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Bridge Monitoring System

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ABSTRACT: Advancements in sensor technology have brought the automated real-time bridge health monitoring system. Many long span bridges in Korea and in Japan have adopted this real-time health monitoring system. In this, new idea of bridge health monitoring system is introduced. This system can analyze and monitor in real time the conditions of a bridge and its environment, including the waters levels nearby and other safety conditions. By the use of wireless sensor nodes, various types of data can be collected like vibration, water level and Bridge weight. The main moto of this paper is to develop a system that can prevent accidents or structural disasters of flyovers and bridges

KEYWORDS: Arduino, Bridge, Load cell, Ultrasonic Sensor

I. INTRODUCTION

Extensions are consistently exposed to dangerous impacts of material maturing, boundless erosion of steel building up bars in substantial constructions, expanding traffic volume, over-burdening. These variables, joined with imperfections of plan and development and unintentional harm. Large numbers of the extensions in urban areas based on the waterway are dependent upon crumbling as their lifetime is lapsed however they are as yet in utilized. They are perilous to connect clients. Because of hefty heaps of vehicles, high water level or pressing factor, weighty downpours these extensions may get breakdown which thus prompts calamity. Scaffold observing framework (BMS) gives past sign to us where we can undoubtedly save such a large number of lives and we can stay away from the misfortune. BMS is an apparatus to improve the security and viability of scaffold. BMS gives continuous and exact data about the underlying medical issue. It's anything but an interaction of non-dangerous assessments to identify area and degree of harm, ascertain the excess life, and anticipate forthcoming mishap. The framework created in this investigation can assist with diminishing the mishap and give the headway of scaffold security checking from various calamity like-flood, wind, seismic tremor, hefty burden, vibration. We propose a coordinated extension checking framework utilizing IOT that can be utilized to forestall mishaps or underlying fiascos of flyovers and. All sensors get the continuous esteem and send it to the worker. On the off chance that the sensor esteem is over, the cutoff then the framework will play the ringer and tell the people groups. Underlying wellbeing observing framework is a standout amongst other famous frameworks which is checking and identify the ecological condition. The extension design may vibrate under the activity of such unique burden as moving vehicles, groups, wind and seismic tremor. The examination is a significant substance of scaffold structure investigation. The information can be utilized for connect wellbeing the executives and in the event of calamity, for catastrophe salvage. For its observing and data correspondence the framework utilizes the WSN innovation.

II-EXISING SYSTEM

In the existing application, we have tried to incorporate all the necessary and secure application that will be of beneficial use to the citizens and their surrounding environment. In the future, a system could be implanted that could along with detection also notify to the municipal services about the future life of the bridges to how long the bridge will sustain. The existing system could also be built using a solar panel around it so it uses solar energy and sustains for a longer period of time. Hence, a new Bridge Health Monitoring System especially for the Indian Bridges which is especially very cheap as compared to optical fiber systems. This will certainly prevent the catastrophes occurring due to deficient bridges and also due to natural disasters. Based on the potential combinations of different available sensors and systems, the range of applications is virtually endless. Application of structural health monitoring technologies to bridges has seen great increase in the past decade. Hence to ensure the safety of bridges, the Bridge Health Monitoring System was introduced. Some of the existing technologies/methods for Bridge Health Monitoring System are as described.
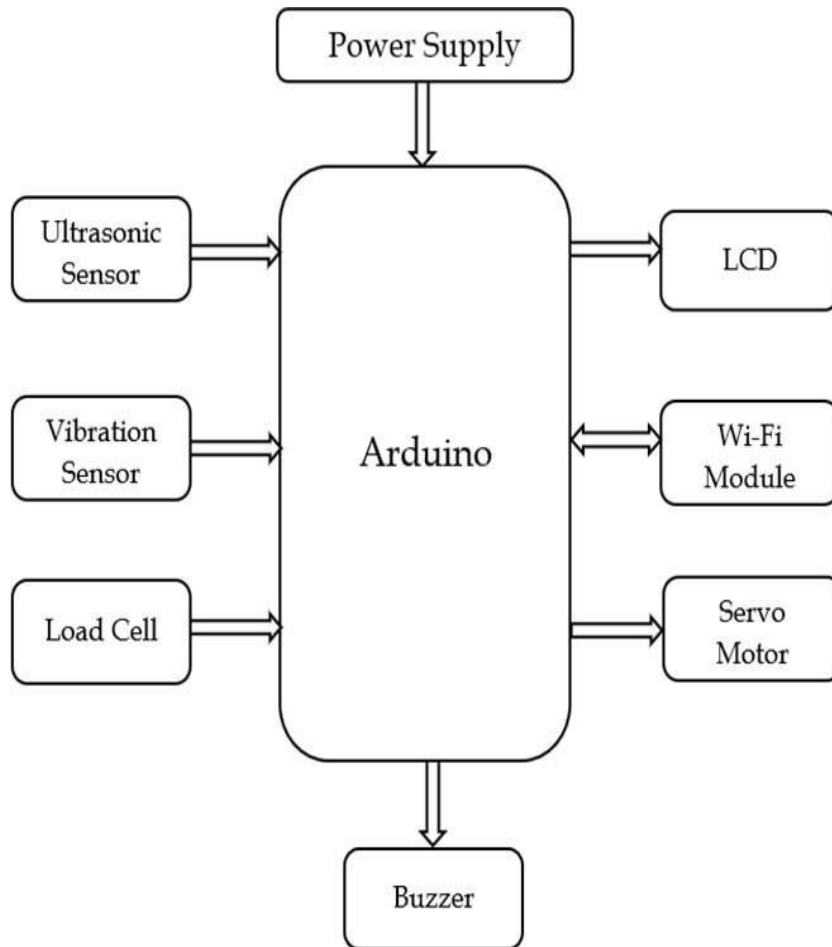
II.MODELING AND ANALYSIS

