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**Section : 7B1**

**Course title :** [Scientific Research and Methodology](https://classroom.google.com/u/3/c/NzEwMzA4NDkwMjQ4)

**Course Code :**418

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**Problem Statement**

Floods are a major natural disaster causing significant loss of life, property, and environmental damage. Traditional flood monitoring systems often lack real-time data and predictive capabilities, leading to delayed responses and increased damage.

**Problem Solution**

The Smart IoT Flood Monitoring System aims to provide real-time monitoring and early warning of flood conditions using IoT technology. This system integrates various sensors and data analytics to predict and mitigate flood risks effectively.

**Technical Implementation**

• Sensors: Utilizes ultrasonic sensors to measure water levels.

• Microcontroller: NodeMCU ESP8266 processes sensor data.

• Data Transmission: Data is sent to the ThingSpeak IoT cloud platform for real-time monitoring and analysis.

• Alerts: LED indicators and internet applications provide alerts based on water level thresholds.

**Results**

The system successfully monitored water levels and provided timely alerts during critical flood conditions. The data was accessible from anywhere, allowing for remote monitoring and quick response.

**Comparison**

Compared to traditional systems, the Smart IoT Flood Monitoring System offers:

• Real-time data collection and monitoring.

• Predictive analytics for early warning.

• Remote accessibility and control.

**Limitations**

• Power Dependency: Requires a reliable power source for continuous operation.

• Network Reliability: Dependent on stable internet connectivity for data transmission.

• Sensor Accuracy: Ultrasonic sensors may have limitations in extreme weather conditions.

**Future Work**

• Enhanced Sensors: Incorporating more advanced sensors for better accuracy.

• AI Integration: Using AI for more accurate flood predictions and automated responses.

• Scalability: Expanding the system to cover larger areas and multiple locations.

**Contributions**

• Provides a cost-effective and efficient solution for flood monitoring.

• Enhances community safety by offering early warnings and real-time data.

• Demonstrates the potential of IoT in disaster management.

**Applications**

• Urban Areas: Monitoring water levels in cities to prevent urban flooding.

• Rural Areas: Providing early warnings to remote communities.

• Government Agencies: Assisting in disaster management and response planning.

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| **Ref.** | **Problem area** | **Data type** | **Data size** | **Data Sources** | **Availability** |
| **1** | **Flood monitoring System** | **Here, Used to Real-time sensor data (water level, rainfall)** | **50MB/day** | **IoT sensors, weather stations, satellite imagery (NASA GFMS)** | **Publicly available, but requires an API connection** |
| **2** | **Prediction of flood risk using IoT and GIS mapping** | **River flow data, elevation models, rainfall, soil moisture** | **Large datasets (100MB-1GB/day)** | **IoT river level sensors, GIS mapping data (DEM), remote sensing** | **Publicly available GIS and satellite data.** |

**References:**

1. **S. Azid, B. Sharma, K. Raghuwaiya, A. Chand, S. Prasad, and A. Jacquier, SMS based flood monitoring and early warning system, vol. 10. 2015.R. Nicole, “Title of paper with only first word capitalized,” J. Name Stand. Abbrev., in press.**
2. **Sharmad Pasha,"Thingspeak Based Sensing and Monitoring System for IoT with Matlab Analysis", International Journal of New Technology and Research (IJNTR) , Volume-2, Issue 6, June 2016 Pages 19-23I. S. Jacobs and C. P. Bean, “Fine particles, thin films and exchange anisotropy,” in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–3**

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| **Ref.** | **Methods/**  **Techniques** | **Results/**  **Outcomes** | **Research gap/ limitation or drawbacks** | **Future Direction/ Future work** | **Opinion/Comments/ Feedback** |
| 1 | IoT sensors (water level, rainfall) & NASA GFMS | Achieved **real-time flood detection** with 85% accuracy in flood-prone areas. | Limited sensor coverage in remote regions | **Expand sensor networks** in rural areas. Utilize low-cost, solar-powered sensors. | **usefulness of real-time alerts**, |
| 2 | **GIS mapping integrated with IoT data** for flood risk visualization. | **interactive flood risk maps** with high accuracy, enabling quicker disaster response. | **consistent internet connection** for real-time updates. | Explore **offline solutions** for areas with limited connectivity. | local authorities on **ease of use** for decision-making. |

**References :**

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2. **Giovannettone J, Copenhaver T, Burns M, and Choquette S 2018 A statistical approach to mapping flood susceptibility in the Lower Connecticut River Valley Region. Water Resources Research.**