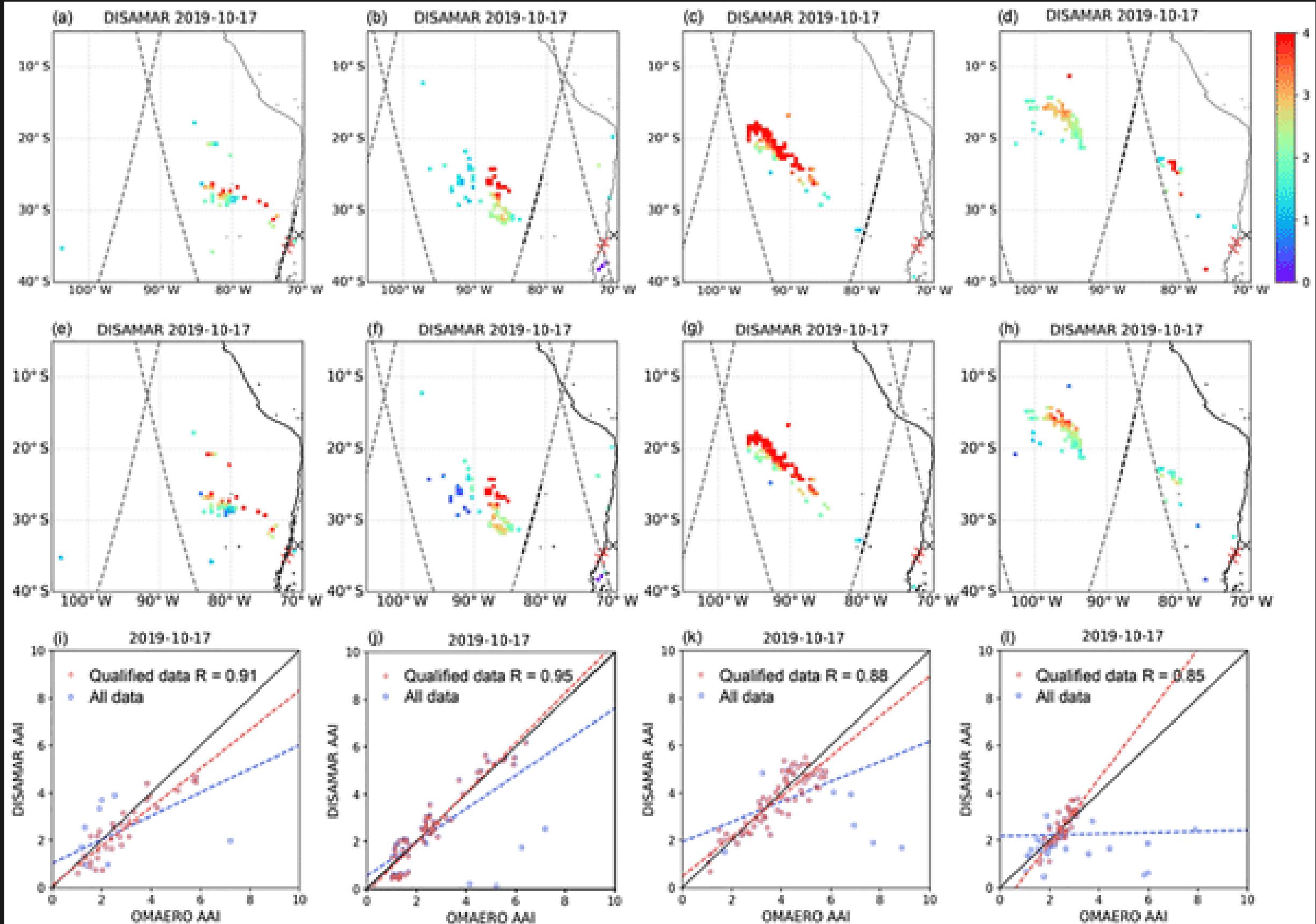
Collecting data from several sources is not the main point. But how are perceiving the optimum data for a particular place at a particular time, is the catch.

- **CREATION OF OUR API**

• We have created an API our own. With whose help any registered user can utilise our optimised information.

OPTIMISATION GRAPH

Collecting data from several sources is not the main point. But how are perceiving the optimum data for a particular place at a particular time, is the catch.



