Predicting Air Quality using Overhead Imagery

Inspection of air quality information included in Multi-Spectral and Wind data

Ayoub Ghriss, Intern

Supervisor: Kari Klein

The team

Kari Klein

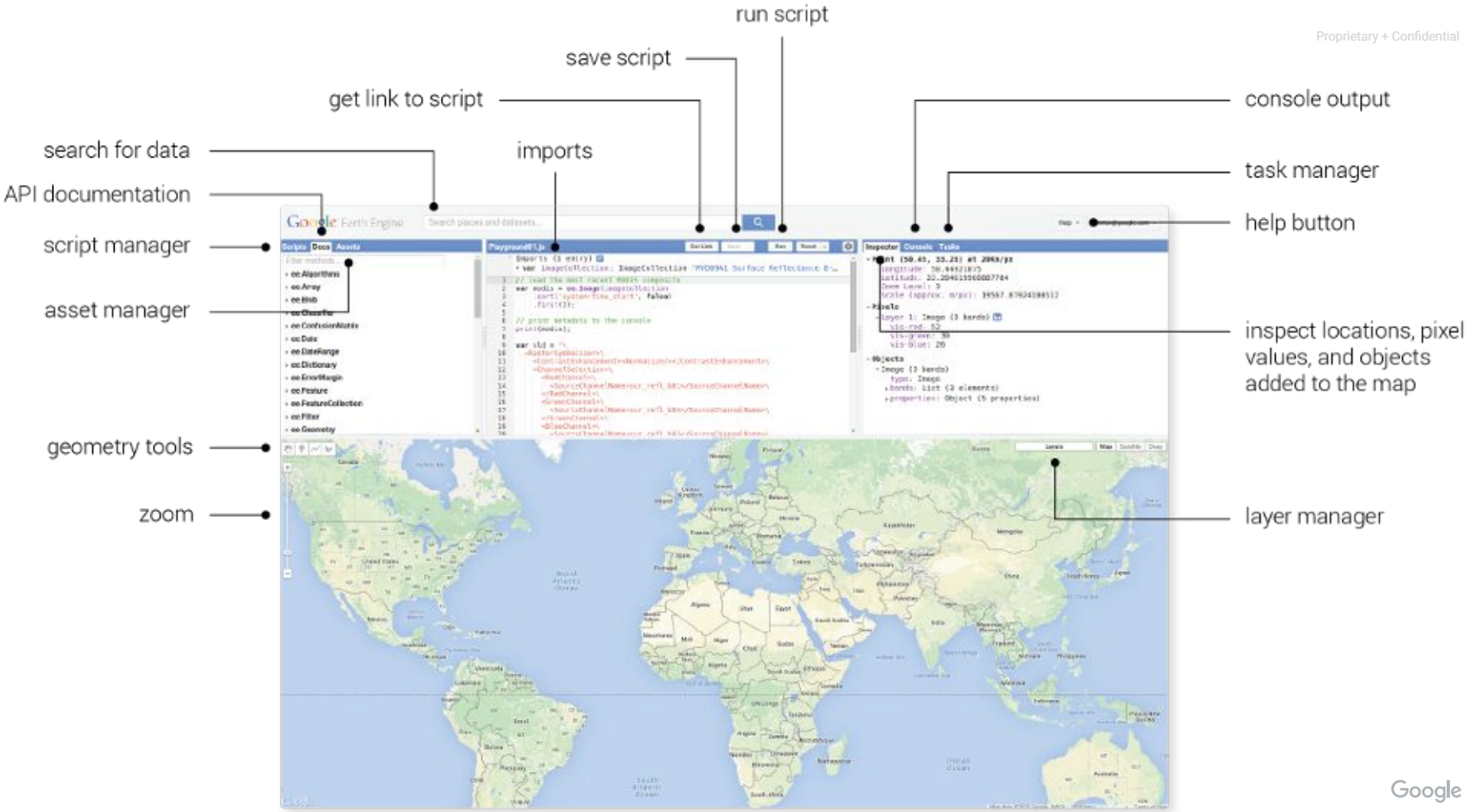
Research and engineer

Lead

Ayoub Ghriss

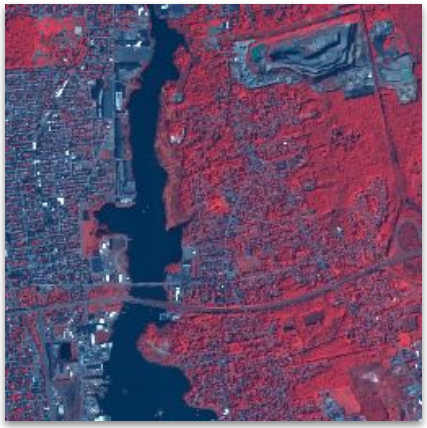
Intern

PhD, CU Boulder

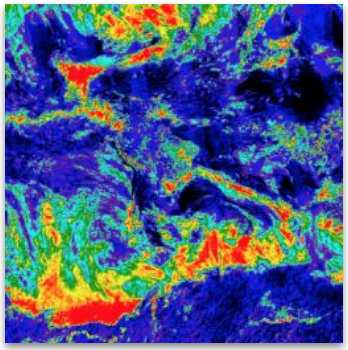


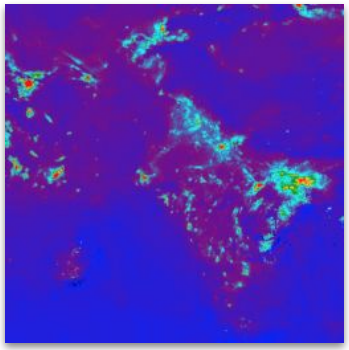
Imagery

MultiSpectral : B,G,R and N,P



Tropomi: Cloud, NO2, CO...





Digital Surface Model (DSM)

Goals

