

Internet of Things Based Smart Flood Monitoring & detecting system

N. V. S. Sunny Varma, E. Esha Preethi, M. Ramesh Kumar, Ravi Kumar Tenali

Abstract: Flooding is the major turn-up disasters that occur in different parts of the world. As these causes a huge amount of loss in the human environment. To reduce and make the system from alert, detecting these conditions is very crucial. The proposed design of the system uses Internet of Things to monitor these conditions near the dam with the help of MEMS. Level, Temperature and Humidity sensor. With the help of these sensors and microcontroller, the data is processed to the database. From the database, the data is checked in the webpages and alert the surrounding villages and living areas.

Keywords: Internet of Things, sensors, Microcontroller, Database.

I. INTRODUCTION

Internet of Things is interconnecting the devices such as sensors, actuators or embedded Items such as software/hardware. Here the network connectivity is necessary. According to the Gartner, 50 billion objects would be connected by the end of 2020. Internet of Things senses the readings from the sensor and control and monitors the data with the help of network.

Floods are the natural disasters with creates the severe damage to the urban/rural sectors. In India, the agriculture sector has the highest impact due to the floods. Every year, 400 million hectares of Indian land is affected due to the floods. As majority of the people are in the cities, due to the floods they don't get the water information easily and quickly [1][2]. These mostly cause the property loss, Citizen Work loss or human loss. In this proposed design, the alerting the system by monitoring near the dams regarding the status of the floods with sensors in the main objective.

Literature Survey

The Literature survey of the proposed design is mentioned. In this paper, the author proposed into three key points (I) IoT and the areas of applications (ii) rain and other sensing parameters (iii) prediction of floods [3].

Leman et al. [4] has the current sense of Malaysia disaster management to increase the flood prediction and maintain the low risk. Lo et al.

[5] proposed the system to monitor the flood based object system with the surveillance system. The methods of image processing are directly utilised by the author. S.Azid [6] has proposed to read the water level at time interval and send SMS to the residences to alert them regarding the flood. Jana priya et al. [7], satria et al. [8] has proposed the design of flood prediction with the ultrasonic sensors used to level the flood water and alert the surrounding system. With this inspiration, our proposed design will send the sensor data to the emergency cell of government department and the alert will be given to the citizens.

II. METHODOLOGY

The Methodology of IoT Based smart flood monitoring & detecting system is designed in the below Fig.1.

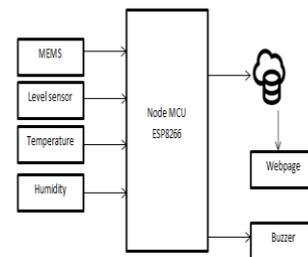


Fig.1. Methodology of the proposed design

III. PROPOSED DESIGN

The proposed design is elaborated into two categories, (i) Hardware/software co-design (ii) Design.

(i) Hardware/Software Co-design

The first area is based on the literature survey and the required sensors are chosen for the better performance. The Hardware/software is identified on the bases of the survey. The hardware model consists of Level sensor, Humidity & Temperature sensor, MEMS sensor. This sensor is connected to microcontroller ESP8266 for data processing. The software language used in the design is embedded c.

(ii) Design

In this Proposed system the design is presented is mentioned using four sensors, Temperature and Humidity sensor, Level sensor and MEMS sensor are used to get the flood water information. This information is processed with the Node MCU Wi-Fi based microcontroller and sent to the database.

Revised Manuscript Received on 30 March 2019.

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Further this information is gathered into the webpage for the visualization purpose. If the level of the flood water is rising rapidly immediately the buzzer is given to alert the nearby citizens and authorities

IV. HARDWARE & SOFTWARE REQUIREMENTS

The hardware and software requirements used in the system are mentioned below.

- a) Node MCU – ESP8266: The ESP8266 module is developed by the espressif company to transfer the data wireless. The ESP8266 consists of the Wi-Fi module with integrated TCP/IO protocol stacks. ESP8266 is a low-cost wireless system which works on the AT commands. The Wi-Fi microcontroller with the standards of IEEE 802.11 b/g/n protocols are loaded in the system

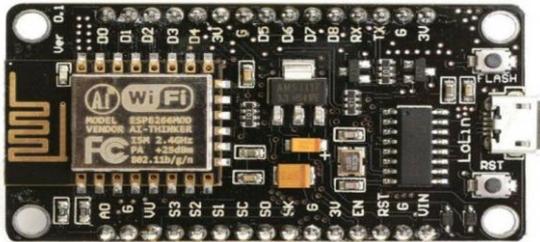


Fig.2. ESP8266 Wi-Fi Module

- b) MEMS Sensor: In order to calibrate the axis of the angle, the accelerometer with the parameters focussing on the tilts are calibrated. These acceleration parameters are to be measured by converting the analog voltage readings for accelerating the offset and sensitivity. In this system the devices use accelerometer, for the wave condition on the bases of tilt factor
- c) Ultrasonic sensor: Ultrasonic sensor is used to define the distance or level. The ultrasonic works on the bases of sound waves generated in the trigger and echo system. When the obstacle is observed in the trigger path, immediately the reflection path is observed at echo.
- d) Temperature sensor: LM35, the temperature sensor is used to get the basic sensor reading of the temperature. This sensor varies the temperature across the system and purposely show the reading in the centigrade and Fahrenheit.
- e) Humidity sensor: The resistor type humidity is used for the system design where the humidity sensitivity element is placed on the substrate to observe the relative humidity conditions.