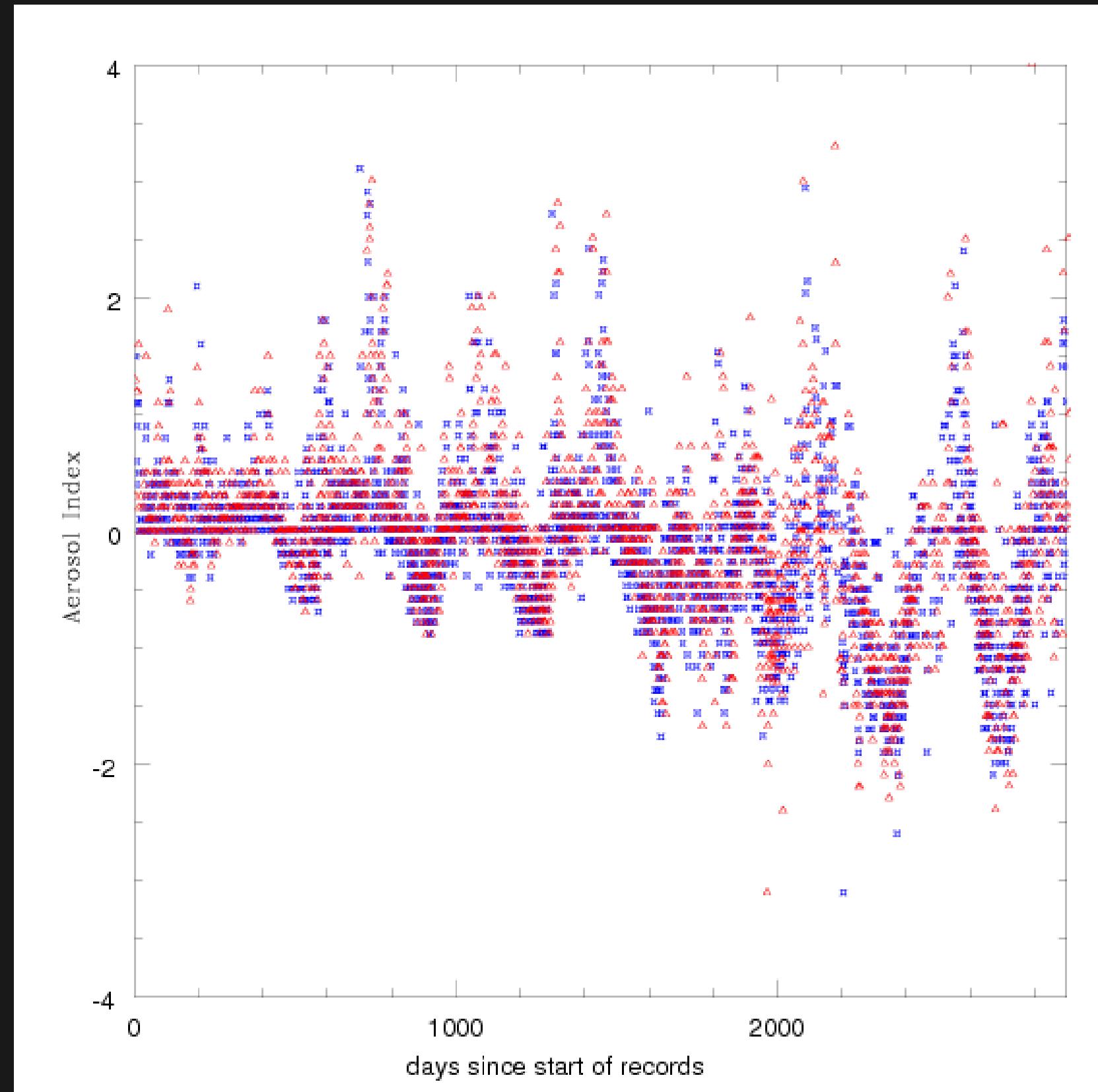
AIR POLLUTION

When we can say air over a place is polluted?

