

IOT BASED FLOOD DETECTION & SAFETY MEASURES

Prof. Sujata Dake*¹, Shubham Nagose*², Nikhil Bhowate*³,

Mahima Choudhari*⁴, Khushi Jaishwal*⁵

*^{1,2,3,4,5}Department Of Computer Science And Engineering, Wainganga College Of Engineering And Management, Nagpur-441114, Maharashtra, India.

ABSTRACT

In several places flood results in massive loss of life and property. Hence it is necessary to alert the people in advance. As a solution, in this paper, the flood detection system based on IOT has been developed. This system consists of a flood warning station powered by battery, a flood monitoring center, and a notification system. The flood warning station consists of water level sensor, water flow sensor and a humidity sensor. The data received from sensors, will be stored in arduino and transmitted through Wi-Fi module to the notification center. It will also be displayed in the LCD display for the nearby residents. When the received data is above the threshold level, message will be sent via notification system to the user. This is a simple and an effective system which is equipped with a buzzer to monitor and alert the residents of flood prone areas.

Keywords: Arduino Nano, DHT11, Flood Detection, GSM, Ultrasonic Sensor.

I. INTRODUCTION

Flooding occurs when water from rivers, lakes, or heavy rainfall overflows into populated areas, often carrying objects and causing destruction. This poses risks to property, vehicles, trees, and even lives. In urban areas, flooded roads lead to traffic congestion, stranding vehicles and passengers, resulting in loss of time, money, and resources. Despite efforts by local governments to inform citizens about flood-prone areas, information dissemination is often inadequate, especially during the rainy season. Proactive monitoring and warning systems are essential to prepare people and reduce flood impact.

Climate change has intensified flooding worldwide, leading to devastating impacts, including water contamination, spread of waterborne diseases, damage to infrastructure, and disruptions to agriculture. Floods are a leading cause of natural disaster deaths globally, particularly in Asia, where weather conditions and human activities exacerbate risks. While high-cost flood warning systems exist in developed nations, affordable and effective solutions are needed in developing regions. This paper proposes an IoT-based flood detection and alert system using Arduino, water level sensors, and GSM technology to provide early warnings and help safeguard lives, property, and resources.

II. METHODOLOGY

System Overview:

- The system utilizes electronic-based components to gather data input for flood detection, integrating sensors and controllers with IoT connectivity.

Hardware Components:

- **Arduino Nano:**

- A microcontroller board based on ATmega328P, serves as the central control unit.
- Paired with a Wi-Fi module for IoT connectivity through a local Wi-Fi network.

- **WiFi Module (ESP8266):**

- Integrated with the Arduino Nano, allowing the system to connect to the internet for remote data access and alert dissemination.

- **DHT11 Temperature & Humidity Sensor:**

- Low-cost digital sensor that measures temperature and humidity in the area.
- Provides data every 2 seconds to help determine rainfall intensity, indicating potential flood conditions.

