GEORISKACCESS: GIS-BASED PM2.5 POLLUTION AND RISK FACTOR ANALYSIS.

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Factors Influencing Residential Decisions:

Environmental Quality:

- Air Quality

Development:

- Population and Infrastructure

Climate:

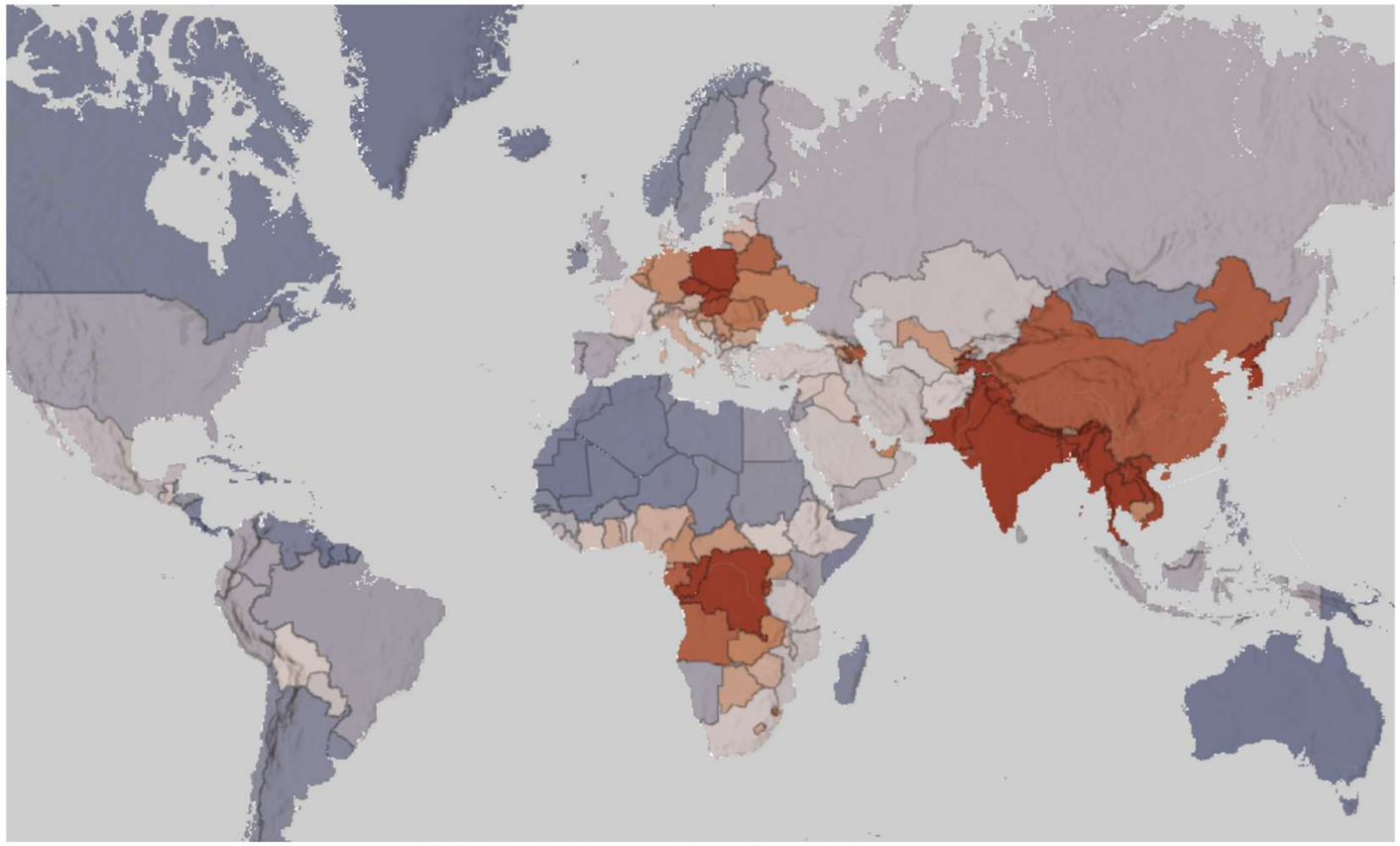
- Temperature and Humidity

Free Space:

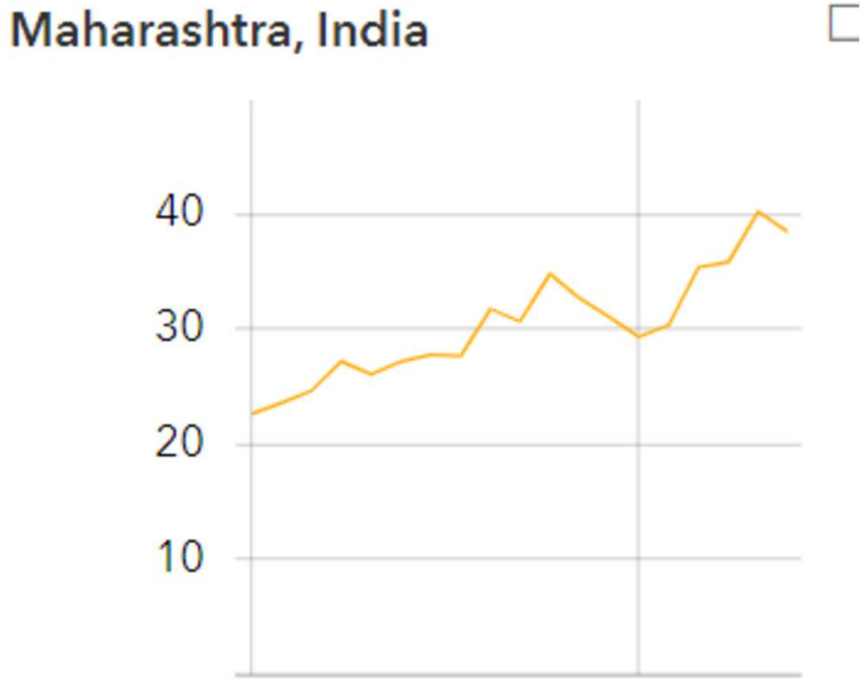
- Opportunities for Outdoor Activities
- Greenery

PROBLEM STATEMENT

PM2.5 pollution poses significant health risks, including respiratory and cardiovascular diseases. Assessing and managing this pollution is crucial for public health.



