International Journal of Application or Innovation in Engineering & Management (IJAIEM)
Web Site: www.ijaiem.org Email: editor@ijaiem.org
Volume 7, Issue 12, December 2018 ISSN 2319 - 4847

Flood Warning System by using Wireless Sensor Network and Metrological Department Prediction

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Abstract : ***This research proposal is basically for generating flood alert system in Indian environment by using weather forecasting data, and wireless sensor networks, The wireless sensor network is playing important role to transmission and monitoring the data, we can collect telemetered rainfall data and flow of water level data from various location, the system is measures the River Water Level, flow of water and different weather condition through wireless sensor network it also sends flood notification messages to the inhabitant of such a zones, base station of that area for necessary action. The prevailing Indian flood alert system depends on Input data from satellites (especially from ISRO and NASA) for flood anticipation, which is received in non-real time. By the time the data is received by these institutions, a heavy damage is already caused to the human civilization. The main problem is with the warning or data received being non-real time. The proposed system is based on WSN and it is used to provide data in real time. This would certainly help in monitor, detect and report the flood's status to a regulatory unit using relative water level in different reservoirs and rivers and amount of rainfall as flood indicators, whose values are gathered by sensors in the sensor field.***
Keywords: Data, WSN, Network, ISRO, Wireless.

1. INTRODUCTION

This In most parts of India, flood had caused damages to properties and it involved a large amount of loss to individuals and governments. During flood, it is important to have efficient flood response operation system to manage all activities among different related agencies. The flood monitoring and detection system monitors and know the development of floods and then send flood notification SMS to the inhabitant of such zones for necessary action The objective of this project is to send the alert to riverside people so they can safely move from flood area it gives advanced alert through SMS The flood monitoring and detection system not only monitoring and alerting to the authorities & uses but also it provides future predictions for the future disasters to the user. We design a system with low-cost, small-sized, easily configurable and scalable WSN nodes to monitor, detect and track various environmental phenomena and events.

2. FEATURES OF WSN

The main features of a WSN include

- Power consumption constraints for nodes using batteries or energy harvesting.
- Ability to cope with node failures (resilience)
- Some mobility of nodes (for highly mobile nodes see MWSNs)
- Heterogeneity of nodes
- Homogeneity of nodes
- Scalability to large scale of deployment
- Ability to withstand harsh environmental conditions
- Ease of use
- Cross-layer design

Cross-layer is becoming an important studying area for wireless communications. In addition, the traditional layered approach presents different problems:

Traditional layered approach cannot share different information among different layers, which leads to each layer not having complete information. The traditional layered approach cannot guarantee the optimization of the entire network. The traditional layered approach does not have the ability to adapt to the environmental change. Because of

the interference between the different users, access conflicts, fading, and the change of environment in the wireless sensor networks, traditional layered approach for wired networks is not applicable to wireless networks.

So the cross-layer can be used to make the optimal modulation to improve the transmission performance, such as data rate, energy efficiency, QoS (Quality of Service), etc. Sensor nodes can be imagined as small computers which are extremely basic in terms of their interfaces and their components. They usually consist of a processing unit with limited computational power and limited memory, sensors or MEMS (including specific conditioning circuitry), a communication device (usually radio transceivers or alternatively optical), and a power source usually in the form of a battery. Other possible inclusions are energy harvesting modules, secondary ASICs, and possibly secondary communication interface (e.g. RS-232 or USB).

The base stations are one or more components of the WSN with much more computational, energy and communication resources. They act as a gateway between sensor nodes and the end user as they typically forward data from the WSN on to a server. Other special components in routing based networks are routers, designed to compute, calculate and distribute the routing tables.

3. ARCHITECTURE OF WSN

The most common WSN architecture follows the OSI architecture Model. The architecture of the WSN includes five layers and three cross layers. Mostly in sensor n/w we require five layers, namely application, transport, n/w, data link & physical layer. The three cross planes are namely power management, mobility management, and task management. These layers of the WSN are used to accomplish the n/w and make the sensors work together in order to raise the complete efficiency of the network.

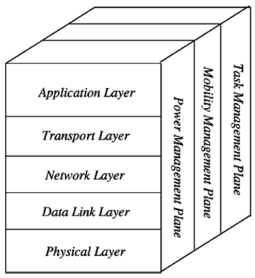

Figure1:- Architecture of WSN

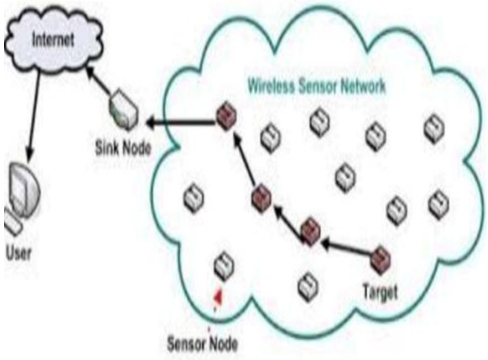

Figure [2]: Working Mechanism of WSN in Flood Control System [3]

Close Loop Control System:

These are based on a combination of pre-defined control concept (feed forward) and feedback from the controlled object. In this type of controller, there is a feedback of the necessary data to determine when to evacuate water. The controller receives feedback from one or more sensors in the field that continuously provide updated data to the controller about the parameters that influence the system behavior. According to the measurements provided by the sensors and the pre- programmed parameters, the controller decides on when and how far to evacuate the water. Closed loop controllers base their decisions on:

- Monitoring the state variables.
- Comparing the state variables with the desired variables or target state.
- Deciding what actions are necessary to change the state of the system.
- Carrying out the necessary actions. A closed loop control system is event driven and hence responds automatically to prevailing changes thereby achieving high level of efficiency.

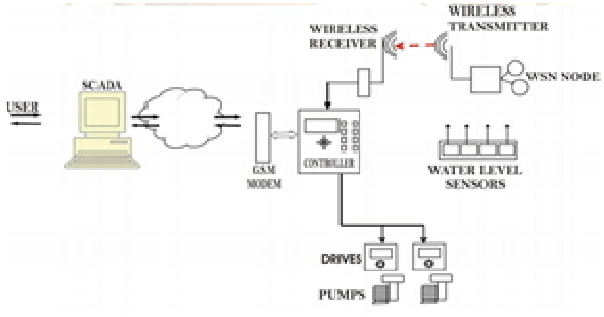

Figure3:- Schematic Diagram of an Automated Flood Control System

4. CONCLUSION

The system uses different sensor & WSN technology for real-time data collection and transmission of water level information from remote hydrological stations to the main data center. The system is composed of five major components, data collection, data transmission, data receiving, data processing and information distribution. The flood monitoring and detection system monitors and is aware of the development of floods and then send flood notification via email, SMS and call to the inhabitant of such zones (people residing in catchment areas) for necessary action. The main purpose of this project is to send alert to riverside and catchment are people so they can safely move away from the affected zone well in advance. It gives advanced alert through different types of notification. We design a system with low-cost, small-sized, easily configurable and scalable WSN nodes to monitor, detect, and track various environmental phenomena and events. The main objective of this project work is to develop a real-time flood monitoring system

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