Business Case for AQI Prediction for Sales

Air pollution is a growing concern worldwide, affecting public health, economic productivity, and overall quality of life. Accurate Air Quality Index (AQI) prediction can provide early warnings, enabling individuals, businesses, and governments to take proactive measures. This business case outlines the need for an AQI prediction system, its benefits, sales potential, implementation plan, and expected return on investment (ROI).

Problem Statement

Air pollution contributes to respiratory diseases, cardiovascular conditions, and reduced life expectancy. Industries, commuters, and policymakers lack real-time, predictive insights to mitigate risks effectively. Traditional AQI monitoring systems provide historical and real-time data but fail to offer accurate future projections necessary for timely decision-making.

When Grap 3 restrictions were implemented in Delhi NCR it prevented the use of BS-III petrol and BS-IV diesel four-wheelers with restrictions on commercial vehicles impacted businesses that rely on transportation for goods.

Solution

An AI-powered AQI prediction system can revolutionize environmental monitoring by forecasting pollution levels using meteorological, industrial, and traffic data. The AQI information is a lag indicator where we get the AQI values and then make decisions according to it. In this solution we are trying to predict AQI early as a lead indicator to prepare for the problem better.

- **Sales**: To leverage AQI data for location-based product sales, and to prevent huge losses to businesses.
- **Supply Chain**: AQI prediction optimizes supply chain logistics, warehousing, planning, and sustainability by anticipating pollution-related disruptions and enabling proactive adjustments.

Solution Overview The proposed AQI prediction system leverages machine learning deep learning algorithms to analyze historical air quality data, weather conditions, and emission sources. The system will provide:

- **Short-term and long-term AQI forecasts**
- **Real-time alerts for critical pollution levels**
- **User-friendly dashboard for visualization and insights**

Key Benefits

- **Supply chain Efficiency**: Help businesses plan operations to minimize loss and comply with regulations.
- **Sales Growth**: Companies can capitalize on AQI insights to increase sales of products and services.

AQI Prediction System - Project Plan

Data Collection & Preprocessing

Get AQI data (OpenAQ, Kaggle, WAQI API).
Clean & preprocess data (handle missing values, normalize).
Select key features (PM2.5, PM10, NO2, etc.).

Model Training (Google Colab - Free GPU)

Train XGBoost or LSTM (deep learning) model
Evaluate performance (RMSE, MAE).

Deployment (Streamlit Cloud - Free Web App)

Create a Streamlit web app for real-time AQI predictions.
Upload code & model to GitHub.
Deploy on Streamlit Cloud (connect GitHub → Deploy).

Real-Time Predictions

User enters pollutant levels (PM2.5, PM10, NO2, etc.).
Model predicts AQI instantly & displays results.