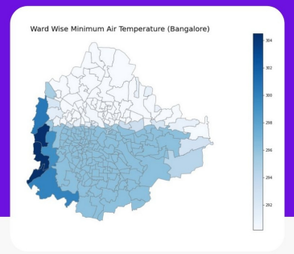
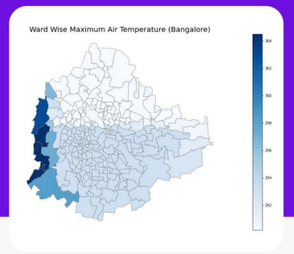
OBSERVATIONS

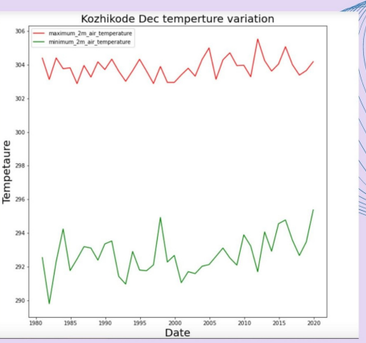




SUMMARY OF THE RNN MODEL

```
Model: "sequential_3"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
bidirectional_2 (Bidirection (None, 30, 60)            7680
_________________________________________________________________
dropout_8 (Dropout)          (None, 30, 60)            0
_________________________________________________________________
lstm_9 (LSTM)                (None, 30, 30)            10920
_________________________________________________________________
dropout_9 (Dropout)          (None, 30, 30)            0
_________________________________________________________________
lstm_10 (LSTM)               (None, 30, 30)            7320
_________________________________________________________________
dropout_10 (Dropout)         (None, 30, 30)            0
_________________________________________________________________
lstm_11 (LSTM)               (None, 30)                7320
_________________________________________________________________
dropout_11 (Dropout)         (None, 30)                0
_________________________________________________________________
dense_2 (Dense)              (None, 4)                 124
=================================================================
Total params: 33,364
Trainable params: 33,364
Non-trainable params: 0
_________________________________________________________________
```

Our RNN model provides the next 4 values of forecast of temperature based on 30 values of historical temperature data.



TEMPERATURE vs YEAR

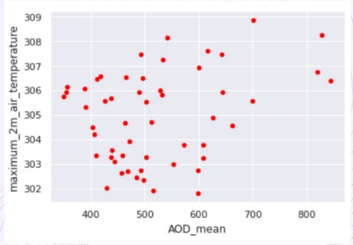
This line plot shows minimum and maximum values of temperature for Kozhikode district from 1980 - 2020 for the month December

The values of Maximum temperature can be seen varying but Maximum temperature of 1980 and 2020 has mostly remained the same. But on the contrary the Minimum temperature values is rising and highly volatile

SCATTER PLOT
AOD VS MAX_TEMPERATURE

Both Datasets were merged together to plot this scatter plot

This graph shows a higher temperature on higher values of AOD



CONCLUSION

Our story

A Vishnusankar
Adarsh Joshy
Arjun B J
Haneem E M
Jaideep Kumar P M

All 3 model's predicted values are indicating a slight increase in the temperature. Also all the analysis both quantitative and qualitative indicates that the temperature values are slightly increasing over the time. The change is almost clearly noticeable in the recent decade. This would mostly due to the human contribution to this long term crisis. During analysis, it was observed that density plot has a significant peak in the year 1990. 1990 was the warmest year since comparable record-keeping began in the middle of the 19th Century. 1990 was a year in which there was El Nino effect. El Niño is a climate pattern that describes the unusual warming of surface waters in the eastern tropical Pacific Ocean. El Nino conditions arise from the episodic warming of the tropical Pacific off Peru and lead to surges of extreme drought and heat in the Northern and Southern hemispheres. Acceleration of the planetary greenhouse effect point to higher temperatures in the 1990s and confirm that pollution of the atmosphere is already causing global warming. Preliminary evidence shows that temperatures in the lower atmosphere were warmer in 1990 than in any year since record-keeping began in 1958.

