

Air Quality Index (AQI) Prediction using Machine Learning

A Predictive Modeling Approach

Problem Statement

1 Current AQI prediction methods have limitations

2 Machine learning can improve AQI prediction accuracy



Air pollution is a major environmental health risk, and accurate AQI prediction is crucial for public health policy-making.

• **Methodology**

- Text: This study uses a machine learning approach to predict AQI values based on historical data of pollutant concentrations and meteorological factors.
- Bullet points:
 - Data collection from various sources
 - Data preprocessing and feature engineering
 - Model development and training
 - Model evaluation and prediction

- Data Collection
- Historical data of pollutant concentrations and meteorological factors were collected from various sources.
- points:
 - Government databases
 - Research studies
 - Online repositories
 - Air quality monitoring stations

Data Preprocessing

Collected data was preprocessed to handle missing values, normalize, and feature scale.

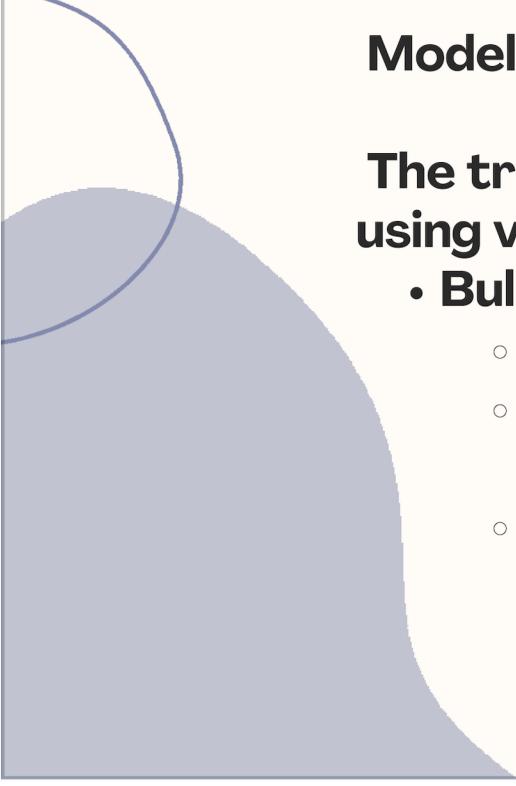
Bullet points:

- **Handling missing values using imputation techniques**
- **Normalizing data using techniques like Min-Max Scaler**
- **Feature scaling using techniques like Standard Scaler**

Model Development

Various machine learning algorithms were explored for AQI prediction.

- Bullet points:
 - Linear Regression
 - Decision Trees
 - Random Forest
 - Neural Networks

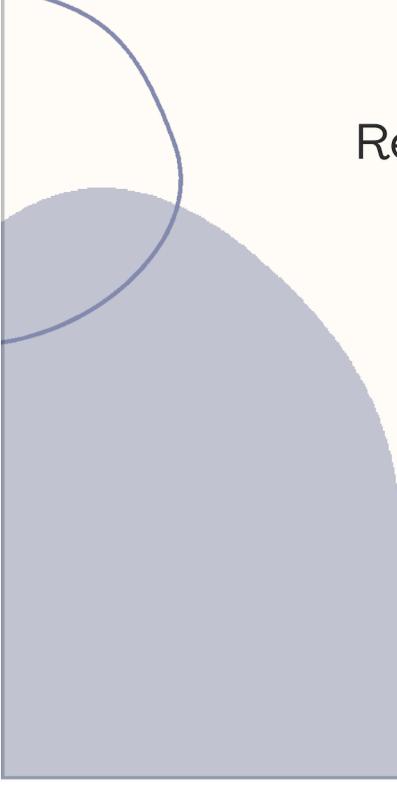


Model Evaluation

The trained model was evaluated using various metrics.