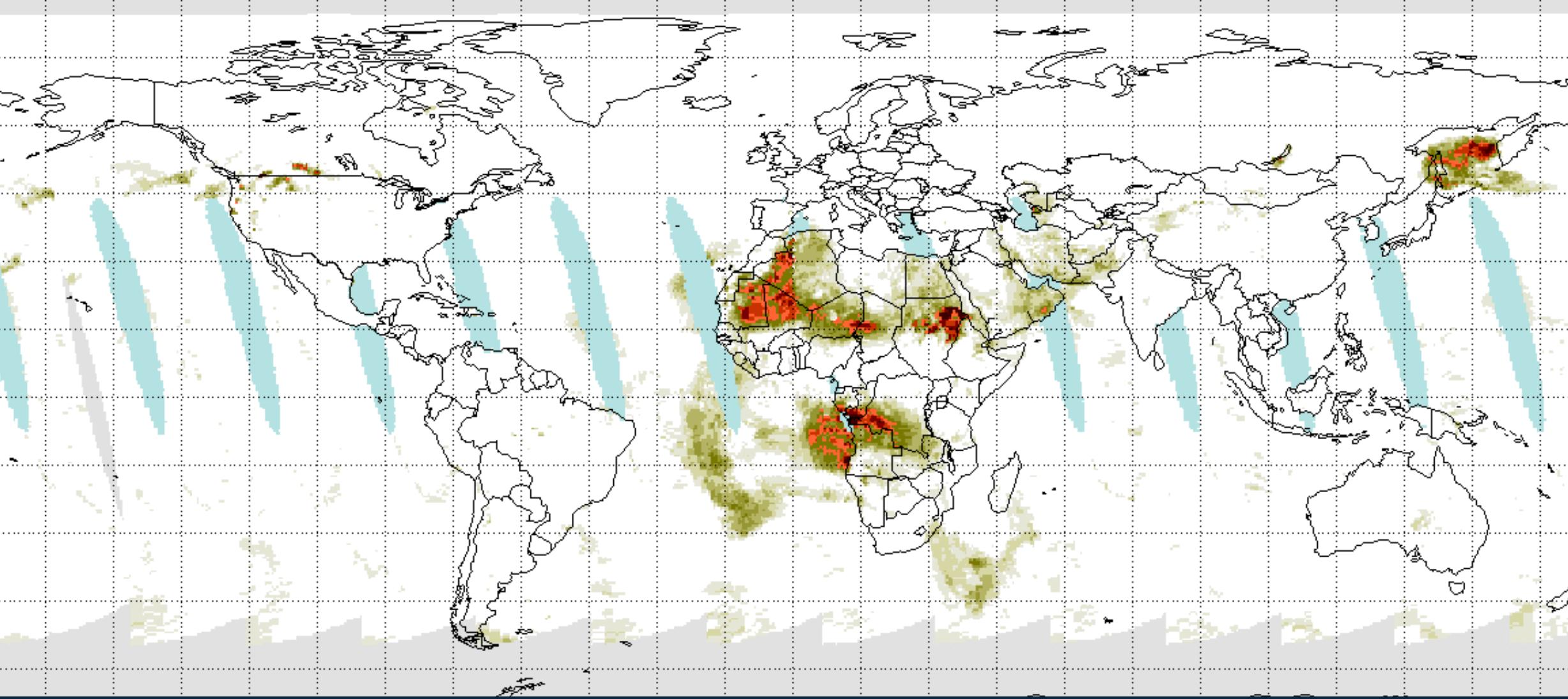
Several parameters (i.e. aerosol index) are weighed/checked before stating this. But the parameters varies through out the world.

The parameters that causes Delhi's air to be polluted would not be same as that of London's.

Therefore the algo couldn't be fixed. We need to weigh the parameters, perform dimension reduction through implementation of SVM (Support Vector Machine).



**MAIN
CHALLENGES**



HANDLING OF RUN TIME DATA

How do we operate on dataset where data is being added with every passing minute?

We have to imply Recurrent Neural Network(RNN)
while working with such unsegmented data.

But RNN has 2 backlogs:

- Vanishing Gradient Problem.
- Can't ignore the time lag.

So, we implement Long Short Term Memory (LSTM). That overcomes these two backlogs of RNN.

