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Automated flood and crack detection system

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ABSTRACT

The heavy floods can be so disastrous that the infrastructure is washed away, the people and the animals drown, and the people can be stranded for long periods. The society and the economy of the country will suffer in many ways after the flood. The loss of the lives, the vegetation, and the infrastructure. In this project real-time safety evaluation of bridges includes the following components: (1) real-time analysis of weight (2) real-time analysis of detection of cracks 3) real-time analysis of water level.

Keywords— *Sensor, Early warning system, Monitoring, Flood detect, Crack detect, Weight detect*

1. INTRODUCTION

Traditional methods of bridge safety management have the following problems: failure to collect data or monitor on-site conditions in real time and failure to comprehensively record or analyse the collected data of on-site conditions in real time, resulting in poor disaster rescue efficiency; and data collection through visual assessments or use of large-size electronic equipment, often resulting in inaccurate monitoring results or higher costs and higher power consumption. A real-time water monitoring system using the image processing technology and water level recognition and surface velocity recognition. Using this image processing technology takes a long time to detect the condition of flood and this process is difficult to detecting flood. In our project, we use three sensors for monitoring bridge condition and detecting flood and detecting high weight on the bridge.

1.1 Objectives

- To provide security to all the users who are using it.
- To provide reliability to the users.
- To maintain the digitized information of all the users of India.
- To help India for making it digitized.
- Smart city mission.
- To save the many lives.

2. LITERATURE SURVEY

IoT-based bridge safety monitoring system is developed using ZigBee technology. This system is composed of: (1) monitoring devices installed in the bridge environment; (2) communication devices connecting the bridge monitoring devices and the cloud-based server; (3) a dynamic database that stores bridge condition data; and (4) a cloud-based server that calculates and analyzes data transmitted from the monitoring devices. This system can monitor and analyse in real time the conditions of a bridge and its environment, including the waters levels nearby, pipelines, air and other safety conditions. The detected data and images are transmitted to the server and database for users to have real-time monitoring of the bridge conditions via mobile telecommunication devices [5].Two types of real-time water monitoring system using the image processing technology the water level recognition and surface velocity recognition. According to the bridge failure investigation, floods in the river often pose a potential risk to bridges, and scouring could undermine the pier foundation and cause the structures to collapse [3]. Internet of Things (IoT) can be used, which would provide flexibility to monitor structures (building, bridge) from anywhere. In this paper, a complete IoT SHM platform is proposed. The platform consists of a Raspberry Pi, an Analog to Digital Converter (ADC) MCP3008 and a Wi-Fi module for wireless communication. Piezoelectric (PZT) sensors were used to collect the data from the structure. The MCP3008 is used as an interface between the PZT sensors and the Raspberry Pi [1].

3. PROPOSED SYSTEM

In our project, we are work on Monitor Bridge in real time.

(a) Monitoring real-time water level: We are using the ultrasonic sensor to monitor the water level. The sensor detects the flood then it will send the signal to the Arduino controller. The system sends an alert message to the user. And the barrier gate close.

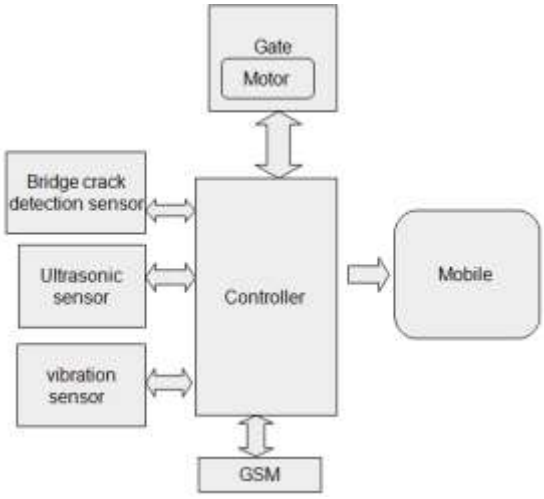

Fig. 1: Block diagram of the sensor node

(b) Detect crack: In this system, if the crack is detected on bridge alert message sent to the user and barrier gate will be close.

(c) Weight detects: Sensor detects the high-level weight on the bridge then alert message is sent to the user and barrier gate will be close.

4. FEASIBILITY STUDY

4.1 Software feasibility

(a) Embedded C
(b) Arduino Id

4.2 Hardware feasibility

(a) Ultrasonic Sensor
(b) Crack detect sensor
(c) Android mobile
(d) GSM
(e) Vibration sensor

5. FUTURE SCOPE

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. Such information's should be in real time and transmitted wirelessly from the measured location.

6. CONCLUSION

In our project, it will continuously monitor for Water level and crack and high weight on the bridge. The main aim of this project is to minimize the structural damages and prevent life and property. In this Bridge safety and flood detection system, we monitor the bridge condition and give an alert message to the user. Advantages of this project are to save lives and property. Take real-time information on the bridge.

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