Smart Monitoring System For Bridge Safety

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Abstract- *In the existing system there is no such facility to check the bridge condition. So by using this application we can check the water level and we can also check the bridge condition. As everything is automated so less human efforts are required. Our application also provides the facility of broadcasting the alert message to the users.*

Keywords- Arduino Board ,Water level detection sensor, Conducting wire, Motor, Buzzer/Bulb, Ultrasonic sensor.

I. INTRODUCTION

Now a day there is no such application which will give information to the user if the bridge gets collapsed. Whenever bridge collapses so many people losses their family member. This happens because there is no application which will send the alert message to the user when the movement of the bridge is detected or when the bridge is collapsed.

We have some water level detectors but in existing system we have to check manually where the water level is. So the current system is quit time consuming.

So we have developed an application in which everything is automated so less human efforts are required and this application is very much useful in the emergency condition like when bridge collapse, or to prevent from flood.

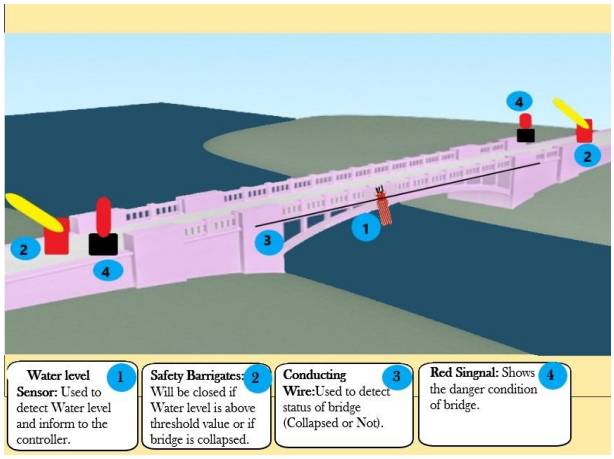

Fig: Bridge Safety System .

II. RELATED WORK

In late 20th century, Mark Weiser (1991, 1994) [4-5] proposed the concept of ubiquitous computing, which provided a blueprint for IoT. In 1995, Bill Gates et al.[6] officially proposed the concept of IoT in the book, "The Road Ahead". In 1999, the MIT Auto-ID Centre applied the electronic product code (EPC) standard and radio frequency identification (RFID) technology, laying the foundation for IoT application. Through the RFID and wireless communication technologies, objects are equipped with the capability of data transmission and they can be connected through RFID sensors and the internet for smart identification and management. In addition to man-to-man communication, man-to-thing and thing-to-thing communication can also be achieved in this interconnected network environment. The arrival of the IoT era means the development of information technology has an extensive influence on a wide range of fields from something as small as nanotechnology to something as large as city wireless network establishment. IoT interactions have three dimensions: time, place and thing. They can be man-to-man, man-to-thing and thing-to-thing interactions through information transmission on the IoT. With the maturing of IoT technology, environments in which everything can communicate with one another can be created. There are three layers in the architecture of an IoT:

(1) sensor layer:

mainly responsible for sensing and collecting all kinds of physical, identification, audio and video data from the physical world through the application of sensors, RFID, barcodes and other data collection technologies;

(2) network layer:

mainly responsible for transmitting data reliably and safely through wider and faster networks connections currently available on the internet, wireless communication networks, satellite communication networks or cable TV networks; and

(3) application layer:

composed of an application support sublayer and an application service sublayer with the former applied to support information coordination, sharing and interconnection across

different industries and applications while the latter sublayer applied in fields such as smart traffic, smart home, smart logistics, smart medicine, smart power, digital environmental protection, digital farming and digital forestry. A wireless sensor network (WSN) consists of three components respectively responsible for sensing, communication and computing (hardware, software and algorithms). In a WSN environment, each sensor (such as temperature sensor, sound sensor or pressure sensor) distributed in the environment is a node that transmits signals through wireless communication to the base station of the network. Machine-to-machine communication can be made possible through the WSN technology. The WSN technology is an indispensable communication method for IoT. Each sensor has different communication requirements such as frequency, power consumption and complexity. These requirements also have a direct influence on the design consideration of a WSN such as its power, storage, computing speed and bandwidth.

III. HARDWARE IMPLEMENTATION

Arduino Board:

Arduino is a computer hardware ,software company, project, and user community that manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Arduino boards are accessible commercially in preassembled. The Arduino project provides an IDE (integrated development environment) based on the Processing language project.

Ultrasonic sensor:

ultrasonic sensor provides an easy method of distance measurement. This sensor is perfect for any number of applications that require you to perform measurements between moving or stationary objects.

Interfacing to a microcontroller is a snap. A single I/O pin is used to trigger an ultrasonic burst (well above human hearing) and then "listen" for the echo return pulse. The sensor measures the time required for the echo return, and returns this value to the microcontroller as a variable-width pulse via the same I/O pin.

IV. PROPOSED SYSTEM

In this application we will be using the brigades at both the end points of the bridge. To check the water level we will use the water level sensor and if the water level crosses the certain limits then the brigades will automatically closed, so that the user or the localities will not use that bridge.
Similarly to detect the movements of the bridge we will use the conducting wire. We will fix this wire to the whole bridge, so that if any type of movements is detected during the night then brigades will be closed automatically and along with this an alert message will be send to the localities that are registered.

Some additional feature is added in this application which can be used in the emergency conditions. Like if the water level crosses the certain limited or if the movements are detected on the bridge then immediately alert message will be broadcast to the police station, municipal office and to the risqué team. So by this we can help those people who are stucked and need the help, or we can stop the people to use that bridge or if any other action is needed then the municipal party can take it.

Now suppose the brigades are closed still some people try to use that bridge so in such case by using the ultrasonic sensor we will set certain distance and if any person is detected who have crossed that limit then a alarm will start automatically and immediately the alert message will be send to the nearest police station so that they can stop that person and can also save his or her life. So by this application we can save many lives'.

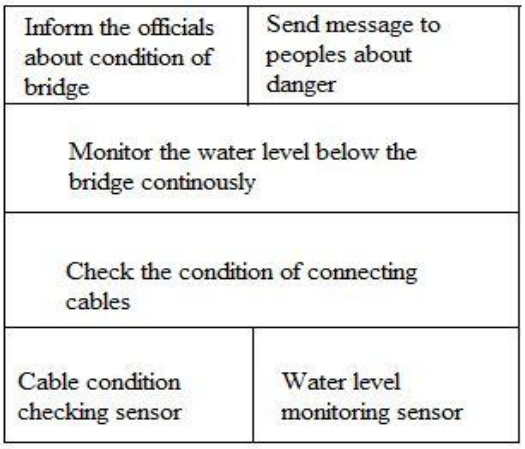

Fig : Proposed System

V. CONCLUSION

In this application we have checked the water level and the bridge condition also. In the emergency condition we have added the facility of broadcasting the message not only to the police station but also to the municipal office, risqué team and to the users .The main aim of this application is to

save the lives of the people, to protect from accident, to help the people who are stucked after the bridge is collapse.

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