MAIN CHALLENGES

CONTINUOUS PLOTTING OF DATA

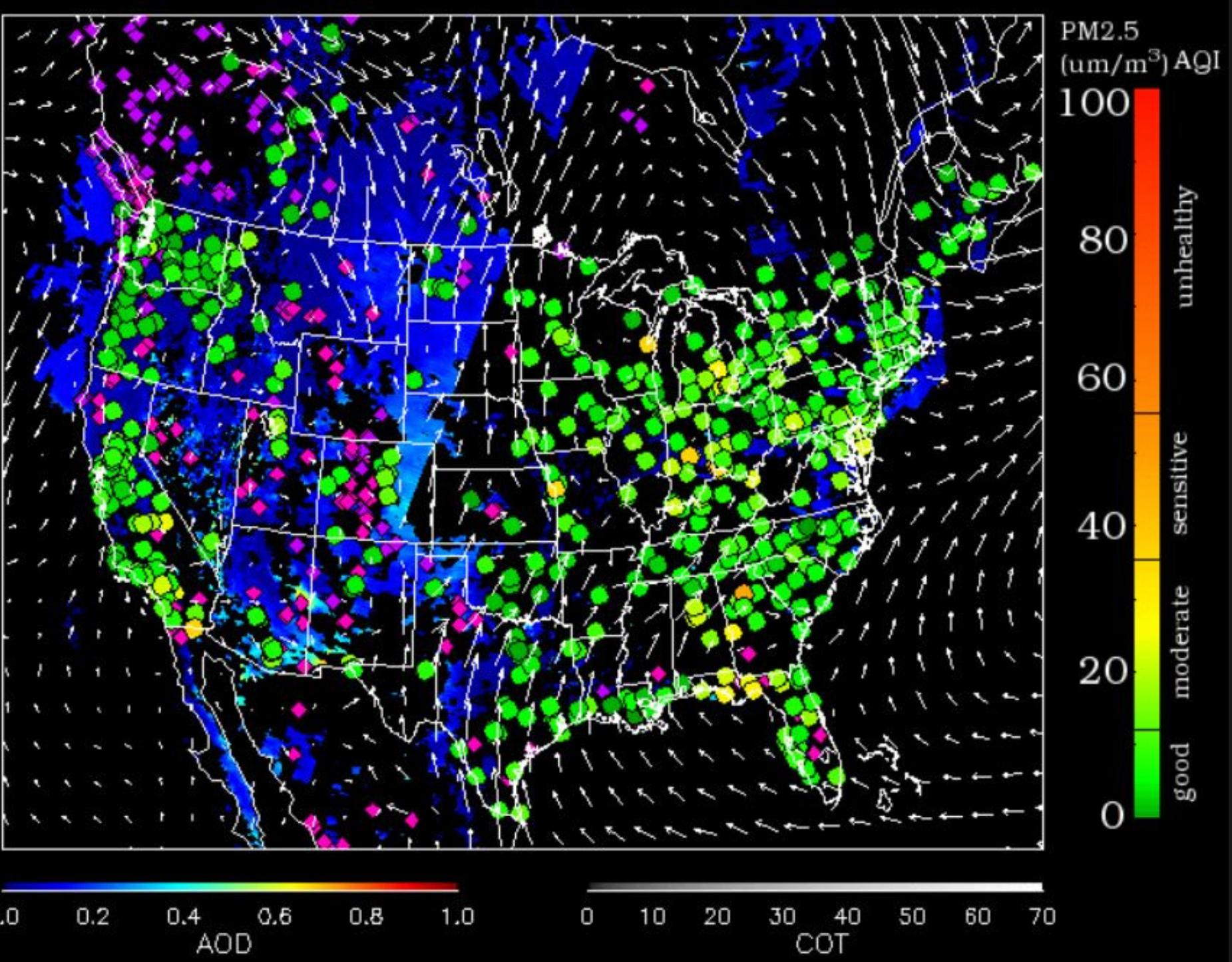
How can we plot data on a map that is being updated continuously?

We have used several python packages such as GMPlot.

It's even feasible with GeoLocation of JavaScript.

