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REAL TIME FLOOD WATER MONITORING AND ALERT SYSTEM USING IOT FOR KAVERI RIVER ZONE AT SRIRANGAPATANA

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ABSTRACT

Flooding in the Kaveri River zone, particularly around Srirangapatana, poses recurring risks to life, property, and infrastructure during monsoon seasons. Traditional flood monitoring methods often rely on manual observation, leading to delays in detection and response. To address these challenges, this project proposes a real-time flood water monitoring and alert system using Internet of Things (IoT) technology. The system integrates sensors such as ultrasonic water level sensors, flow sensors, and rainfall sensors to continuously measure river conditions with high accuracy. The collected data is transmitted to a cloud platform using IoT communication protocols, enabling real-time analysis and visualization. When water levels exceed predefined danger thresholds, the system automatically triggers alerts through SMS, mobile notifications, alarms, and a web dashboard, ensuring timely communication to residents and disaster management authorities. By providing continuous monitoring, early warnings, and location-specific data for the Srirangapatana stretch of the Kaveri River, the proposed IoT-based system enhances flood preparedness and reduces potential damage. It offers a low- cost, scalable, and efficient solution that can be expanded to other vulnerable regions of the river basin, contributing significantly to disaster mitigation and community safety.

KEYWORDS: IoT (Internet of Things), Real-time Monitoring ,Flood Detection ,Water

Level Sensor, Ultrasonic Sensor, Early Warning System, Flood, Alert System, Kaveri River Basin, Srirangapatana, Cloud Computing, Data, Transmission, Wireless Communication (GSM),Threshold-based Alert, Disaster Management, Environmental Monitoring, Sensor, Network, Remote Data Access, Predictive Analysis River Monitoring

INTRODUCTION

Floods are among the most devastating natural disasters, causing extensive damage to life, property, agriculture, and infrastructure. In India, riverine flooding is a recurring concern, particularly during the monsoon season. The Kaveri River, flowing through the historic town of Srirangapatana in Karnataka, is prone to sudden rises in water level due to heavy upstream rainfall, reservoir releases, and unpredictable climatic changes. Traditional flood monitoring methods in this region often depend on manual inspection and delayed reporting, which can result in late warnings and inadequate preparedness for communities at risk. With the rapid advancement of digital technologies, the Internet of Things (IoT) has emerged as a powerful tool for environmental monitoring. IoT enables the deployment of interconnected sensors that can continuously collect, process, and transmit real-time data. Applying this technology to flood monitoring ensures faster detection of rising water levels and timely alert dissemination. An IoT-based flood monitoring and alert system enhances safety by providing continuous, automated, and accurate updates about river conditions. This project focuses on designing and implementing a real-time flood water monitoring and alert system for the Kaveri River zone at Srirangapatana. The system integrates sensors such as ultrasonic water level sensors, flow sensors, and rainfall sensors to monitor river conditions. Data is transmitted to a cloud platform where danger thresholds are analyzed, and alerts are automatically sent to concerned authorities and residents through SMS, mobile notifications, and alarms. By providing early warnings and supporting proactive decision-making, the system aims to reduce the impact of floods and improve disaster preparedness in vulnerable regions of Srirangapatana.

Problem Statement and Literature Review

The Srirangapatana region along the Kaveri River is highly vulnerable to seasonal flooding, especially during the monsoon when water levels rise suddenly due to heavy rainfall and upstream reservoir releases. Existing methods of monitoring river conditions rely heavily on manual observation, periodic reporting, and traditional gauge systems, which often fail to provide timely and accurate information. These limitations result in delayed warnings, insufficient preparedness, and increased risks to human life, livestock, property, and

agriculture. There is a clear need for a real-time, automated, and reliable flood monitoring system that continuously tracks water levels and environmental conditions and provides immediate alerts to authorities and residents. Therefore, this project aims to develop an IoT-based flood water monitoring and alert system specifically for the Kaveri River zone at Srirangapatana to enable early detection, swift communication, and effective disaster response. Existing research on flood monitoring systems highlights that traditional manual methods are slow, error-prone, and ineffective for early warning. Recent studies show that IoT-based solutions significantly improve flood detection by using sensors such as ultrasonic and flow sensors to continuously monitor water levels in real time. Literature also emphasizes the importance of cloud platforms for storing and analyzing data, as well as wireless communication technologies like GSM and LoRa for transmitting alerts quickly to authorities and communities. Various case studies demonstrate that automated early warning systems greatly reduce flood damage by providing timely notifications and enabling preventive action. These findings support the development of an IoT-enabled flood monitoring and alert system for the Kaveri River at Srirangapatana, where rapid water level changes demand accurate and real-time monitoring.

Working Principle

The system operates by continuously monitoring the water level and related environmental parameters of the Kaveri River using IoT-based sensors. Ultrasonic sensors measure the distance between the water surface and the sensor to determine rising or falling water levels, while additional sensors such as flow sensors and rainfall sensors capture river flow intensity and local precipitation. The sensor data is collected by a microcontroller (such as Arduino or NodeMCU), which processes the readings and transmits them to a cloud platform through wireless communication technologies like GSM, Wi-Fi, or LoRa.