PM 2.5 Deaths in 19 years

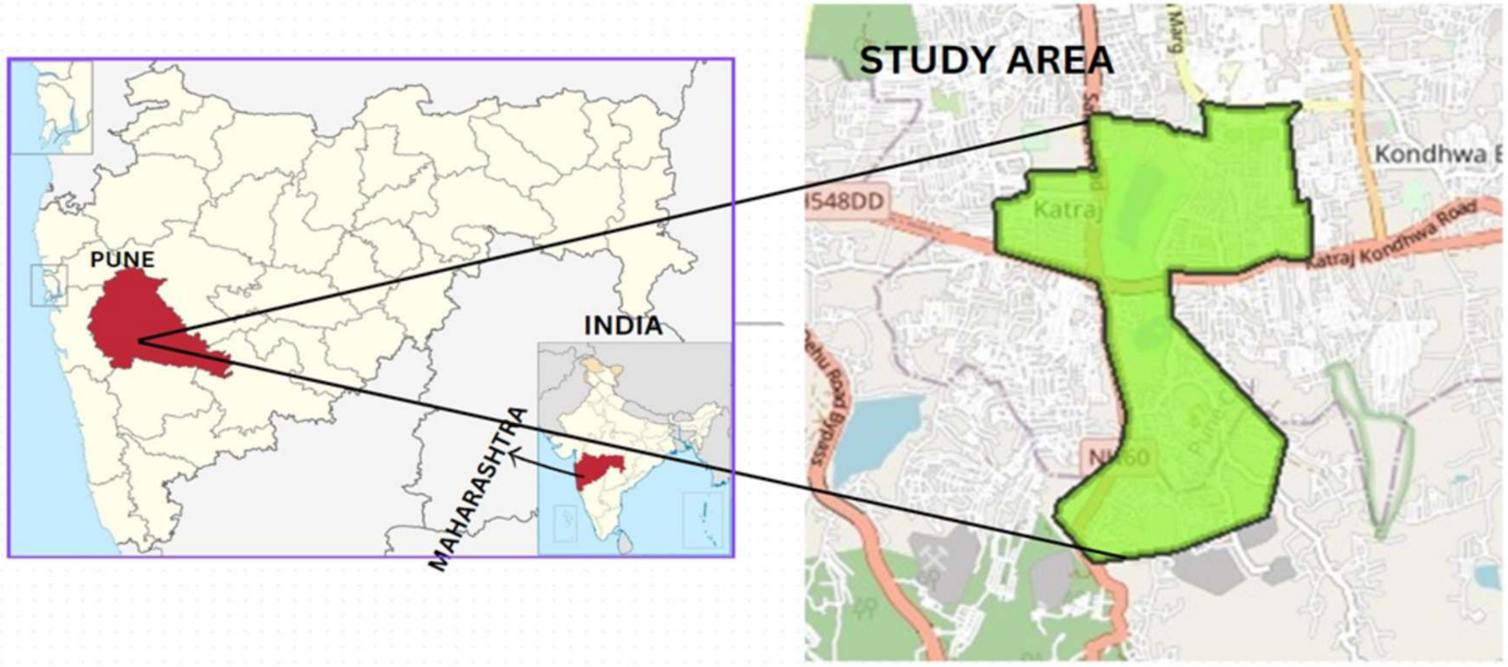


The average annual particulate matter 2.5 (PM 2.5) in this area between 1998 and 2016 was 32.5 micrograms per cubic meter. The World Health Organization's guideline is 10 micrograms per cubic meter.

WHY WE NEED TO MONITOR AND KNOW IT

- Informed Policy Making:
- Public Awareness and Engagement
- Environmental Protection
- Efficient Resource Allocation
- Health Impact Mitigation