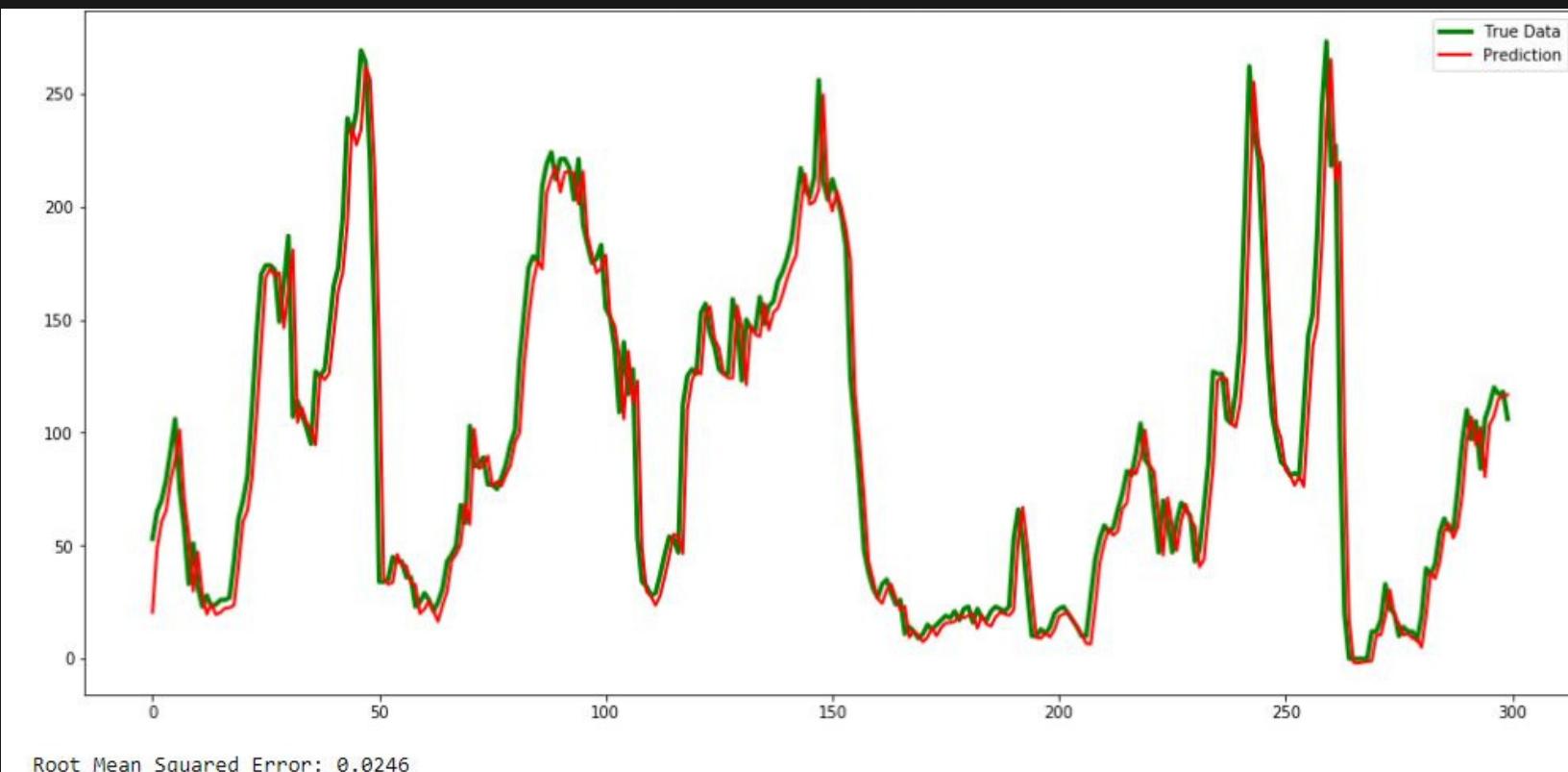
This provide an interactive platform for users.

Helping us to solve our direct problem statement of bridging the knowledge gap among the user.



