Air Pollution Challenge

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AGENDA

- Business goal and data
- Workflows
- Findings and recommendations
- Product and future work

BUSINESS GOAL

Help the African government predict the air quality of a city and implement preventive measures for the well-being of its residents.

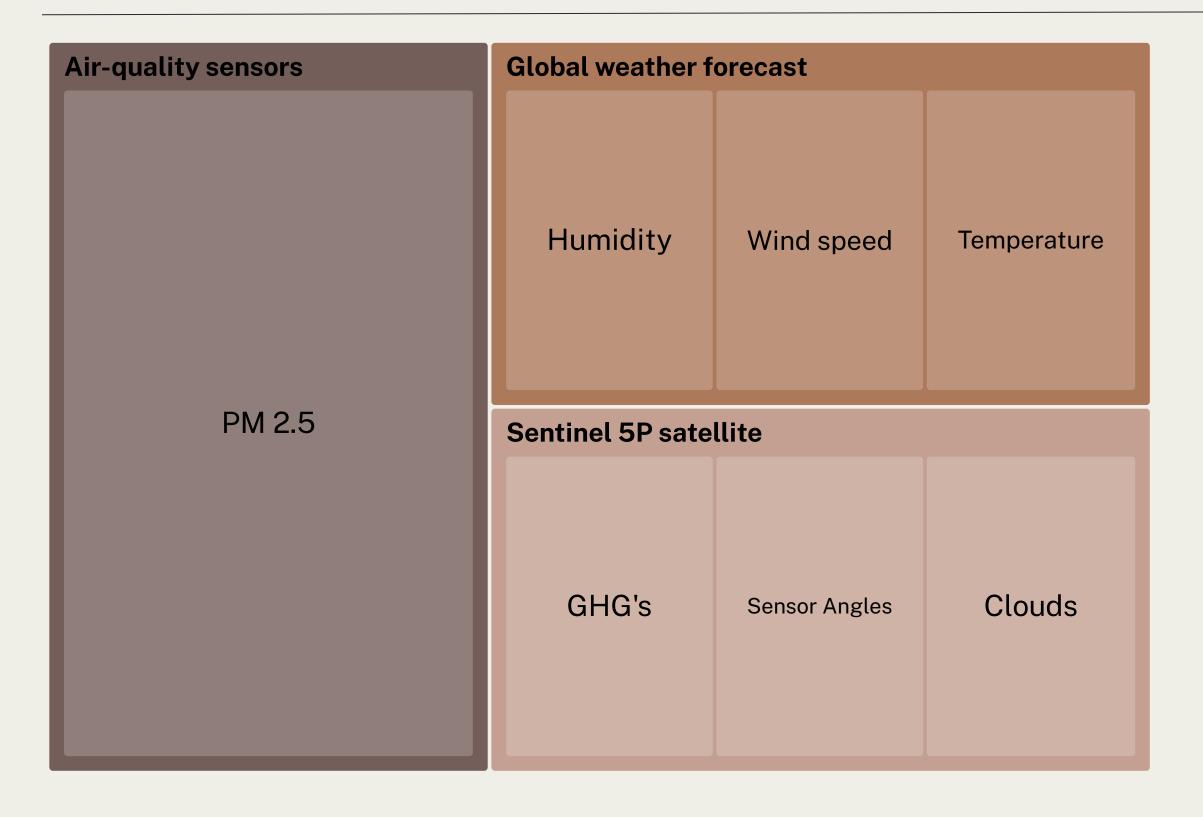


AIR QUALITY INDEX

AQI Level	PM 2.5	Health Recommendation for 24hr exposure	
Good (0-50AQI)	0-12	Air quality is satisfactory, and air pollution poses little or no risk.	
Moderate (51-100AQI)	12.1-35.4	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.	
Unhealthy for Sensitive Groups (101-150 AQI)	35.5-55.4	Members of sensitive groups may experience health effects. The general public is less likely to be affected.	
Unhealthy (151-200 AQI)	55.5-150.4	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects	
Very Unhealthy (201-300 AQI)	150.5-250.4	Health alert: The risk of health effects is increased for everyone.	
Hazardous (301 and above AQI)	250.5+	Health warning of emergency conditions: everyone is more likely to be affected.	

