

IOT Based Bridge Monitoring System

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Abstract- *In many cities bridges are built on the rivers that are very dangerous but they are still in use. Many bridges gets collapse due to heavy rain, earthquake, high water level which may turn into disaster. So, bridges may require continuous monitoring for the safety of people. The use of the wireless sensor, various data can be collected like weather conditions, and data of high priority structures. These data are also be useful for monitoring and surveillance of the bridges. With the Help of IOT we can monitor the bridge, can collect the data of bridge and prevent accidents and disaster. The main aim of this paper is to prevent accidents that is happening on the bridges, prevent disasters of dams, bridges and flyover and alert the driver about rainfall, floods etc.*

Keywords- IOT, Wireless sensors, Bridge, Monitoring, Data.

I. INTRODUCTION

There are different Engineering structures that are responsible for economic growth, development of the nation. There are many structures such as buildings, dams, roads, and bridges.

The bridge may vibrate due to the load of a moving vehicles, crowds, wind and earthquake. The data that are received by sensors can be used for bridge safety management and in the occurrence of disaster, for preventing a disaster. For the bridge monitoring and for communication the system uses the Wireless Sensor network (WSN). As WSN plays a very important role in the application of remote monitoring. For the bridge monitoring and communication, the system uses the ZigBee protocol. The protocol has many characteristics such as low power consumption, high safety, and low cost, low data rate. In addition it is easy to implement. Many of the bridges Are poor due to external and internal factors. Due to the action of dynamic load of vehicle and earthquake it generates a huge vibration in the bridges.

II. LITERATURE SURVEY

A. Ren-Guey Lee et al has given an efficient implementation for bridge monitoring system by using the wireless sensor Network (WSN). It collects the environment parameters transmitting the numerical data to the gateway through the

multiple-hop relay, and then it stores data in the back-end database for the monitoring staffs to analysing and studying of the data.

B. Shivan Haran, ET al. has discussed about the monitoring of bridges using WSN. The system uses a heterogeneous network of WSN and conventional P2P together with a combination of sensing devices is to be used on a bridge. There are Issues that are related to condition of the bridge such as faults, overloads, analysis of network and system performance.

C. Jin-Linn Lee has explained IoT-based bridge safety monitoring system using the ZigBee technology. The system consists of monitoring devices installed in the bridge environment, Communication devices that connects the bridge monitoring Devices, cloud-based server, database for storing bridge data, And a cloud-based server that calculates data transmitted from the monitoring devices.

III. EXISTING METHODOLOGY

IOT based bridge monitoring system has been implemented using ZigBee. It can be modified by using Wireless sensor networks (WSN), Arduino micro, weight sensors, water level point contact sensors, temperature sensors, gprs, vibration sensors, pressure sensors and database.

IV. LIMITATIONS OF EXISTING SYSTEM

Existing System of bridge safety management have the problems like failure to collect data or monitor on-site conditions, data collection through visual assessments or use of large size electronic equipment have higher cost or higher power consumption, often resulting in inaccurate data.

V. PROPOSED METHODOLOGY

The proposed framework consists of Arduino micro is a microcontroller(datasheet) .The sensors collects the data such as pressure, temperature, load, water level. If there is any vibration these are sensed by vibration sensors. Wireless sensor networks (WSN) collects the data and sends the data to database. The data is stored in the database and the users can access the data anytime through application by logging

in.If the user forgets the password then the user can use emergency.

VI. SYSTEM ARCHITECTURE

This system is combination of both hardware components and software components. Database is used along with the setup for storage and retrieval of data.

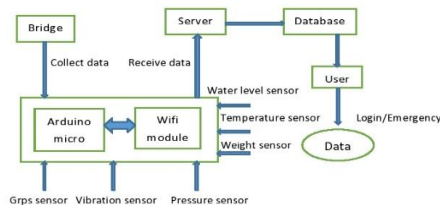
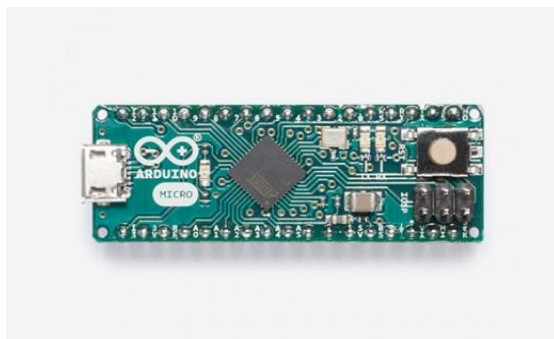


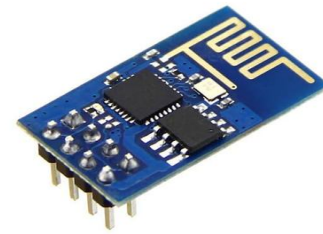
Fig 1: System Architecture Design

Software used – Arduino micro

Arduino micro is a microcontroller board based on the ATmega32U4 (datasheet). It has 20 digital input/output pins (of which 7 can be used as PWM outputs), 12 analog inputs, a 16 MHz quartz crystal oscillator, a USB connection, an ICSP header and a resetbutton. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable to get started.



Wi-Fi module



GPRS module



VII. CONCLUSION

IOT based bridge Monitoring system is to alert using sound sensors when there are signs of collapsing the bridge. This system can prevent accidents and disasters.

VIII. FUTURE ENHANCEMENT

IOT based bridge monitoring system can be enhanced by adding more features and using different protocols.

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