A Literature survey on Internet of Things based Flood Detection and Monitoring System Using Raspberry Pi

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ABSTRACT

This project describes the design and implementation of a wireless sensor network for Flood detection and monitoring. The sensor network was deployed in a commercial windmill or near the sea shore. The sensor node was developed using off-the-shelf components and consists of sensors like wind speed sensor, Humidity sensor, Accelerometer sensor, Temperature sensor and Raspberry pi powered with IOT. Real- time data enabled the operators to characterize the operating parameters at the seashore and also to respond immediately to any changes in the controlled parameters.

I. INTRODUCTION

The objective of this project is to design a simple, easy to install, Raspberry pi-based circuit to monitor and record the values of sensors at the natural environment like sea shore and river side that are modified and in case of flood or tsunami and so on.. The processor used is a low power, cost efficient chip manufactured by NXP of on-chip memory It communicates with the various sensor modules in real-time in order to monitor the wind speed, moisture , temperature efficiently near sea shore.. Here the data can be read through IOT to any of the remote place using Internet of things and also parameters can be passed from IOT enabled mobile phone to sea shore in the form of voice guidance to make the people alert.. In this project we going use Raspberry Pi, which is the current dominant processor in mobile based products and software development Tool.

II. OBJECTIVES

i)To monitor rise in water level.

ii)To reduce losses in flood prone areas.

iii)To avoid spread of false information.

iv)To provide an accurate and reliable alerting system.

III. LITERATURE REVIEW

1.ThinagaranPerumal, MdNasir Suleiman, C. Y. Leong. IoT Enabled Water Monitoring System IEEE Explore, 2015

In this paper [10],[11],[12] proposed an IoT based water monitoring system that measure water level in real time. The prototype is based on idea that the level of water can be very important parameterwhen it comes to the flood occurrencesespecially in disaster prone area. A water level sensor is used to detect the desired parameter and if the water level reaches the parameter the signal will be freed in real time to social network like Twitter. A cloud server was configured as data repository. The measurement of water level are displayed in remote dashboard. The proposed solution with integrated sensory system that allows inner monitoring of water quality. Alerts and relevant data are transmitted over the internet to a cloud server and can be received by user terminal owned by consumer. The outcome of water measurement is displayed in web based remote dashboard.

2. Amjath Ali J 1 , B. Thangalakshmi 2 , A. Vincy Beaulah3 1 Lecturer, Department of Electrical and Electronics Engg., Ibra college of Technology,

Disaster-LINK is a smart IoT device that acts as an alarm and monitoring system during natural disasters that operates by communicating over internet. It comes with Wi-Fi support for internet connectivity and uses an

IoT cloud platform which helps to control, monitor and manage the device. The device senses its local environment using onboard sensors and send early warnings to family, friends and colleagues immediately when it finds a disaster situation. It is also able to receive such warning alarms from other similar devices available on the internet and provide the user with voice, flashing light, SMS and E-mail alarm notifications. The ultimate aim of the project is to spread the disaster warning information quickly through internet and make it available to those who need it as early as possible. The fact that internet is faster than the seismic waves of an earthquake, and much faster than a flood or tsunami, helps the device to deliver the alert message much before the actual calamity reach the user's location giving that vital extra time to take those precautionary emergency measures.

3.Syed NazmusSakib ; TanjeaAne ; NafisaMatin ; M. Shamim Kaiser

This paper presents a neuro-fuzzy controller based flood monitoring system using wireless sensor network. The distributed sensor nodes use IEEE 802.15.4 protocol, also called low rate wireless personal area network, to collect the sensor information such as water level data from the river, rainfall, wind speed and air pressure data from a selected site. In order to validate the proposed flood monitoring system, Chadpur, a flood prone district of Bangladesh, has been considered as selected site. The sensors information are sent to the distributed alert center via Arduino microcontroller and the XBee Transceivers. At the distributed alert center, XBee Transceiver and a Raspberry Pi microcomputer are used to generate flood alert based on sensor information and two decade flood data and these data are stored in a database. Sensor information are analyzed by the intelligent neuro-fuzzy controller used in Raspberry Pi microcomputer to announce the flood alerts. The wireless sensor network is connected as mesh topology which can send signals over far distance. The performance evaluation reveals that the proposed system accurately detect flood alert compared to the existing flood alert system.