- **Bullet points:**

- **Mean Squared Error (MSE)**
- **Root Mean Squared Error (RMSE)**
- **Coefficient of Determination (R-squared)**



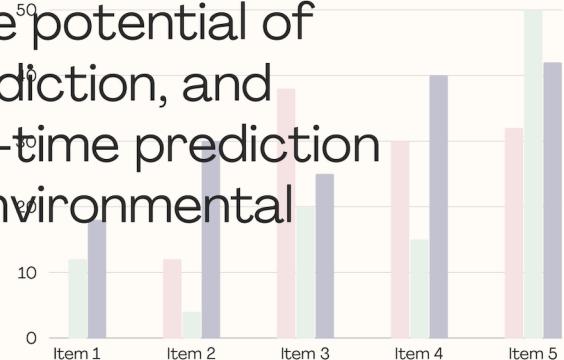
Results

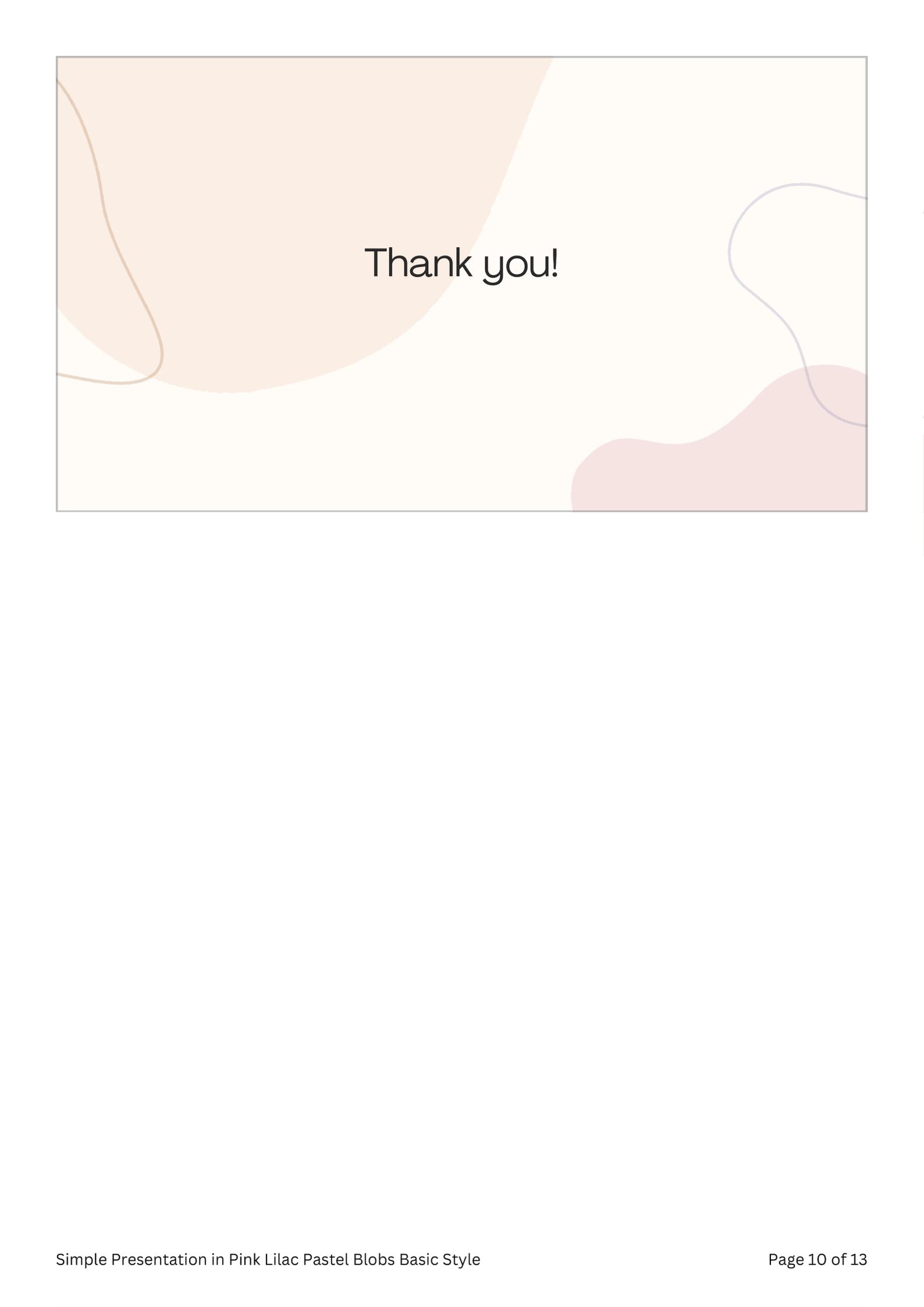
- The machine learning model showed improved AQI prediction accuracy compared to traditional methods.
- Graphs or tables showing results

Conclusion

This study demonstrated the potential of machine learning for AQI prediction, and future work can explore real-time prediction and integration with other environmental monitoring systems.

- Summary of key findings





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