KALAM PRAGATI

Empowering Engineers with Skills for Success

Innovation and Design Thinking

Continuous Internal Evaluation - 4

Team Details

Techpenta

Pratha Singh Rathaur
2300560310037

Sachin Chaudhari
2300560310044

Mohd. Arhan
2300560400014

Ayush Awasthi
2400560109003

Shivansh Singh
2200560130051

Yash Singh
2204220130059

Research

What is the Problem?

The problem is frequent flooding events caused by canal overflows, particularly in outer zones of Lucknow. These floods are leading to repeated crop damage, severely affecting farmers. The lack of an effective alert system to inform farmers in time is also mentioned as a key issue, making it difficult to take preventive measures and protect their livelihoods.

Research

Why is it a problem?
It's a problem because:

1. Crop Damage: Flooding destroys crops, which are the primary source of income and food for farmers. Repeated losses push them into financial hardship.

2. Livelihood Risk: Farmers depend entirely on their land for survival. Floods threaten their ability to earn and sustain their families.

3. Lack of Early Warnings: Without timely alerts, farmers cannot take protective actions (like moving equipment, reinforcing barriers, or adjusting planting schedules).

4. Worsens in Rainy Season: The problem becomes severe during peak monsoon, increasing unpredictability and damage.

5. Long-Term Impact: Continuous flooding can degrade soil quality, reduce agricultural productivity, and discourage farming in the region.

In short, it affects food security, economic stability, and mental well-being of the farming community.

Research

Who is facing the problem?

The problem is being faced by farmers in the outer zones of Lucknow, especially those whose fields are located near canals and low-lying areas. These farmers are highly vulnerable to flooding and crop damage due to their geographic location and lack of access to early warning systems or preventive infrastructure.

Research

When and Where does the Problem Occur?

The problem occurs primarily in the outer zones of Lucknow, especially in low-lying agricultural areas located near canals. These regions are highly vulnerable to canal overflows during the monsoon season, typically between June and September, when heavy rainfall increases water levels beyond the canal's capacity.

During this period, canals often breach or spill over, causing flooding of adjacent farmland. The floods not only destroy standing crops but also delay planting cycles, damage soil quality, and wash away farming equipment or fertilizers. This results in huge financial losses for farmers who rely solely on agriculture for their income.
The absence of a timely alert or warning system makes it even worse, as farmers are caught unprepared. They don't get enough time to secure their crops or take preventive actions, which could reduce damage. This repeated pattern of flooding has created a cycle of economic stress and uncertainty for farming communities in these vulnerable zones.

Research

What are the existing solutions?
The Existing solutions to alert Lucknow farmers about canal overflows are:

 * Localized canal sensors for real-time water level monitoring.

 * Targeted mobile apps and SMS alerts based on farmer location and canal proximity.

 * Predictive models using sensor data and weather forecasts.

 * Community-based information networks with local volunteers.

 * Integration with the Irrigation Department for data sharing and official warnings.

These aim to provide timely and specific alerts where current systems fall short.

Research

What are users complaining about the existing solutions?
Here are the main complaints:

* No Canal-Specific Alerts: The system doesn't warn specifically about canal overflows, the direct threat.

* Insufficient Warning Time: Alerts don't come early enough to protect crops from rapid canal flooding.

* Irrelevant General Information: Broad flood warnings for major rivers aren't helpful for localized canal issues.

* Lack of Precise Location Details: Warnings don't specify which canals or areas are at risk.

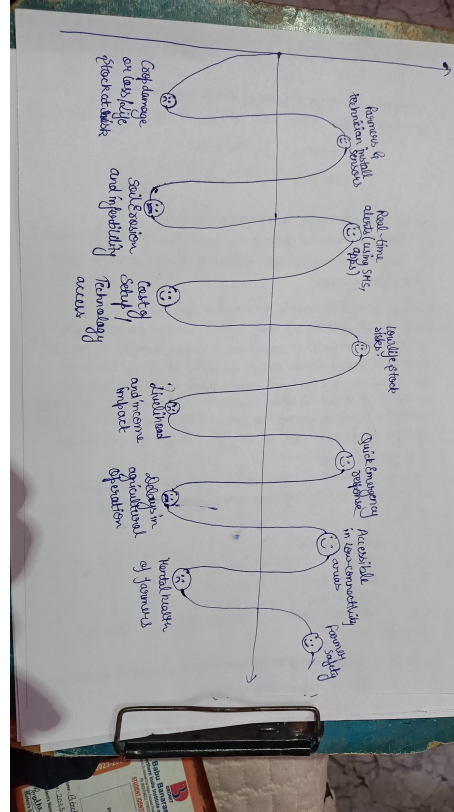* Accessibility and Understanding Issues: Farmers may lack the means or language skills to use existing systems.