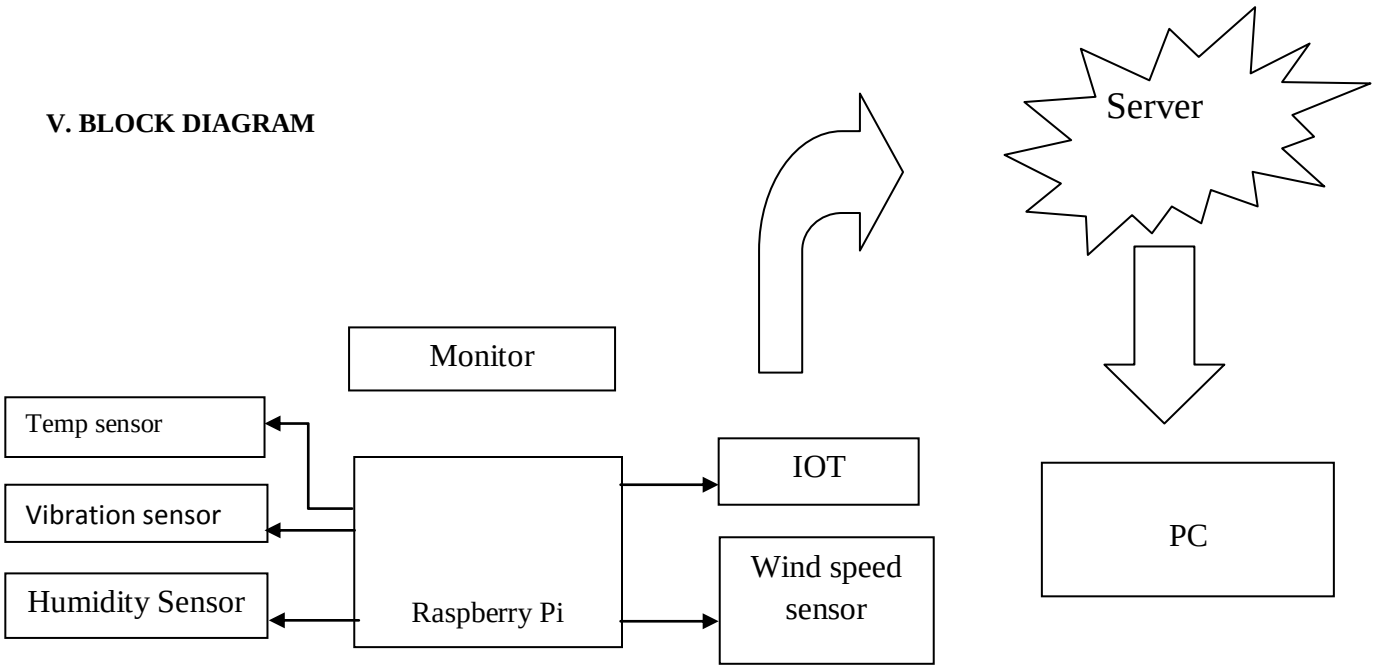
4. Edward Udo, EtebongIsongArticle · January 2014

Nigeria as a whole and Uyo, a southern province in Nigeria, in particular is facing a serious challenge with an increasing frequency of flood in recent years. It is therefore crucial to utilize the state-of-the-art sensing and communication technologies to monitor and detect flood occurrences The role of the designed Flood Monitoring and Detection System (FMDS) based on WSN is to continuously monitor, detect and report the environment's status to a control unit using relative humidity, temperature, water level and amount of rainfall as flood indicators, whose values are gathered by sensors in the sensor field. 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 developed Flood Monitoring and Detection System (FMDS) covers 15 flood prone regions in Uyo metropolis in AkwaIbom State, Nigeria. The GIS map of the flood prone zones is incorporated into the FMDS. The system is composed of three major modules which are the sensor field module, surveillance module and the phone module. The system was developed using Java Programming Language built into surveillance module of the system. The developed system is robust and gives timely alert of flood occurrences.

IV. SOFTWARE COMPONENT

1. Embedded c
2. Python
3. Keil-c compiler
4. Flash magic burner software.
5. IOT based App
6. Linux

V. BLOCK DIAGRAM



VI. HARDWARE REQUIREMENTS

1. Raspberry Pi
2. Wind speed sensor
3.]
4. `
5. Temperature sensor
6. IOT
7. Monitor

VII. TECHNICAL SPECIFICATION

1. Operating voltage of embedded circuitry is 3.3vdc
2. Current consumption of device in active mode 200mill amp
3. Operating frequency of device is 10MHZ to 60MHZ

VIII. ADVANTAGES

1.Impact of flooding is reduced

2.Warning give people time to move positions upstairs, put (sandbags in position and to evacuate).

3.Low maintenance solution for detecting natural calamities applications.

4.The timely operation of flood control structures (e.g. gates, temporary flood defenses) preventing inundation of property and land.

5.The removal of property to somewhere above the flood level or out of the flood plain.

IX. APPLICATIONS

1.It can be used to detect earthquakes.

2.It can be used to monitor natural calamities.

3.It can be used to predict the floods and Tsunami.

4.Ability to alert multiple mobile users.

5.To avoid wastage of water.

X. FUTURE WORKS

The system provides a real world application of internet of things and offer services like accurate level monitoring directly and indirectly.
Precise and accurate detection of water level will improve the data collection system for the monitoring station.
The flood alert information's can be displayed on LED display boards for road users and for safety reasons could be placed at strategic locations.
The Flood Observatory System will be easy to install and maintained if it is powered by solar cells.

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