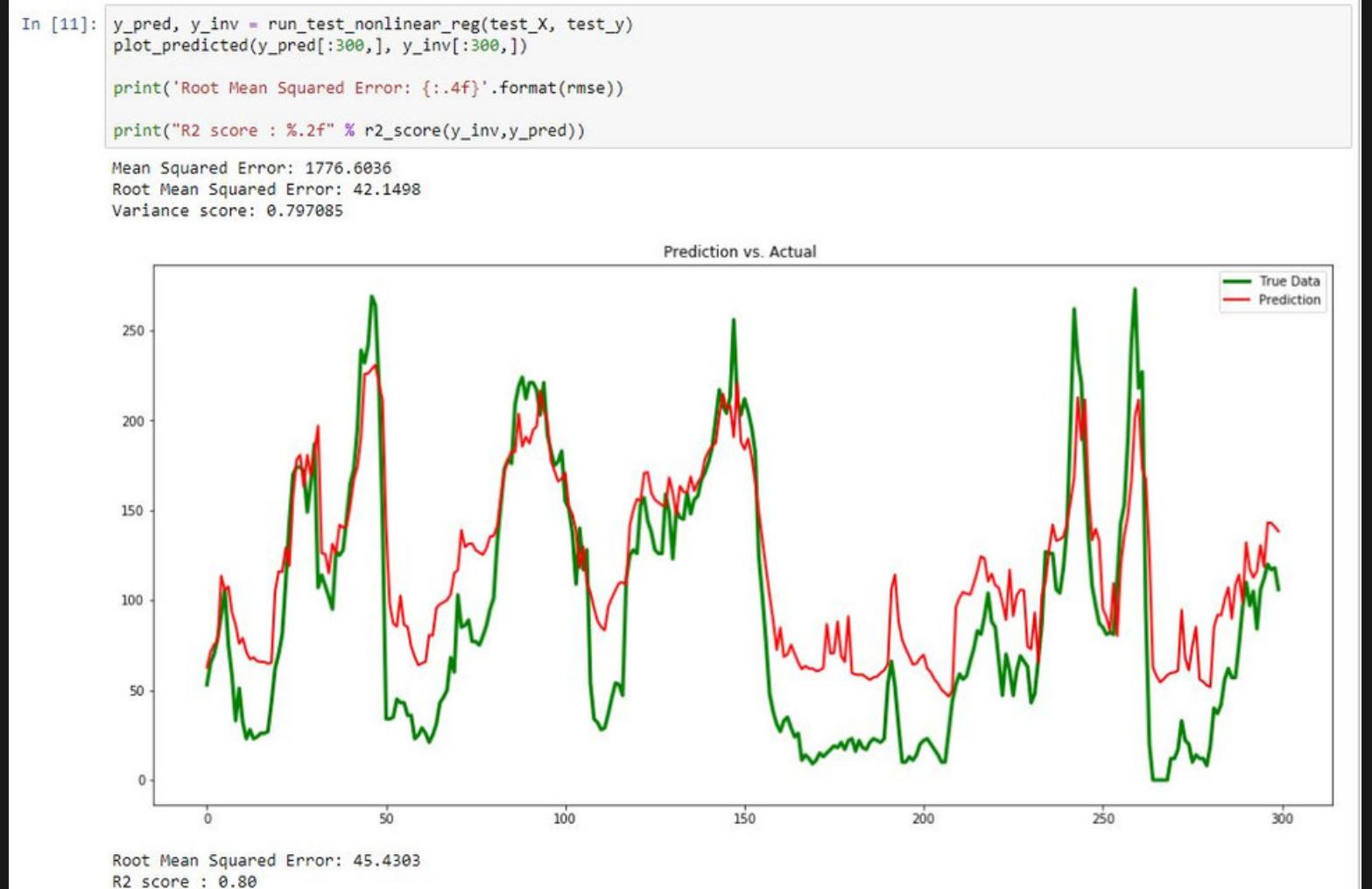
**MAIN
CHALLENGES**

LSTM MODEL TRAINING REPORT