- Exploit high resolution imagery to infer air quality measures
- Analyze how different types of imageries correlate with the measures
- Good mapping would allow inferring measures when they’re not directly available

Intuitions

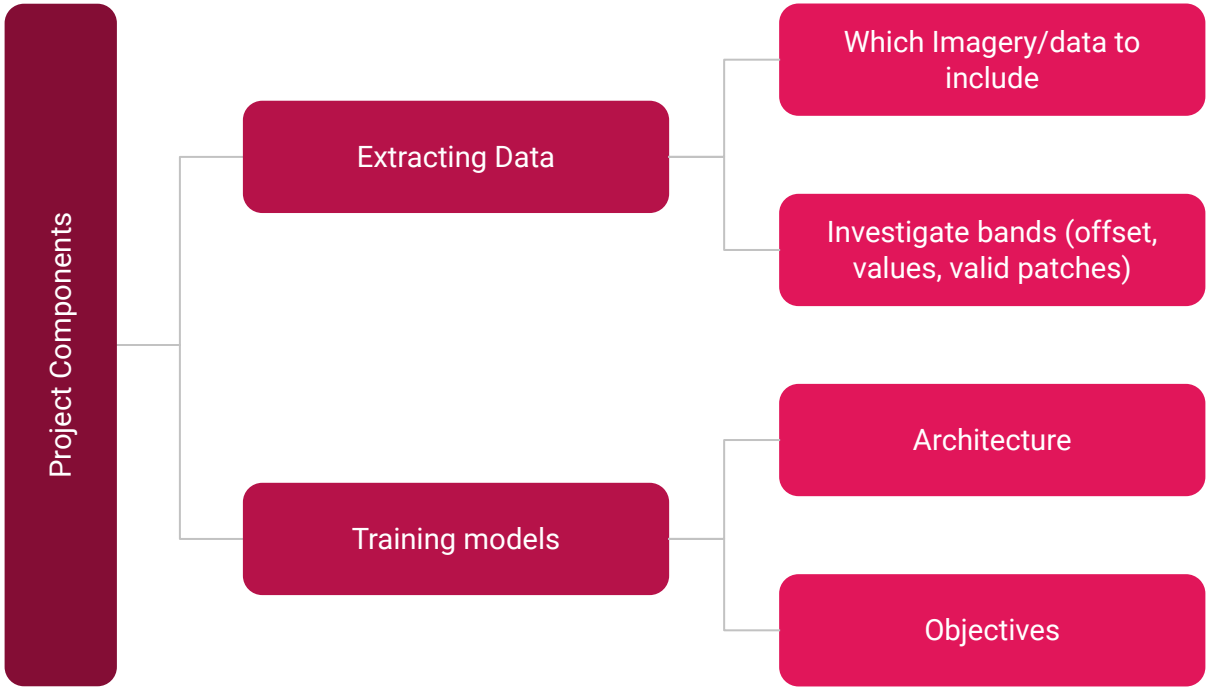
- The outliers (low air quality) point out areas of interest
- Identify the type of imagery that contains enough information to infer air quality
- Investigate the prediction of high resolution air quality data (Air View), with coarse resolution measures included as input