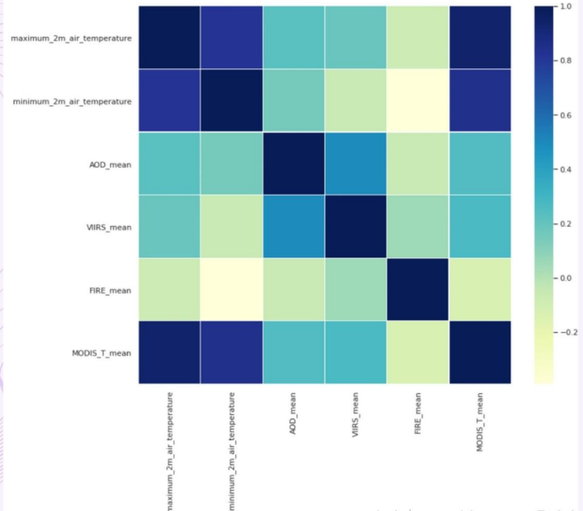
CLIMATE CHANGE IS REAL.

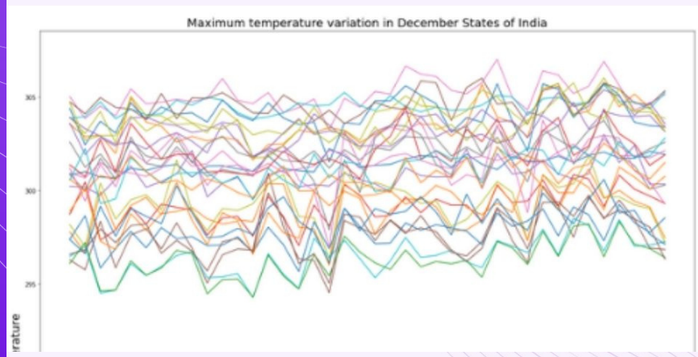
GEE CODING PROJECT

CORRELATION ANALYSIS ON MULTIPLE DATASETS

Relation between five merged datasets is analysed using correlation matrix. Using the correlation matrix Heatmap is plotted

Variables that has highest correlation with ERA5 air temperature is MODIS_T which is the surface temperature variable which is predictable
Other ones having slight correlation are AOD and VIIRS(Night Light data - which is not reasonable)





FUTURE PREDICTIONS

BANGALORE DISTRICTS NEXT 4 QUATERLY MEAN TEMPERATURES

Predicting future temperature for next 4 quartely month

```
testing_sample_scaled = sc.fit_transform(test_set_sample[4:34])
testing_sample_scaled = np.reshape(testing_sample_scaled,(testi
predicted_temperature = regressor.predict(testing_sample_scaled
predicted_temperature = sc.inverse_transform(predicted_temperat
print(predicted_temperature[0])
```

```
[297.91928 299.58896 297.62598 296.5048 ]
```

The above are the predicted mean values for the next quarterly months for banglore

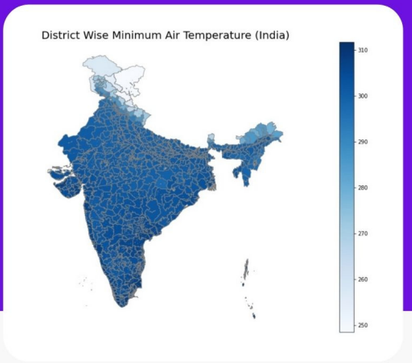
KERALA STATE NEXT 4 MONTHLY MEAN TEMPERATURES

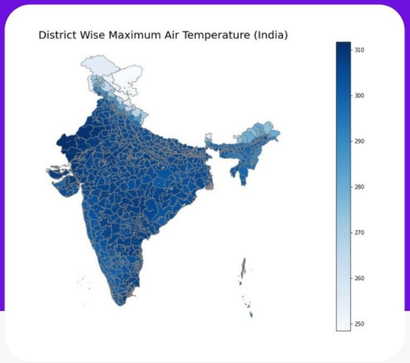
```
testing_sample_scaled = sc.fit_transform(test_set_sample[70:100
testing_sample_scaled = np.reshape(testing_sample_scaled,(testi
predicted_temperature = regressor.predict(testing_sample_scaled
predicted_temperature = sc.inverse_transform(predicted_temperatu
print(predicted_temperature[0])
```

```
[300.33813 301.1022  300.9345  299.91898]
```

The above values are the predicted mean temperature of Kerala for next 4 months, the values are in kelvin scale

OBSERVATIONS





- Temperature varies from 250 K to 310 K
- The average maximum temperature in the northern most regions is drastically lower than the other parts of the country.