College code:9512

College name:JP COLLEGE OF ENGINEERING

Department:ECE

Project code:Proj_211934_Team_1

ENVIRONMENTAL MONITORING SYSTEM

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PHASE 1:

PROBLEM STATEMENT:

- **Environmental Security**: The energy supply infrastructure, including gas and oil pipelines, can significantly impact the environment. Conversely, environmental processes also influence these linear structures. Therefore, environmental monitoring is essential during the design, construction, and operation of such infrastructure[1].

- **Health Hazards**: In many regions, air quality poses severe health risks due to pollution. Monitoring air quality is critical to protect public health and mitigate environmental damage[2].
- Adaptability: Monitoring systems must adapt to changes in the environment, control parameters, observation frequency, and data processing procedures[1]

DESIGN THINKING:

- **Integration**:
- Develop an optimized pattern for the monitoring system.
- Combine various measurement units (e.g., automatic control stations, mobile control by vehicles or helicopters) into an integrated network.
- Integrated control stations are essential for overcoming integration challenges.
- **Representativeness**:
- Use landscape indicators to reveal the landscape pattern of the monitored area.
- Detect water migration flows through remote sensing data interpretation and digital terrain model (DTM) analysis.
- **Adaptability**:
- Design an adaptive system that can change data acquisition patterns based on environmental changes.
- Adapt to variations in control stations, parameters, and observation frequency.
- Implement an algorithm for adjusting observation frequency[1].
- **Risk Assessment**:
- Quantitative risk assessment is crucial for environmental security.
- Methods involving mathematical morphology of the landscape can effectively assess risks (e.g., damage to engineering structures)[1]