Uncertainty of NO2 measures

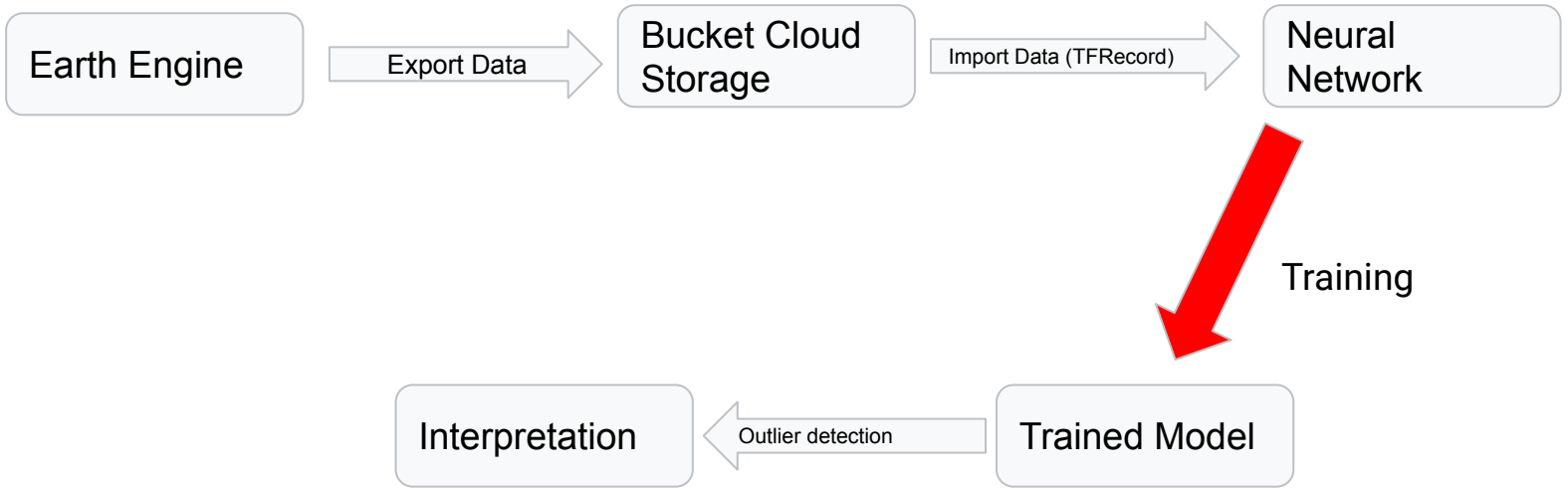
- Largely due to clouds
- Altitude and Emission areas
- Stability of bounding layers