Figure 1: Block Diagram

The sensors and the LCD are interfaced with the Arduino UNO. The sensors used are Flex and Water level. The Flex sensor measures the angle of tilt of the bridge as well as cracks. The value is set so that if there is any sort of tilt or little crack and if it crosses our set value then the crack is detected. The water level sensor will be placed below the bridge and within the gaps. When the water touches the sensor, it will give alertness to the Arduino UNO. Then the alarm will beep. An LCD is kept so that if there is any danger and if the system finds the fault then the LCD will display "DANGER". Servo motors are also there to closed the roads so that no vehicle reach the bridge. It is placed before the bridge. A buzzer is also used to spread alertness when the danger is detected. The wi-fi modem is used to send the data to the server. We have used "BLYNK" were we can see the reading of the sensors. The overall aims for Bridge Health Monitoring systems areto:

1. Ensure safestructures.
2. Monitoring Structural Performance and AppliedLoads.
3. Facilitating the Planning of Inspection andMaintenance.
4. Validating Design Assumptions and parameters.
5. Updating and Revising Design Manuals andStandards.
6. Attain safe economicoperation.

III.RESULTS AND DISCUSSION

1) HARDWARE SNAPSHOT

We interfaced entire circuit as shown in following figure. LCD Display is connected through I2C module to Arduino uno via SDA & SCL Pin. Ultrasonic Sensor is connected to digital pin of Arduino and load cell is connected to analog pin with help of HX 711 signal conditioning module. Accelerometer is connected to SDA & SCL pin of microcontroller. All Circuit operate on 5V supply voltage.
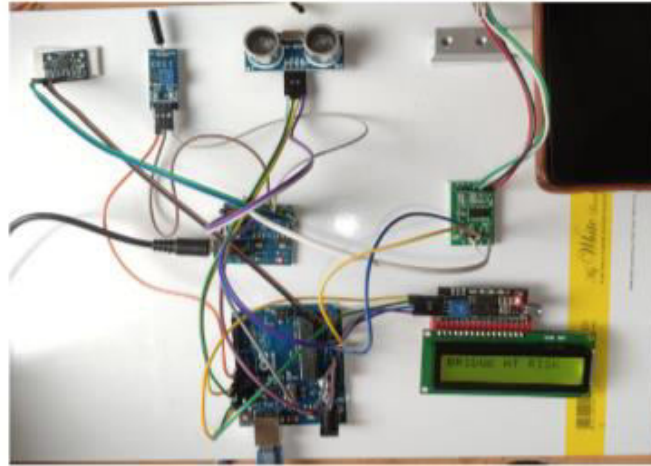