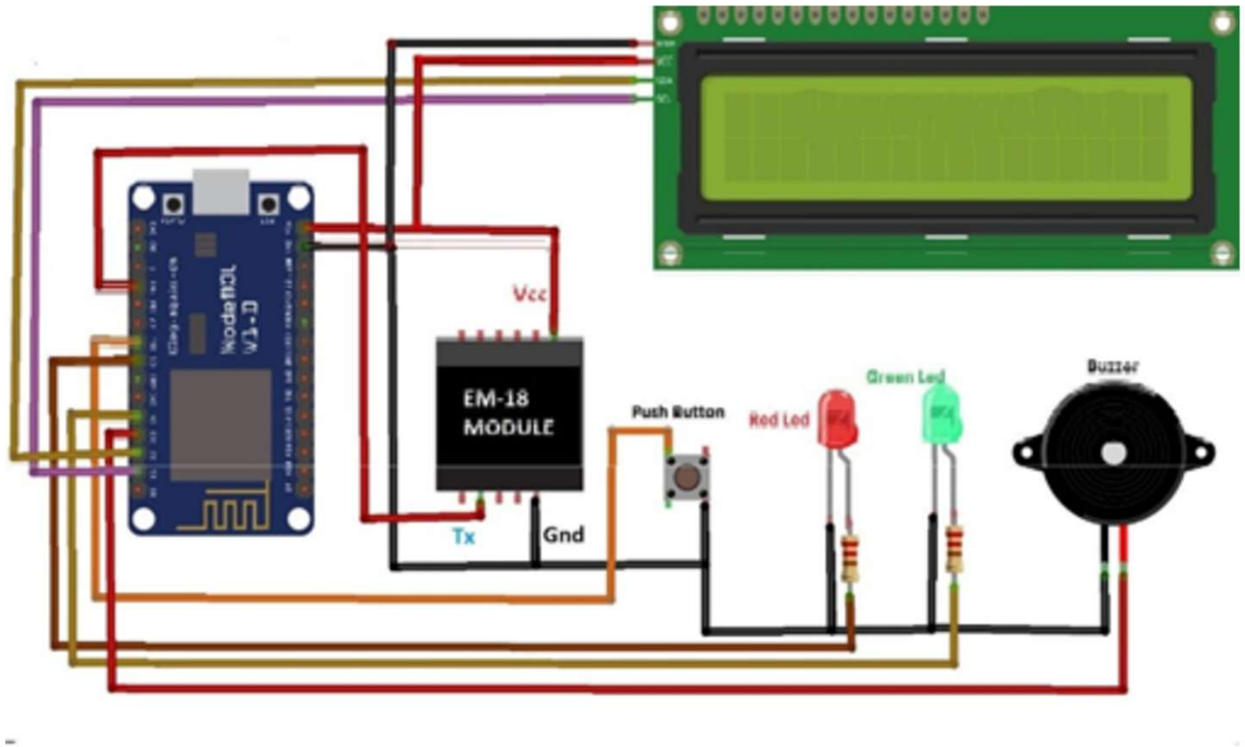
Study Area



Lat,Lon
18.47664,73.79799
18.41569,73.81621
18.47078,73.90039
18.42025,73.90692

HARDWARE

- DHT Sensor: Measure temperature and humidity.
- RTC Module: Recortrd real-time data with a timestamp.
- MQ135 Sensors: Monitor gases like CO, NO2, and SO2.
- Sharp Optical Dust Sensor (GP2Y1014AU0F): Detect fine particulate matter (PM2.5).



PROPOSED SOLUTION

- Enhanced Decision-Making: Provides data-driven insights to policymakers for effective air quality management.
- Targeted Interventions: Identifies high-risk areas for focused pollution control efforts and health interventions.
- Public Health Improvement: Reduces health risks by addressing PM2.5 pollution more efficiently.
- Resource Optimization: Ensures optimal use of resources by directing them to the most affected areas

Risk Factor Calculation Formula:

$$RISK\_FACTOR = w\_EPI * EPI + w\_UDI * UDI + w\_LUV * LUV + w\_CRI * CRI$$

Where:

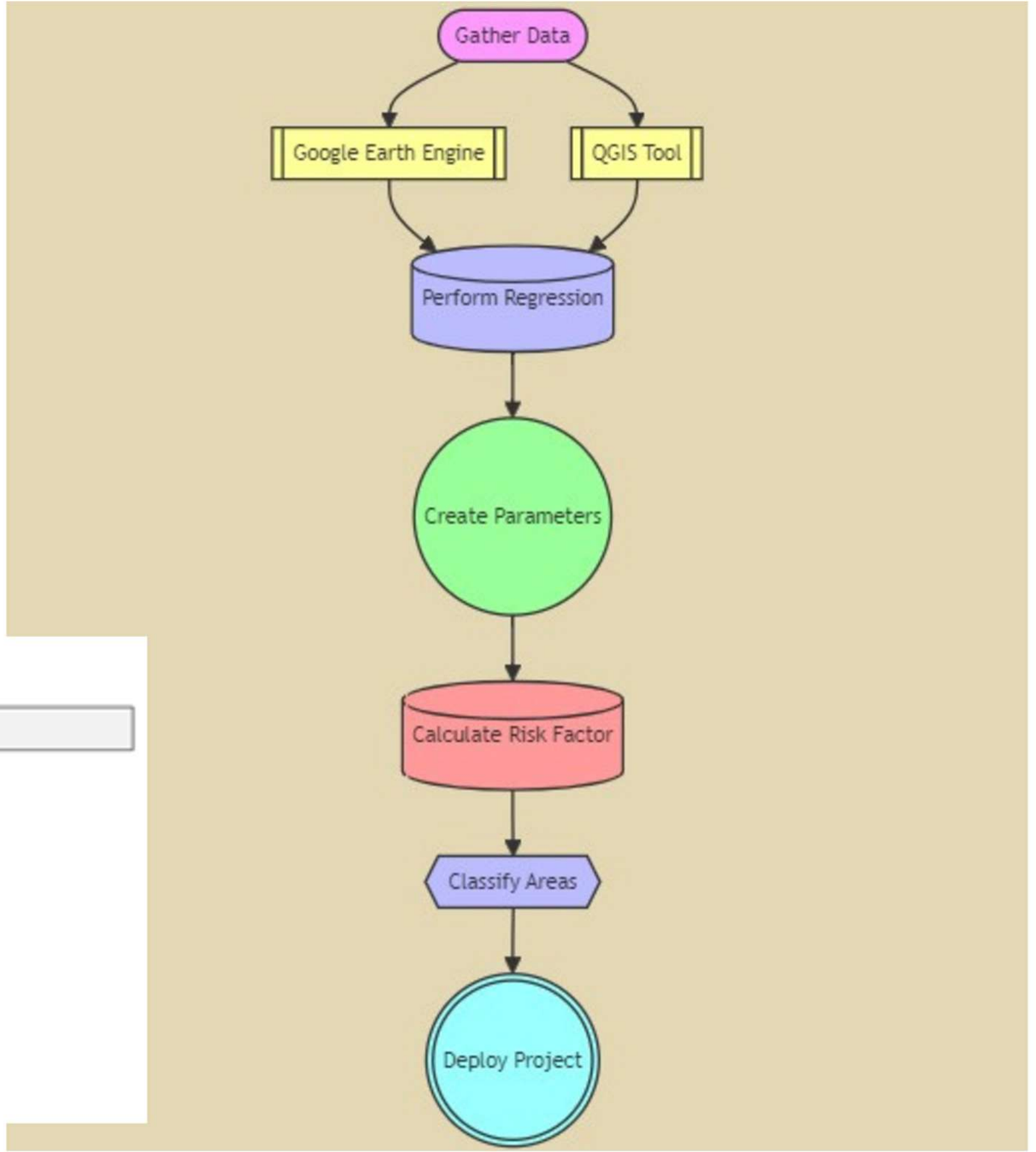
EPI : Environmental Performance Index

UDI : Urban Development Index

LUV : Land Use Variable

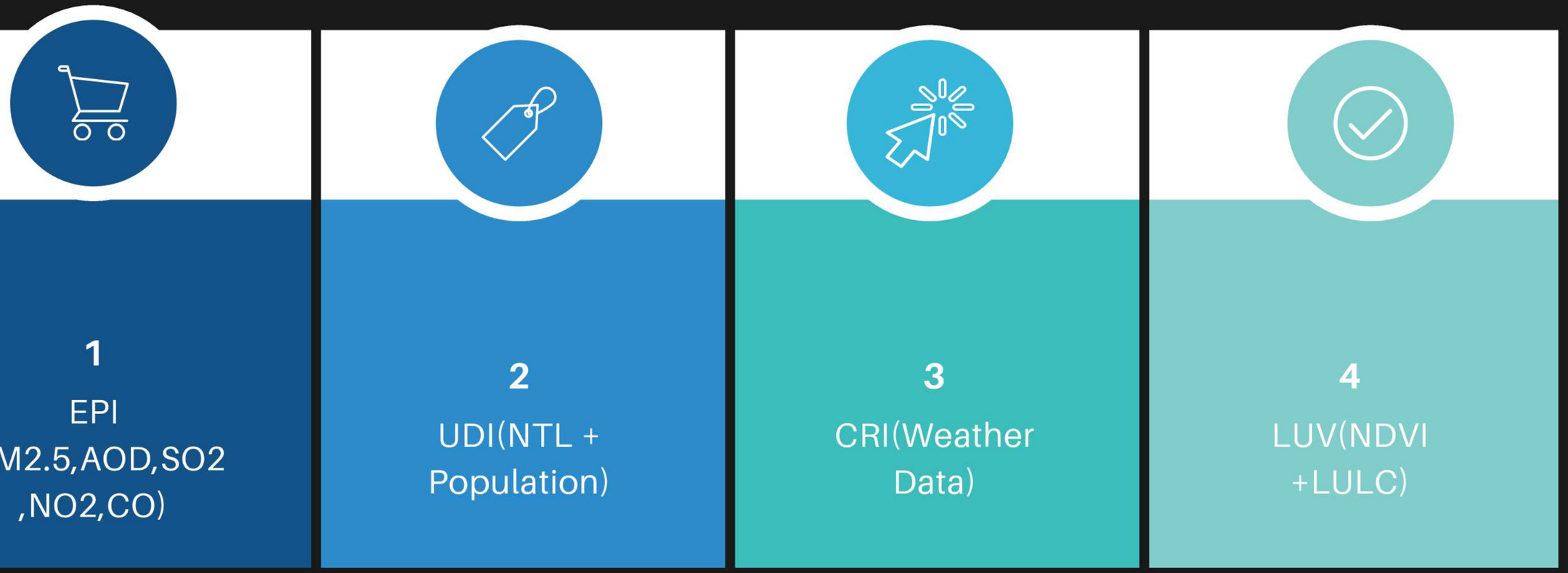
CRI : Crime Rate Index

Weight of x (w_x) = | corr (x, RISK_FACTOR)| / Sum of absolute correlations of all features