Methodology

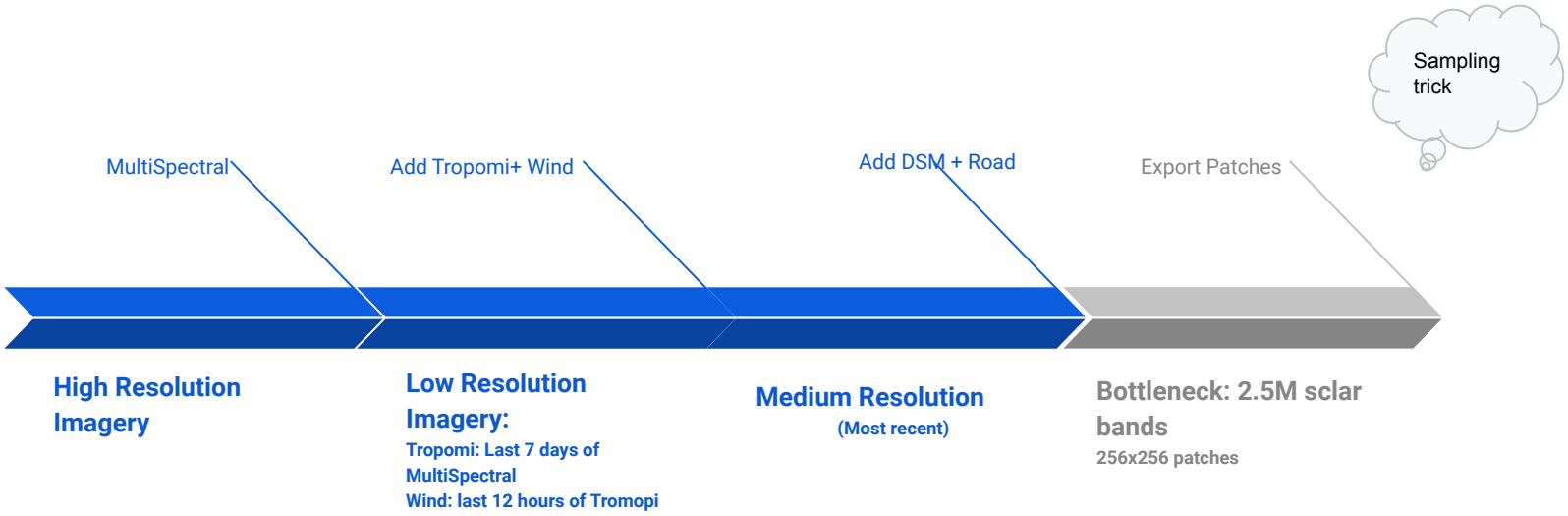
- Multispectral data is sparse and fine grained
- Take contextual data surrounding NO2 measures
- NO2 lifetime is around 4 hours: Given data and NO2 in previous 4h of collection time/ Use NO2 as reference