The software requirements used in the system design are Arduino IDE and the language is done on Embedded C. The Arduino IDE is an integrated development environment designed to program the Arduino microcontroller. It is an open platform for some addition add-on boards such as ESP8266, STM32 etc. The embedded C is used for supporting the embedded device. In this system the sensors relate to the device are connected to observe the state of flood detection in the system and programmed to warn the surrounding environment immediately.

V. SYSTEM OUTCOME REPORT



VI. CONCLUSION

The IoT based flood monitoring and detection system is done to save the lives on the people by reducing the human quick out at the emergency conditions. Here the maximum conditions are observed, and the risk alert is provided to the management.

VII. FUTURE SCOPE

The future scope of the proposed design is to predict the risk analysis of the effect over the low-lying areas and adverse effect analysis over that condition.

REFERENCES

1. Qing gong Ma, et al., "Application of Internet of Things in Urban Flooding Prevention Management System", *Advances in Internet of Things*, 7,1-9,2017
2. U.s.De, et al., "Urban flooding in recent decades in four mega cities of India", *J. Ind. Geophys Union*, Vol.17, No.2, pp. 153-165, 2013.
3. Z. M. Taib, N. S. Jaharuddin, and Z. D. Mansor, "A review of flood disaster and disaster management in malaysia," *International Journal of Accounting & Business Management*, vol. 4, no. 3, 2016.
4. A. M. Leman, K. A. Rahman, M. N. M. Salleh, I. Baba, D. Feriyanto, L. S. C. Johnson, and S. N. Hidayah M., "A review of flood catastrophic management in malaysia," *Journal of Engineering and Applied Sciences*, vol. 11, no. 14, Jul 2016.
5. S.w.Lo et al., "Cyber surveillance for flood disasters," *Sensors (Switzerland)*, 2015.
6. S. Azid, B. Sharma, K. Raghunwaiya, A. Chand, S. Prasad, and A. Jacquier, "SMS based flood monitoring and early warning system," *Journal of Engineering and Applied Sciences*, 2015.

7. 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, Mar 2017.
8. D. Satria, S. Yana, R. Munadi, and S. Syahreza, "Prototype of google maps-based flood monitoring system using arduino and gsm module," International Research Journal of Engineering and Technology (IRJET), vol. 4, no. 10, Oct 2017.
9. Liu, X.Y., Guo, S.L., Liu, P., Chen, L., Li, X., "Deriving optimal refill rules for multi-purpose reservoir operation", Water Resoure Manage IEEE SENSORS JOURNAL,VOL.15
10. Apel, H., Thieken, A.H., Merz, B., Bloschl, G." Probabilistic modelling system for assessing flood risks", Vol.6, No. 3
11. Yun, R., Cao, S.L., "Model selection of precipitation series extension for Menloureservoir",J. Shandong Univ. (Eng. Sci.) 34, 96–100 (in Chinese).
12. Yue, S., Quarda, T. B. M. J., Bobée, B., Legendre, P., and Bruneau, "Approach for describing statistical properties for flood hydrograph." Eng., 7, 147–153.
13. [13] De Michele, C., Salvadori, G., Canossi, M., Petaccia, A., and Rosso, R. Bivariate "statistical approach to check adequacy of dam spillway"" Eng., 10_1_, 50–57.
14. A. Ajay Kumar, Tenali Ravi Kumar, TBAR "Human resource management leave and tour management data retrieval system" in International Journal of Engineering & Technology-IJET(UAE), 2018, vol. 07, pp. 186-188.
15. M.Ramesh Kumar, Ravi Kumar Tenali ,Dr.C Hari Kishan, BBVSVP, "Secured Data sharing in Cloud Using Single Key Based Decryption Method," in Journal of Advanced Resear ch in Dynamical & Control Systems-JARDCS, 2018, vol. 10, pp. 1777-1782.
16. M Spandana, RK Tenali, KN Kumar, K Raju, "Coronary Illness Syndrome Identification System Using Data Mining Methods" in Journal of Advanced Research in Dynamical & Control Systems-JARDCS, 2018, vol. 10, pp. 1584-1590.
17. Ravi Kumar Tenali , M.Ramesh Kumar, M.Spandana, PSSR "Storage and Retrieval of Secure information in the Cloud Systems" in Journal of Advanced Research in Dynamical & Control Systems-JARDCS, 2018, vol. 10, pp. 773-778.
18. "Clinical Document architecture (CDA) Development and Assimilation for Health Information Exchange Based on Cloud Computing System"MM Aradhana, C Nagamani, RK Tenali ,International Journal of Computer Trends & Technology - IJCTT 4 (Special Issue)
19. "Hash Method Elimination Of Data Duplication In Storage Clouds Using Contents Based"DKKK Tenali Ravi Kumar, M.Ramesh Kumar, T. SrinivasaRao International Journal of Pure and Applied Mathematics-IJPAM 117 (17), 109-114
20. "Security Provision for Web Cloud Computing Using Biometrics", Meghana, A., Tenali, R.K., Sri Alekhya, C., Tarun, B., International Journal of Innovative Technology and Exploring Engineering , ISSN: 2278-3075, Volume-8 Issue-5 March, 2019 , Pg: 874-878