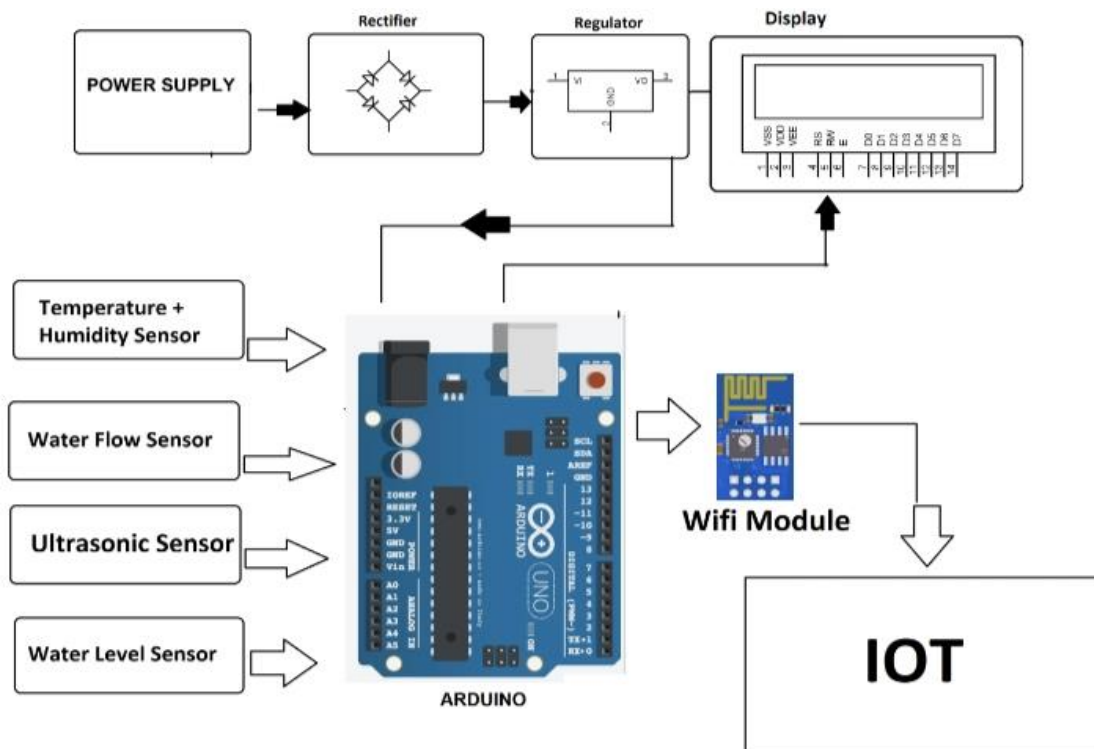
- **Water Flow Sensor:**

- Uses a hall-effect sensor to measure water flow rate based on rotor speed.
- Requires a 5V to 18V DC power supply to operate.

System Operation:

- The Arduino controller processes data from the sensors and communicates via the Wi-Fi module.
- The collected data can be accessed remotely through IoT.
- A connected LCD displays real-time readings, providing on-site alerts.
- The system operates using a continuous power supply to maintain data flow and functionality.

III. MODELING AND ANALYSIS



IV. CONCLUSION

Flood Detection System tries to help all kinds of people to be aware of the damages that could harm them. Be it related to farming, industries, or even normal residents; this system is trying to alert everyone. Since this natural phenomenon is uncalled for, we have to take precautions for our betterment. This proposed approach aims at monitoring the water level in a particular water body. In the future, it may be amplified to monitor multiple locations at the same time and the web page must be able to display the knowledge supported by the choice done by the authority.

ACKNOWLEDGEMENTS

We express our heartfelt gratitude to the Department of Computer Science, Wainganga College of Engineering and Management, Nagpur, for allowing us to pursue our project, "IoT Based Flood Detection And Safety Measures".

We extend our sincerest thanks to our esteemed guide, Prof. Sujata Dake mam, for her invaluable guidance, encouragement, and insightful suggestions throughout this project. Her support and fresh ideas have significantly enriched our understanding and experience.

Our thanks also go to Prof. Rahul Bhandekar, Head of the Department of Computer Science, for his continuous encouragement and support. We are also grateful to the entire faculty of Wainganga College of Engineering and Management for their cooperation and assistance.

V. REFERENCES

[1] Prabodh Sakhardande, Sumeet Hanagal, Savita Kulkarni, "Design of Disaster Management System using IoT Based Interconnected Network with Smart City Monitoring" 2016 International Conference on Internet of Things and Applications (IOTA) Maharashtra Institute of Technology, Pune.

-
- [2] Shah, S. A., Seker, D. Z., Hameed, S., & Draheim, D. (2019). The Rising Role of massive Data Analytics and IoT in Disaster Management: Recent Advances, Taxonomy and Prospects. IEEE Access, 1-1.
doi:10.1109/access.2019.2913340
- [3] Varghese, A. J., Thomas Jolly, A., Peter, A., Rajeev, B. P., Sajitha, K. S., & George, D. E. (2019). IoT based Disaster Monitoring and Management System for Dams (IDMMSD). 2019 1st International Conference on Innovations in Information and Communication Technology (ICIICT).
doi:10.1109/iciict1.2019.8741464.
- [4] Khan, T., Ghosh, S., Iqbal, M., Ubakanma, G., & Dagiuklas, T. (2018). RESCUE: A Resilient Cloud Based IoT.