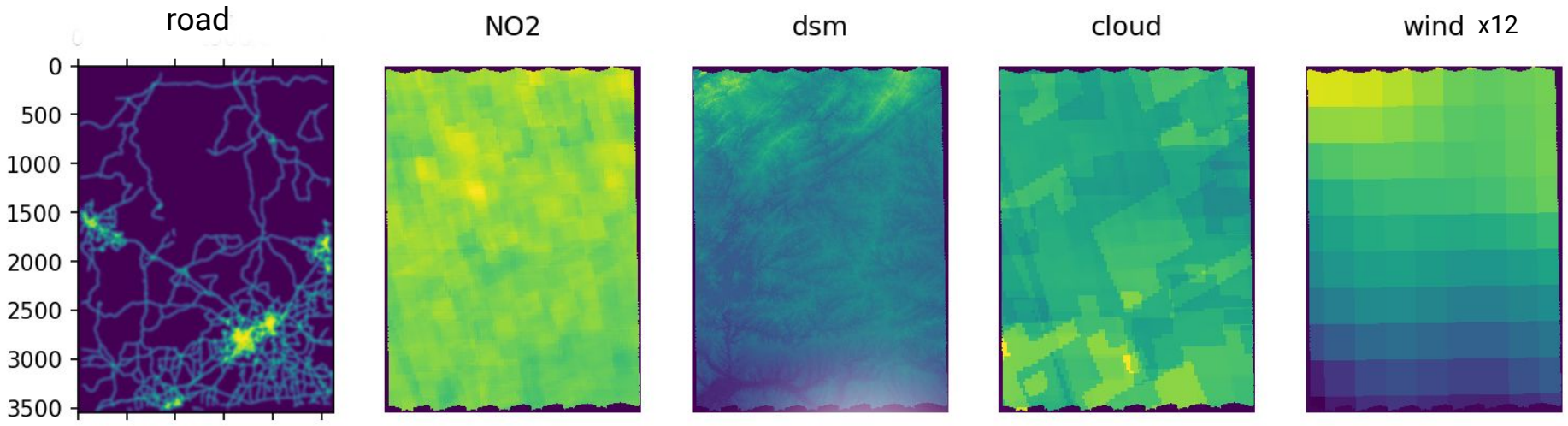
Pipeline



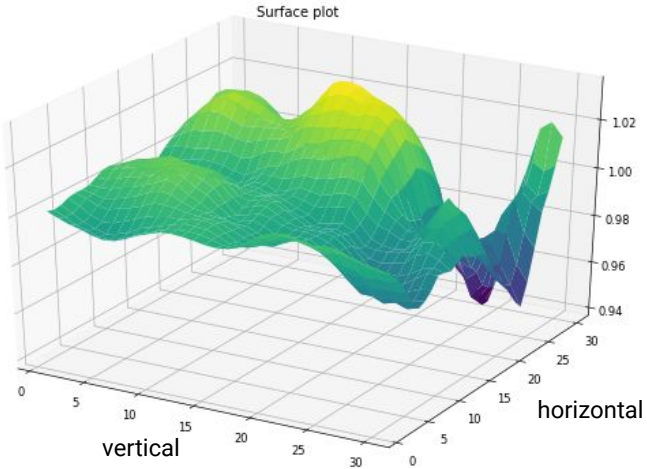
Extracting Training Data



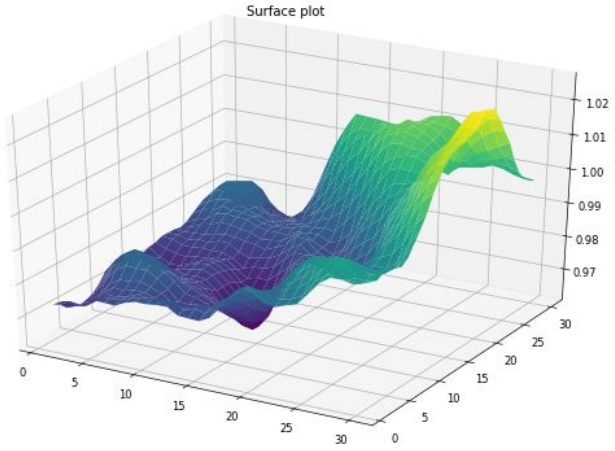
Imagery bands



Bands analysis: offset



