**Project 9: Air Quality Analysis and Prediction in Tamil Nadu**

**Phase 1: Problem Definition and Design Thinking**

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**Problem Definition:**

To start, we need to clearly define the problem we aim to address. In this case, we want to predict air quality (specifically PM2.5 levels) in a particular region. This problem definition is essential as it sets the direction for our project. We should consider aspects such as the geographic scope, the time frame, and the specific air quality metrics we are interested in.

**Design Thinking:**

Embracing design thinking principles can help us approach this project with a user-centred mindset. It's important to think about the end-users of our predictions. Are we developing a tool for environmental agencies, health practitioners, or the general public? Understanding their needs and pain points will guide our project's development.

**Objectives:**

We should establish clear objectives for our project. For instance:

Develop an accurate air quality prediction model.

Create a user-friendly interface for accessing air quality predictions.

Raise awareness about air quality issues within the community.

**Analysis Approach:**

Our analysis approach should be based on sound data science principles. We need to determine which machine learning and statistical models are most appropriate for predicting air quality based on historical data and meteorological factors. It's also important to consider potential challenges, such as missing data or outliers, and how we plan to address them during data preprocessing.

**Visualisation Selection:**

Choosing the right visualisations is critical for conveying our findings effectively. Since we are dealing with air quality data, we might consider the following visualisations:

**Time series:** plots to show historical trends in air quality.

**Heatmaps or contour plots:** to illustrate spatial variations.

**Scatter plots:** to explore correlations between air quality and meteorological variables.

**Interactive maps**: to display predictions for different geographic areas.

The choice of visualisation should align with our objectives and the needs of our target audience. Visualisations should be clear, informative, and easy to interpret.

**Conclusion:**

In conclusion, I believe that a well-defined problem statement, a user-centred approach, clear objectives, a robust analysis plan, and thoughtful visualisation selection will be key to the success of our air quality analysis and prediction project. I look forward to collaborating with the team to bring this project to life and make a positive impact on our community.