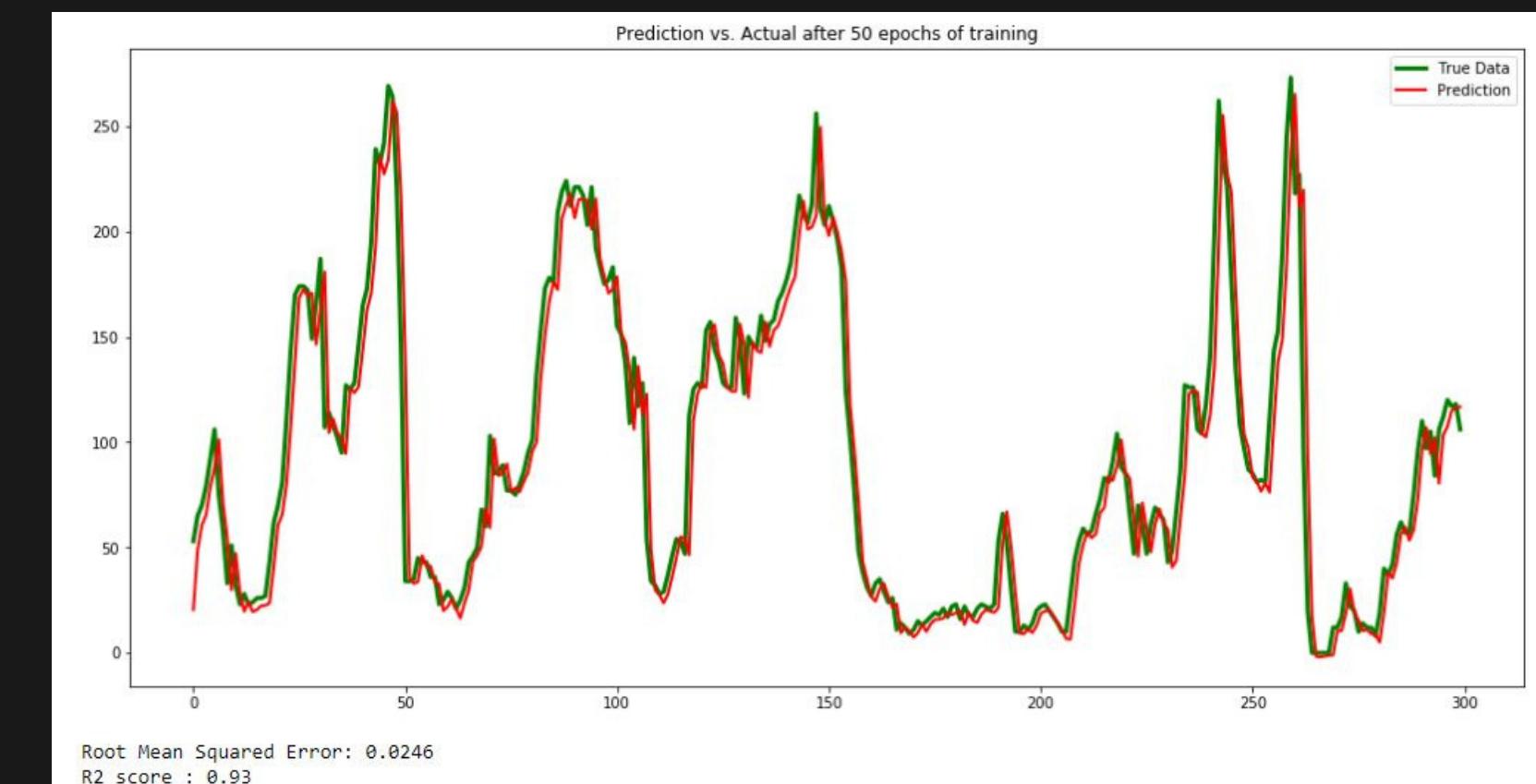


Step 2

How accuracy of
our LSTM model
increased with
passing time...