Source: https://www.iqair.com/us/newsroom/what-is-aqi

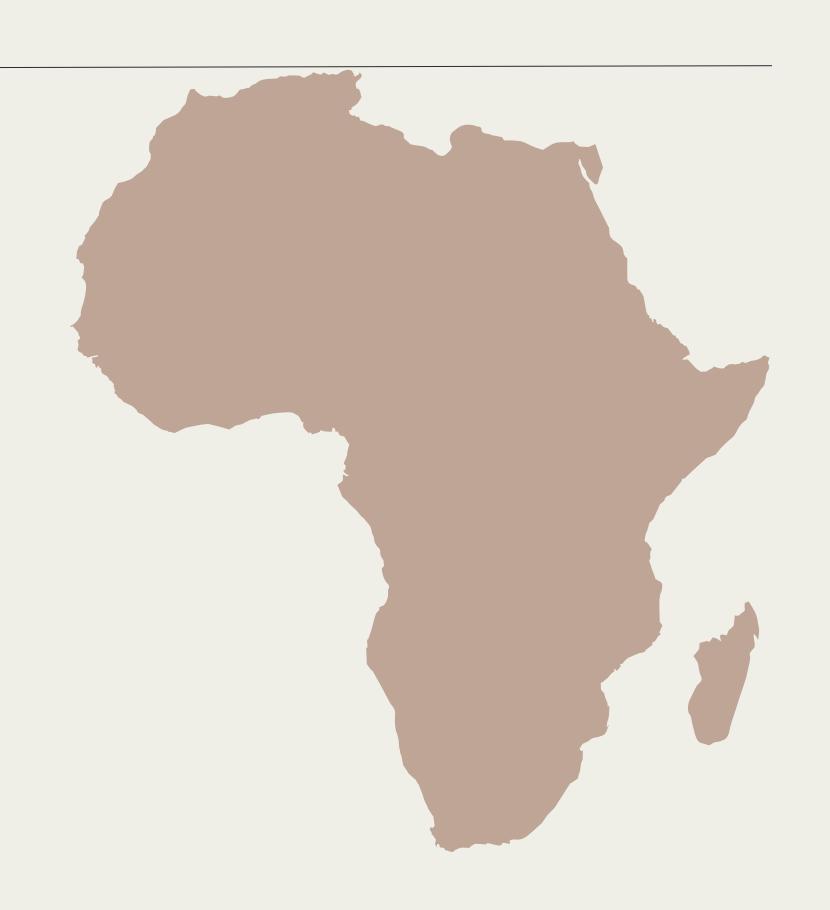
DATA INFO AND SOURCES



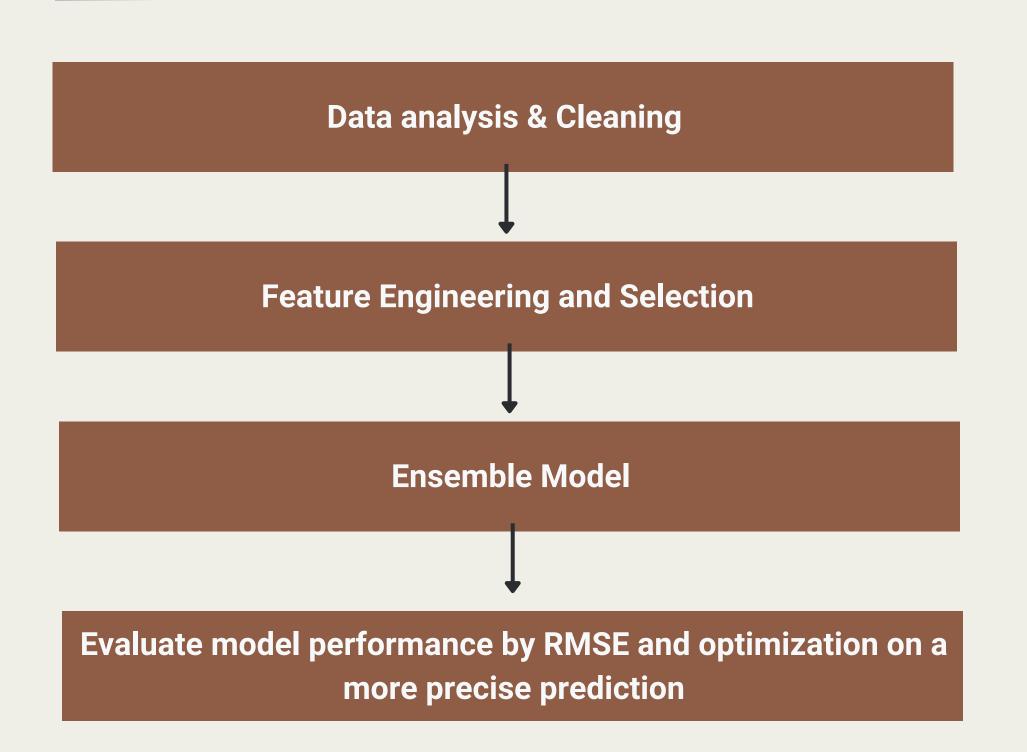


PROJECT WORKFLOW

Call for precise prediction of air quality **Diverse data collection** over 350 cities over a period of 3 months **Evaluate PM 2.5 predictions as air quality target** Impact analysis to create a multi-facetted model of top 50 factors



TECHNICAL WORKFLOW





FINDINGS

Important Features

- Temperature 2m above ground
- V component of wind 10m above ground
- Cloud base pressure
- Cloud base height
- The density of pollutants like Aerosol,
 Formaldehyde, Carbon Monoxide and Sulphur Dioxide