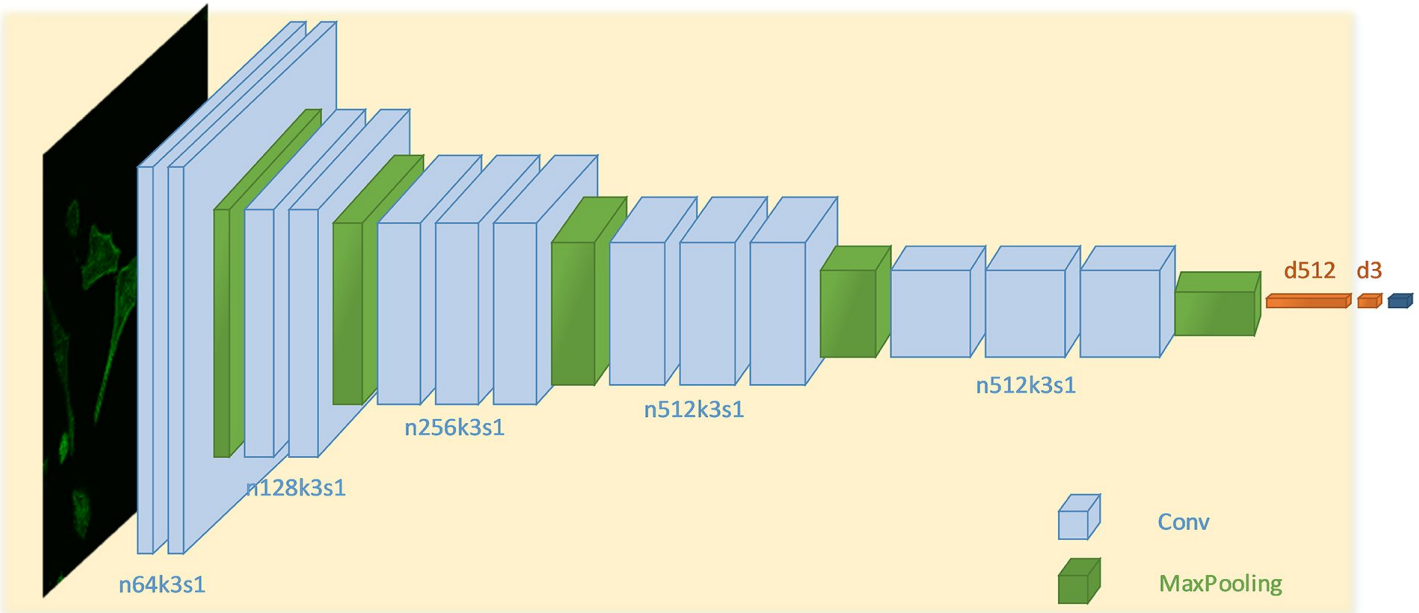
Correlation between road and NO2, Image 1



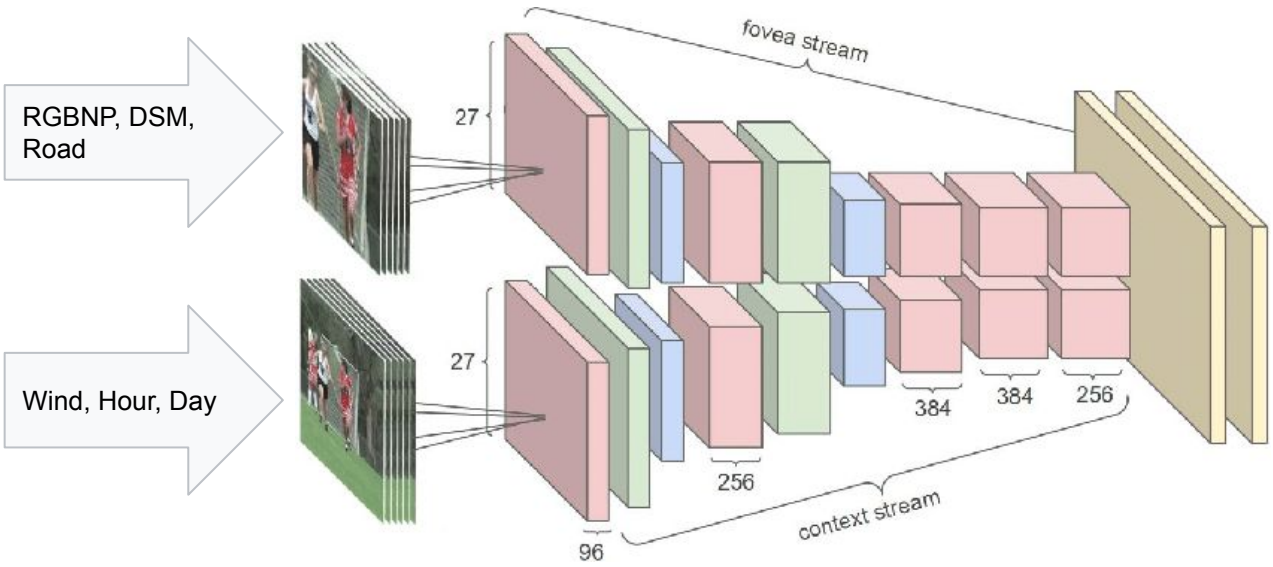
Correlation between road and NO2, Image 2

Training the model

Mapping



Forecast



Questions!