

## Ideation Phase

### Brainstorm & Idea Prioritization Template

Date	31 January 2025
Team ID	LTVIP2026TMIDS77028
Project Name	Rising Waters – A Machine Learning Approach to Flood Prediction
Maximum Marks	4 Marks

#### **Step-1: Team Gathering, Collaboration and Select the Problem Statement**

During the ideation phase, the team conducted a collaborative brainstorming session to identify real-world problems that could be solved using Artificial Intelligence and Machine Learning.

Several societal and environmental challenges were discussed, including:

- Traffic congestion prediction
- Air pollution monitoring
- Crop yield prediction
- Disease outbreak forecasting
- Flood prediction and disaster management

After discussion, the team analyzed the impact, feasibility, and relevance of each problem. Floods were identified as one of the most devastating natural disasters affecting human lives, infrastructure, and the economy.

The team selected the problem statement:

“To design and develop a machine learning-based flood prediction system that analyzes historical rainfall and environmental parameters to forecast flood occurrence and support early warning systems.”

The problem was chosen because:

- It has high societal impact.
- Reliable datasets are available.
- Machine learning models can effectively identify patterns in rainfall data.
- The solution can assist disaster management authorities.

#### **Step-2: Brainstorm, Idea Listing and Grouping**

After finalizing the problem statement, the team generated multiple solution ideas related to flood management:

##### **Idea List**

1. Rule-based flood warning system
2. Machine learning-based flood classification model

3. Deep learning model using LSTM for rainfall time-series
4. Real-time flood monitoring using weather APIs
5. Geographic flood visualization dashboard
6. SMS alert system for flood-prone areas
7. Web-based flood prediction application

### Idea Grouping

The ideas were grouped into three major categories:

#### **Category 1: Prediction Models**

- ML-based classification model
- Deep learning (LSTM) model

#### **Category 2: Alert & Monitoring Systems**

- SMS alert system
- Real-time API integration

#### **Category 3: Visualization & Deployment**

- Web application
- Flood risk dashboard

After discussion, the team decided to focus first on:

A Machine Learning Classification Model  
Flask-based Web Application Deployment

This approach was selected due to feasibility within project duration and technical expertise of the team.

### **Step-3: Idea Prioritization**

To prioritize the best idea, the team evaluated each solution based on:

- Feasibility
- Dataset availability
- Implementation complexity
- Time constraints
- Expected accuracy
- Social impact

### **Final Selected Idea:**

Develop a Machine Learning-based Flood Prediction System using multiple classification algorithms (KNN, Decision Tree, Random Forest, XGBoost), compare performance, and deploy the best model through a Flask web application.

**Reason for Selection:**

- High accuracy achievable with ensemble methods.
- Availability of structured rainfall dataset.
- Real-world applicability.
- Scalability for future improvements (real-time APIs, SMS alerts).
- Suitable for full-stack implementation (Frontend + Backend + ML).