**Ideation Phase**

**Defining the Problem Statements**

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| **Date** | **26-09-2023** |
| **Team ID** | **499** |
| **Project Name** | **6112-AIR QUALITY ASSESSMENT IN TN** |

**AIR QUALITY ASSESSMENT IN TN**

**Problem Definition and Design Thinking**

**Introduction**

The project aims to analyze and visualize air quality data from monitoring stations in Tamil Nadu. The objective is to gain insights into air pollution trends, identify areas with high pollution levels, and develop a predictive model to estimate RSPM/PM10 levels based on SO2 and NO2 levels. This project involves defining objectives, designing the analysis approach, selecting visualization techniques in **IBM Cognos**, and creating a predictive model using Python and relevant libraries.

**Problem Statement**

Objective: Develop a comprehensive and localized air quality assessment system in Tennessee, leveraging advanced monitoring technologies and data analysis techniques.

Data: To conduct a comprehensive air quality assessment in Tennessee, critical data includes measurements of pollutants like PM2.5, PM10, NO2, SO2, CO, and O3 from monitoring stations. Meteorological data, encompassing temperature, humidity, wind patterns, and precipitation, is vital for understanding atmospheric conditions. Geographic information system (GIS) data aids in assessing how topography and land use influence air quality. Emission inventories offer insights into pollution sources, while population density and demographic data help identify vulnerable communities. Health records, historical data, and air quality modeling outputs provide additional context. Access to policy and regulatory information ensures evaluations align with existing guidelines, while remote sensing data offers a broader perspective on pollution patterns.

**Key Challenges:**

**Insufficient Monitoring Infrastructure**: Inadequate coverage of monitoring stations may lead to gaps in data, especially in less populated or remote areas, hindering a comprehensive understanding of air quality.

**Data Quality and Consistency**: Ensuring the accuracy, precision, and consistency of collected data across various monitoring sources can be a challenge, impacting the reliability of assessments and subsequent policy decisions.

**Spatial Variability**: Tennessee's diverse geography can lead to significant variations in air quality levels across regions, necessitating localized monitoring efforts and targeted interventions.

**Design Thinking Approach**

**Empathize:**

We understand that addressing air quality issues in Tennessee is of paramount importance for the well-being and health of its residents. The challenges faced, from limited monitoring infrastructure to the complexities of attributing pollution sources, undoubtedly present significant hurdles. The diverse geography of Tennessee further compounds the issue, demanding a tailored approach for each region. Balancing regulatory compliance with enforcement and public engagement is a delicate task. Additionally, uncertainties in predictive modeling and potential health impacts underscore the need for thorough assessments. It's clear that a collaborative, multidisciplinary effort is required to tackle these challenges and pave the way for cleaner, healthier air for all Tennesseans.

**Actions:**

**Acknowledgment**: Recognize the concerns and challenges faced by the affected individuals and communities regarding air quality in Tennessee.

**Validation**: Validate their experiences and feelings, acknowledging that poor air quality can have serious impacts on health and quality of life.

**Active** **Listening**: Provide a safe space for individuals to express their concerns and experiences related to air quality issues, without judgment or interruption.

**Understanding**: Seek to understand the specific impacts that poor air quality has on their daily lives, such as health issues, lifestyle adjustments, or economic burden

**Define:**

Based on our understanding of the problem and the users' needs, we will define clear objectives and success criteria for our project.

**Ideate:**

Brainstorm potential solutions and approaches to address the problem. This phase involves thinking creatively and considering various statistics and techniques for Air quality assessment in Tamil Nadu.

**Actions:**

- Explore different Mathematical Statistics like F-Test, T-test, etc..,

- Experiment with feature engineering techniques to enhance model performance.

-Visualize the parameter like SO2 and NO2

**Prototype**

Create a Dashboard for the Air Quality Assessment in TamilNadu using IBM Cognos

**Conclusion**

In conclusion, addressing air quality challenges in Tennessee demands a concerted and empathetic approach. The complexities, from limited monitoring infrastructure to diverse geographical influences, underscore the urgency of the issue. Through collaborative efforts, we can bridge gaps in data and technology, ensuring accurate assessments. Engaging communities and stakeholders, while prioritizing public health, will be pivotal in formulating effective policies. By empathizing with the concerns and experiences of affected individuals, we reaffirm our commitment to a cleaner, healthier Tennessee. Together, we can forge a path towards sustainable air quality improvements, safeguarding the well-being and vitality of our communities for generations to come.