On the cloud server, the data is analyzed in real time and compared with predefined threshold levels corresponding to normal, warning, and danger conditions. When the water level crosses these thresholds, the system automatically generates alerts. These alerts are sent to authorities and nearby residents through SMS, mobile app notifications, alarms, or a web dashboard. The continuous flow of real-time data enables users to visualize trends, predict potential flooding, and take timely preventive measures. Thus, the system provides an automated, accurate, and uninterrupted method for early flood detection and warning in the Srirangapatana region.

Methodology

The methodology for developing the real-time flood water monitoring and alert system for the Kaveri River at Srirangapatana involves a systematic approach that begins with analyzing flood-prone locations and studying historical water-level data to identify suitable sensor installation points. Ultrasonic sensors, flow sensors, and rainfall sensors are selected and integrated with a microcontroller such as ESP32 or NodeMCU, along with communication modules like GSM or LoRa for reliable data transmission. These sensors continuously collect real-time water-level and environmental data, which the microcontroller processes, calibrates, and uploads to a cloud platform for storage and visualization. Threshold levels for normal, warning, and danger conditions are predefined based on historical flood patterns, and an alert algorithm is implemented to automatically trigger notifications when readings exceed these limits. Alerts are sent through SMS, app notifications, and alarms to local authorities and residents. The system is then deployed in the field, calibrated, and tested under various conditions to ensure accuracy and responsiveness. Finally, the setup is optimized for long-term performance, with provisions for maintenance, scalability, and future enhancements such as predictive analytics.

RESULT

The implementation of the real-time flood water monitoring and alert system for the Kaveri River at Srirangapatana successfully demonstrates continuous and accurate monitoring of water levels. The IoT- based sensors reliably measure river height, flow, and rainfall, transmitting data to the cloud in real time. The system effectively triggers alerts when water levels exceed predefined thresholds, notifying authorities and residents through SMS, mobile notifications, and alarms. The real-time dashboard provides easy visualization of river conditions, allowing proactive decision-making and early response to potential flooding. Field testing showed that the system can detect sudden rises in water level and provide timely warnings, significantly reducing risks to life, property, and agriculture. Overall, the project proves the feasibility and efficiency of using IoT for flood monitoring and early warning, offering a scalable solution that can be extended to other flood-prone areas along the Kaveri River.

CONCLUSION

The real-time flood water monitoring and alert system using IoT for the Kaveri River zone at Srirangapatana successfully demonstrates an effective and automated approach to flood

detection and early warning. By integrating sensors, microcontrollers, and cloud-based data processing, the system provides continuous monitoring of water levels, flow rates, and rainfall, enabling timely alerts to authorities and residents. The implementation highlights the advantages of IoT technology in improving accuracy, reducing human dependency, and facilitating rapid response during flood events. Field tests confirmed that the system can detect sudden rises in water level and issue timely notifications, thereby minimizing potential damage to life, property, and agriculture. The project offers a scalable, low-cost, and energy-efficient solution that can be extended to other flood-prone regions along the Kaveri River or similar river basins, contributing significantly to disaster preparedness, community safety, and sustainable environmental management.

APPLICATIONS

- Early Flood Warning – Provides real-time alerts to residents and authorities when water levels rise above safe limits, helping prevent loss of life and property.
- River Monitoring – Continuously tracks water levels, flow rates, and rainfall in the Kaveri River for accurate, up-to-date information.
- Disaster Management – Assists government and emergency services in planning evacuation, rescue operations, and resource allocation during floods.
- Agricultural Support – Helps farmers take preventive actions by monitoring river conditions, protecting crops and livestock from flood damage.
- Data Analysis and Prediction – Stores historical and real-time data to predict flood patterns and plan for future flood events.
- A public Safety and Awareness – Keeps communities informed about river conditions and risk levels through SMS, mobile apps, and web dashboards.
- Scalability for Other Regions – Can be implemented in other flood-prone rivers or areas to enhance monitoring and early warning systems.

REFERENCES

1. S. Garima, B. Pravesh, S. Prajjwal, B. Nishita, "IoT Based Flood Monitoring and Alerting System with Weather Forecasting" International Journal of Innovative Technology and Exploring Engineering (IJITEE).
2. Mr. Muthamil Selvan, "Automatic Water Level Indicator Using Ultrasonic Sensor and GSM Module" International Journal of Advanced Research and Innovative Concepts in Education, vol.4, 2021.

3. S. J. Priya, S. Akshaya, E. Aruna, J. A. M. Julie, and V. Ranjani, “Flood monitoring and alerting system,” International Journal of Computer Engineering & Technology (IJCET), vol. 8, no. 2, p. 15, 2019.
4. Hossain, M. A., Azim, M. A., & Khan, A. M. (2020). A real-time flood monitoring and early warning system using Raspberry Pi. In 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT) (pp. 1-6). IEEE.
5. D. Mysar and M.J. Babu, “Real Time Monitoring of Water Level Variation in Rivers and Flood Alerting System using ARM7”, International Journal of Advanced Research in Computer and Communication Engineering, vol. 4, no. 8, pp. 392-396, 2015.
6. Ghosh, A., & Mukherjee, A. (2021). Design and implementation of IoT-based flood monitoring system using NodeMCU and sensors. Proceedings of the 2021 IEEE International Conference on IoT, 1, 33-38.