OUR 4 PARAMETERS

5-Step Ordering Process



1

CAAQMS

2

VIIRS

3

Sentinel 5P and MODIS

4

Real time Data via Sensors

DATA SOURCES

NO2 : Sentinel-5P (S5P) , 7 km x 3.5 km , Daily

SO2 : Sentinel-5P (S5P) , 7x3.5 km^2 (along-track x across-track) at nadir ,Daily

CO : Sentinel-5P (S5P) , 7 km x 3.5 km , Daily

NDVI : MODIS , 250 meters , , 8-days

PM2.5 : CAAQMS , Point data , Hourly

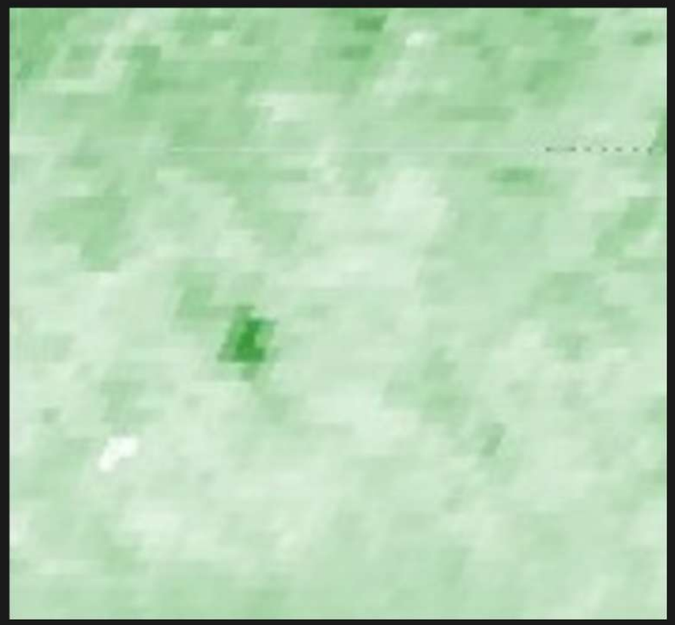
AOD : MODIS (Moderate Resolution Imaging Spectroradiometer), 1 km , 8 days

Result

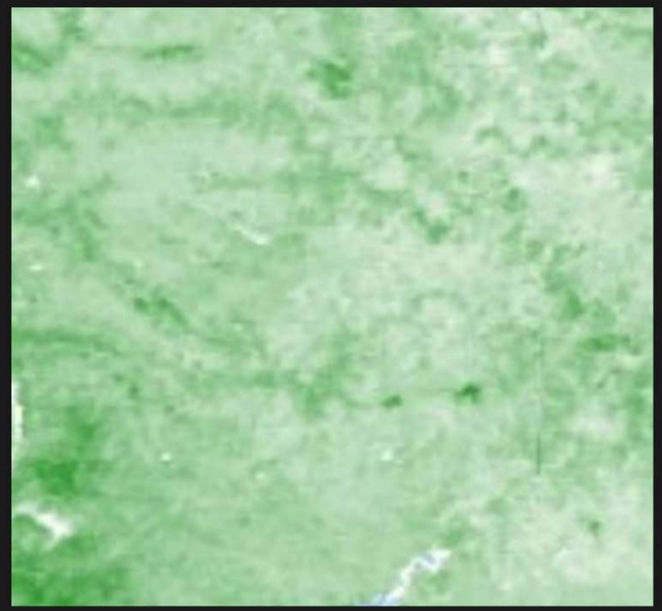
Basic Analysis using Qgis We found Some Basic Trends

for ex:

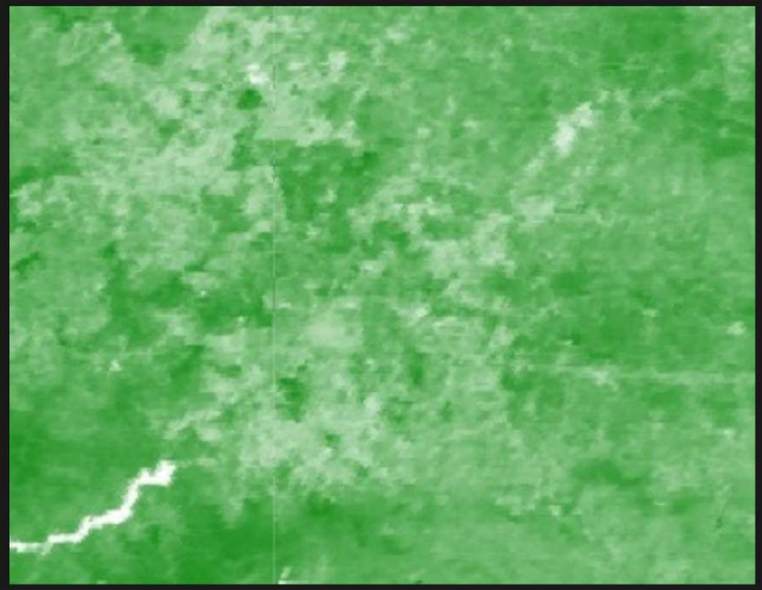
NDVI During The Year 2023



during summer

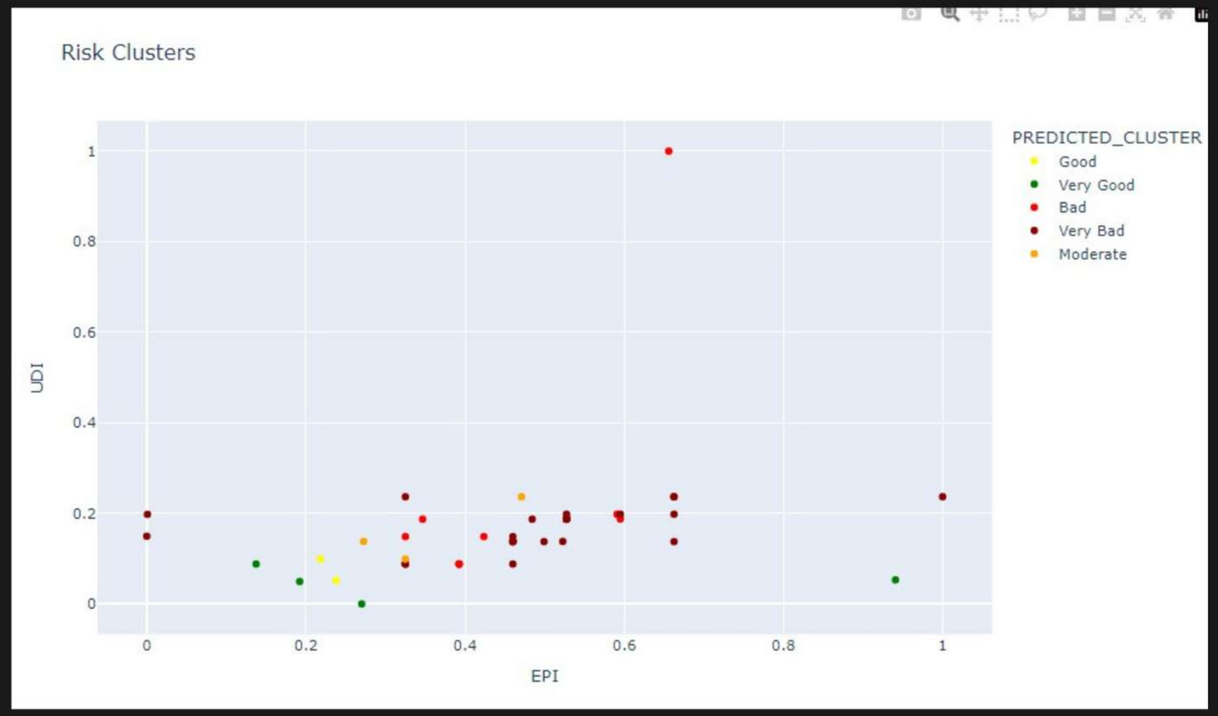


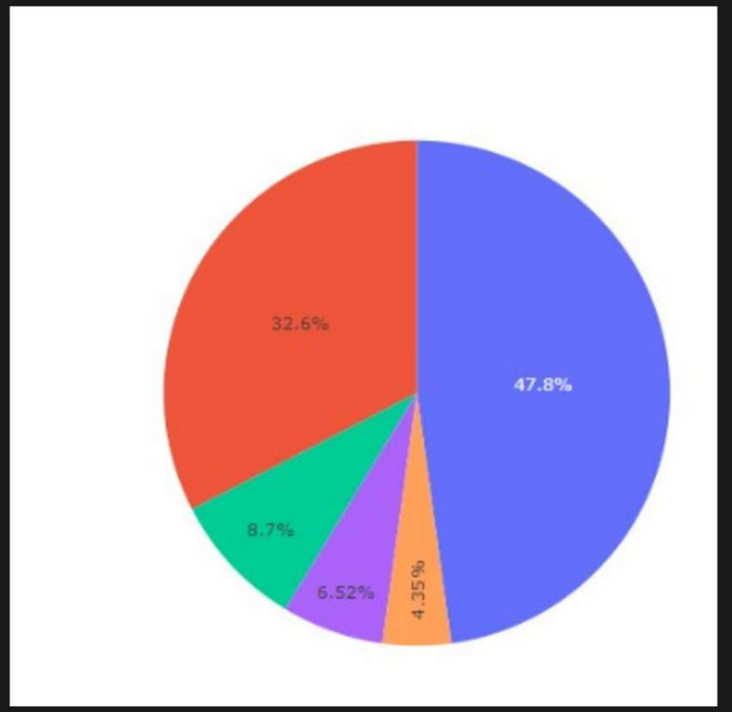
may to july



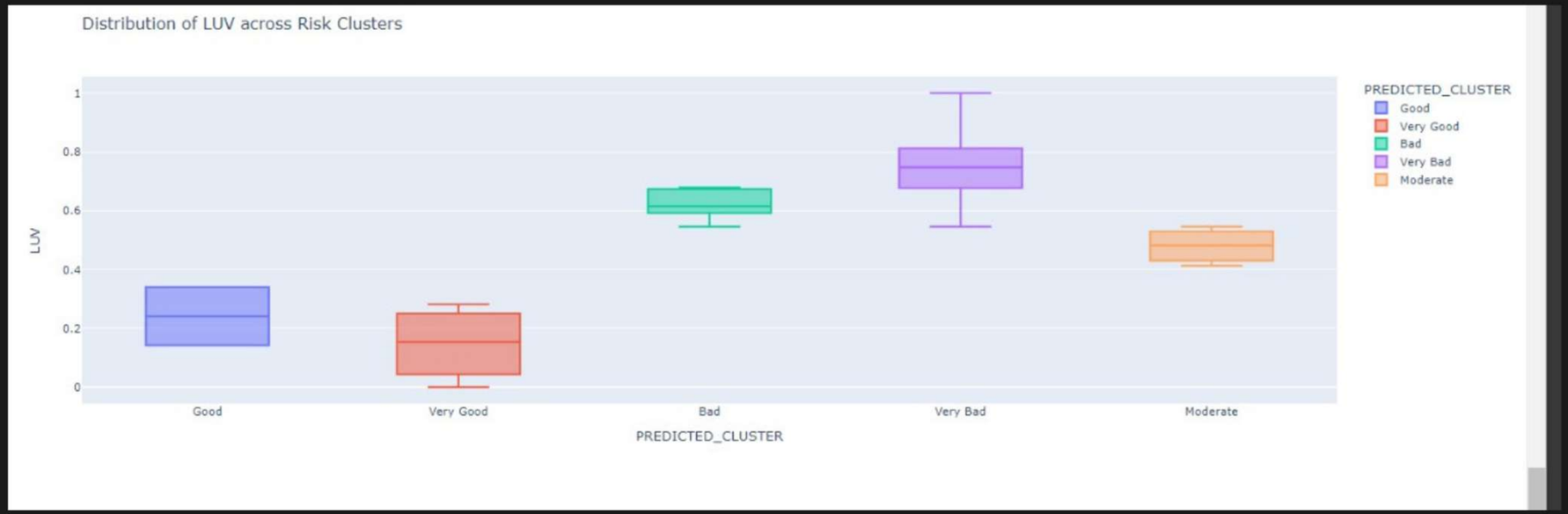
sep to jan

Regression And Risk factor Clustering





Distrbution of Predicted Risk factors for India Locations



This Indicates that Most of Bad Localities Have More Settlements in a Specific Radius