DATE	28-02-2026
TEAM ID	LTVIP2026TMIDS89043
PROJECT NAME	Rising Waters: A Machine Learning Approach to Flood Prediction
MAXIMUM MARKS	2 MARKS

3.2 SOLUTION REQUIREMENT:

Functional Requirements:

These define what the system should do:

1. **Real-Time Flood Prediction:** Use machine learning algorithms to predict flood events based on historical and live data.
2. **Data Integration:** Collect and process data from rainfall sensors, river gauges, weather APIs, and satellite imagery.
3. **Early Warning Alerts:** Generate automated alerts via SMS, email, or dashboard notifications.
4. **Visualization Dashboard:** Display flood risk heatmaps, water levels, and probability charts for easy decision-making.
5. **User Management:** Allow different access levels for government officials, disaster teams, and urban planners.
6. **Scenario Simulation:** Provide "what-if" scenarios for potential flood events and mitigation planning.

Non-Functional Requirements:

These define how the system should perform:

1. **Accuracy:** Predictions should achieve a high degree of reliability (target ≥ 85% accuracy).
2. **Scalability:** Handle large datasets from multiple regions simultaneously.
3. **Performance:** Provide real-time updates with minimal latency (<5 minutes).

4. **Usability:** Intuitive interface for non-technical users with clear visualization.
5. **Security:** Secure sensitive data and user credentials with authentication.
6. **Availability:** 24/7 system uptime, especially during flood season.

Technical Requirements

- **Programming Languages:** Python (for ML), JavaScript/React (for dashboard)
- **Machine Learning Models:** Random Forest, LSTM, or Gradient Boosting for flood prediction
- **Database:** SQL/NoSQL for sensor and historical data storage
- **APIs:** Weather APIs, IoT river sensor integration
- **Cloud Hosting:** AWS, Azure, or Google Cloud for real-time data processing

Business / User Requirements:

- Enable authorities to make faster, informed decisions
- Reduce loss of life and property during floods
- Provide a cost-effective early warning system
- Enhance public trust through transparent flood information