Step 1



Step 3 - Final report after 9 hrs

REVENUE GENERATION



\$ CREATION OF API

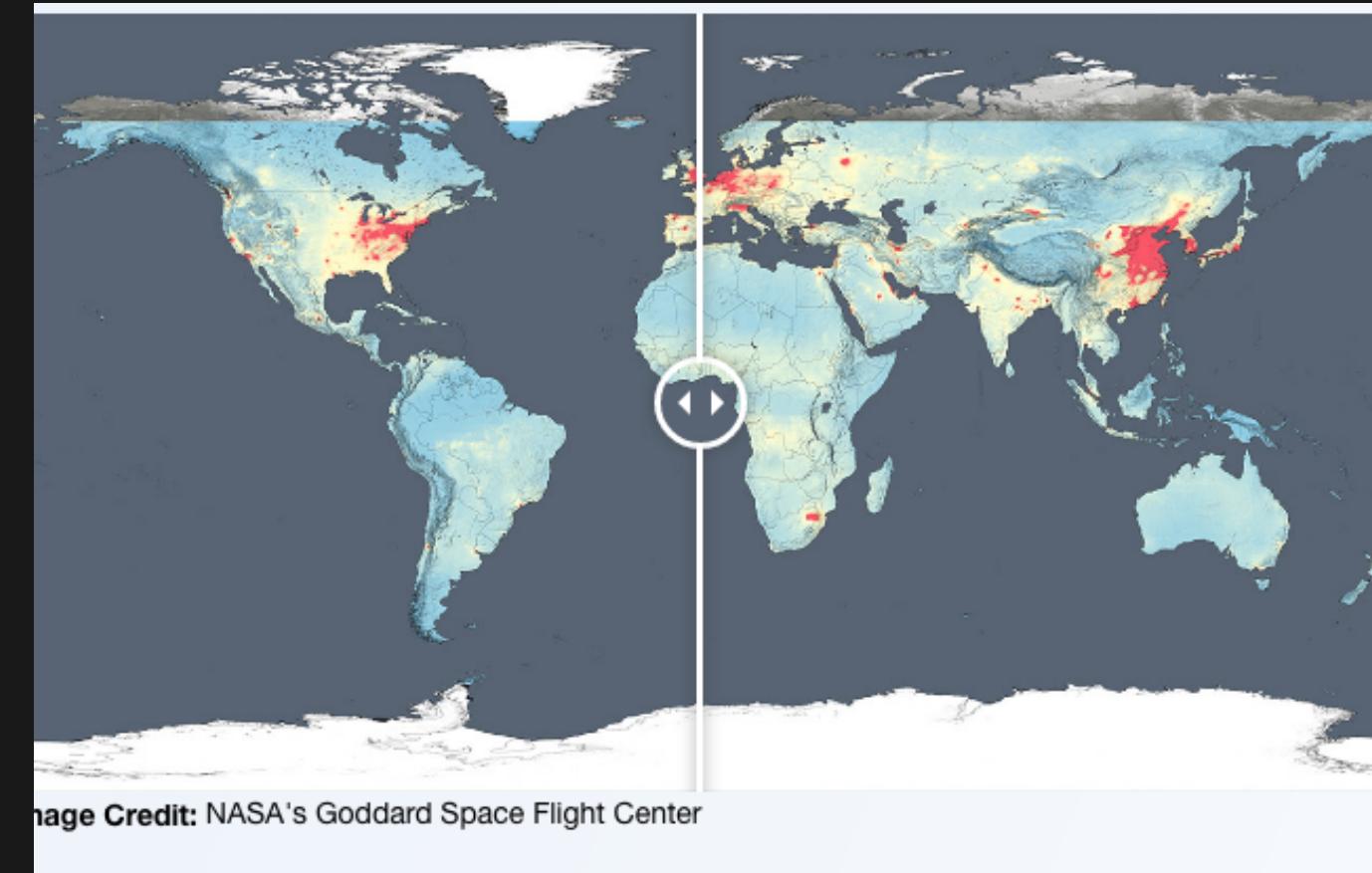
- The API we have created for our product, is available to all the registered user. While they download it or use it for their project, they need to pay for it.

\$ OPTIMISED DATASET

One can use our optimised dataset for downloading it as well they need to pay to pay for it, helping us generate revenue.

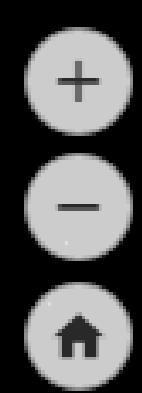
- **MORE ACCURACY**
- The data on which we are performing several algorithm it's accuracy is 0.1 degree (in term of latitude and longitude). Accuracy can be increased and the matrix would be a minute * minute matrix. It's space complexity would increase with increase in accuracy.

FUTURE PROSPECT



- **DECREASING IT'S TIME COMPLEXITY**

Our LSTM model took 8 hrs to train as the data used is real time data, the model should be a continuous training model. We have to work on its time complexity such that its effectiveness isn't compromised.



BETTER UI DESIGN

Designing is soul of a product.

Thus we emphasize of having a way better design in it's prototyping stage.



**THANK
YOU**

SERENDIPITY

SOMDEV BASU
SHILPI MUKHERJEE



**INTERNATIONAL
SPACE APPS
CHALLENGE**