Journey Map

Describe your problems through Journey Map?

Problem Statement

How might we help Farmers in the outer zones of Lucknow to Provide timely and actionable warnings to farmers before canal overflows occur. from Crop Loss (Area and Value): Measure the area of crops damaged by canal flooding (in hectares or acres) and the estimated monetary value of these losses per season/year. to Accuracy of General Flood Warnings for Canal Overflow: Not applicable, as they aren't specific. so as to Increased Sense of Security and Reduced Stress: Knowing that there is a system in place to warn them and potentially mitigate losses will reduce anxiety and improve their peace of mind. despite The main challenges in helping Lucknow farmers with canal flooding involve technical limitations in rural areas, funding constraints, social factors like literacy and trust, environmental hurdles, and the complexities of government coordination. Overcoming these will be key to implementing effective solutions..

Our Ideas

Describe your ideas through the crazy 8 ideation process, for the problem.
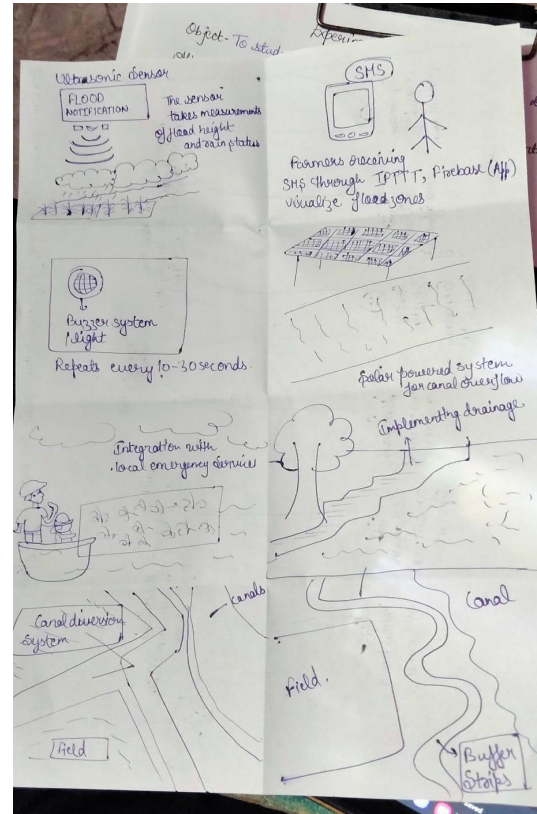
Solution

Describe your final solutions which you are planning to do convert it in a Prototype?

let's outline the second option (IoT Based Canal overflow Alert System) from the sketch in a way that it can be converted into a prototype. We'll define the key components, functionalities, and user interactions for this prototype.

Prototype Name: IoT Based Canal Overflow Alert System via SMS (and potential basic App)

Core Idea: To provide timely and localized flood warnings to farmers in the outer zones of Lucknow via SMS, triggered by real-time sensor data, with a potential basic app component for visualization.

Key Components of the Prototype:

* Simulated Sensor Data Feed:
  * Functionality: A simulated data stream mimicking the readings from ultrasonic water level sensors and rain gauges placed along the canals. This will generate varying water height and rainfall intensity data.
  * Output: Numerical values representing water level (e.g., in centimeters) and rainfall (e.g., in millimeters per hour), along with a timestamp and sensor ID (representing different canal locations).
  * Purpose in Prototype: To simulate the real-world triggers for sending out SMS alerts.
* Alert Trigger Logic:
  * Functionality: A set of predefined rules that determine when an SMS alert should be sent based on the simulated sensor data. These rules will consider:
    * Critical Water Level Thresholds: For each sensor location (representing a specific canal

Thank You