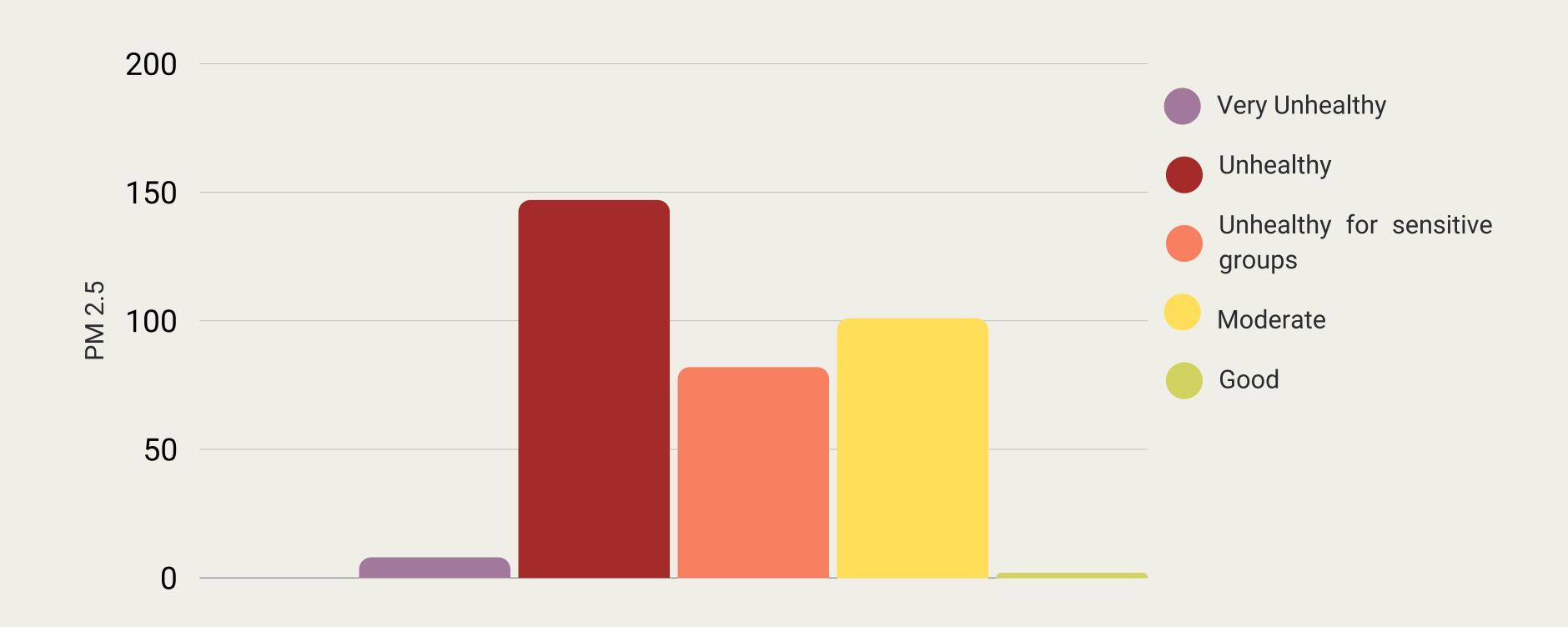
Shortcomings

- RMSE could be improved
 - The error could misclassify the air quality category
- Exclusion of methane
 - 80 % missing data
- A lot of data imputation
 - This could have led to adding information

Baseline vs Final Model	Baseline Model	Final Model	
Train RMSE	31.21	30.77	
Test RMSE	38.42	31.93	



AIR QUALITY ACROSS CITIES



RECOMMENDATIONS

Good (0-50AQI)	Moderate (51-100AQI)	Unhealthy for Sensitive Groups (101-150 AQI)	Unhealthy (151-200 AQI)	Very Unhealthy (201-300 AQI)	Hazardous (301 and above AQI)
Share good news!	Share good news!Encourage outdoor activities	Alerts for sensitive groups	 Share potential risks with public health advisories 	 Emergency communication (text messages and social media) 	 Emergency state & share emergency plans
	 Be mindful of vulnerable groups! Share protection ideas to reduce exposure 	 Alternatives for indoor activities for sensitive groups 	 Limit outdoor exposure including outdoor work hours Encouraging the use of public transportation Promote the use of air purifiers in homes and public buildings 	Stay indoors, close windows, use air purifiers	 Provide clean air shelters, distribute masks Support healthcare facilities Limit vehicular traffic and industrial activities

PRODUCT AND FUTURE WORK

Web App - that can be included in the cities webpage

- SaaS product tailored for municipalities in African cities, connected to sensor data through APIs for seamless real-time data retrieval.
- Our model accurately predicts air quality and categorizes the Air Quality Index (AQI) level in real time based on your location.
- We provide recommendations and actions to take, guided by the current air quality conditions.

Future scope

- Work with local bodies and weather stations to incorporate more data
- Predict future air quality and provide recommendations in advance
- Improve RMSE