Figure 2: Hardware Snapshot

2) SIMULATION

Circuit simulation is done in ISIS Proteus software. We design entire circuit on this software with the help of inbuilt modules and interfaces. Simulate it via hex file uploading in microcontroller. Circuit programming is done in Arduino IDE software and compile in itself.
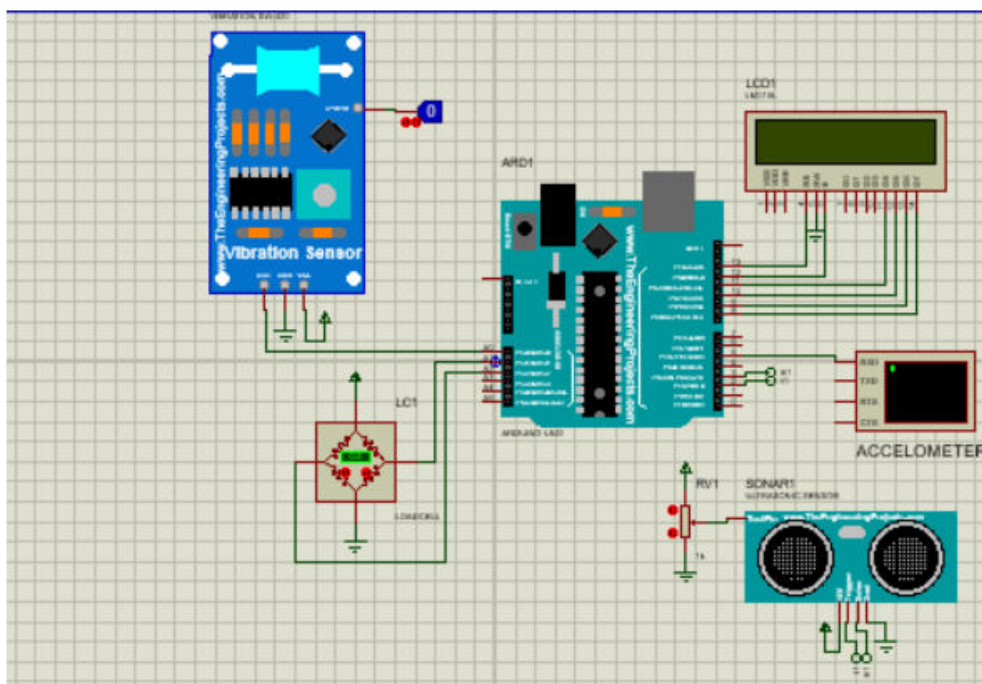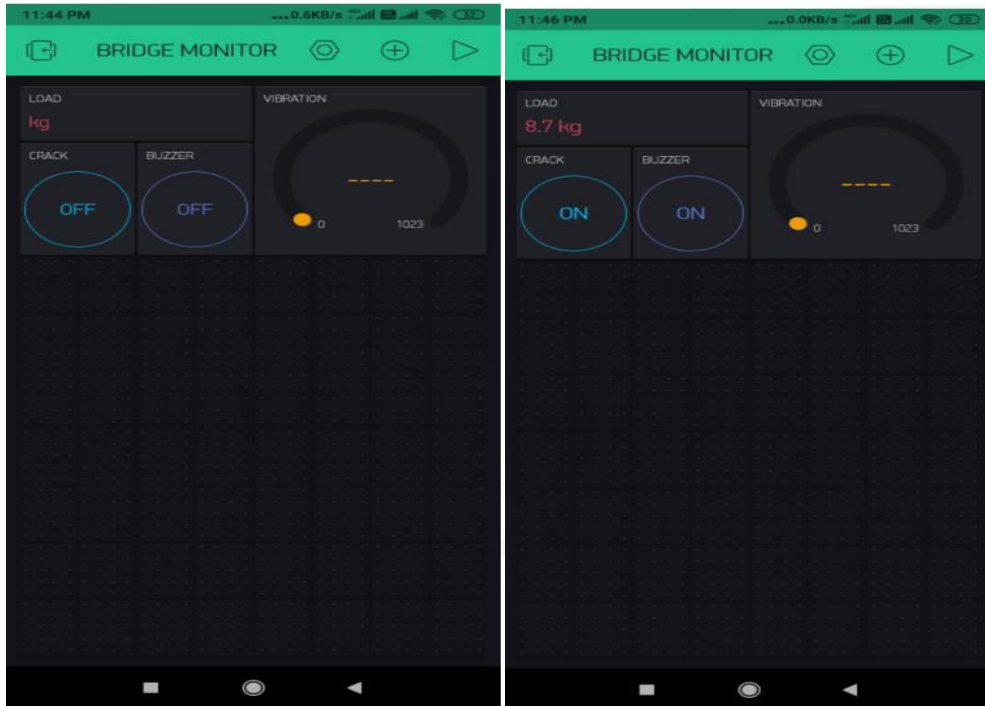

Figure 3: Circuit Simulation

2) RESULT

Our Project is IOT Based Bridge Monitoring System, Hence We use Blynk Platform to observe real time signal analysis. We create new project in it and connect our hardware with this server with help of wifi module.

IV.ADVANTAGES

1) This system can monitor and analyze in real time the condition of a bridge and its environment, including the water levels and other safetyconditions.By the use of wireless sensor nodes, various types of data can be collected like vibration, water level and Bridgeweight.

2) Bridge Monitoring System using IOT is to save the lives of the people, to protect fromaccident.It will prevent more accidents and will help us to use more advance technology in the real world It enables us to use new technology with the world and gives a boost to prevent damage to the to the bridge BMS helps to prevent the damage to the society and also helps to save themoney.

3) The cost of this system is very cheap and very handy so that anyone can access it properly This system can enable 24x7 bridge safety management as well as prompt andappropriate.

V.CONCLUSION

Bridge monitoring and alert generation system using IOT, to alert using buzzer and auto barrier when there are signs of collapsing thebridge.This system will help to reduce big disasters infuture.The main objective of Bridge Monitoring System using IOT is to save the lives of the people, to protect fromaccident.Developing a bridge monitoring system is challenging task hardware and software can make this process much smoother. Further, the analysis software lab view provides can render the process of monitoring more effective andinformative.The system continuously monitors the bridge parameter value and judges whether the bridge is safe or not for traveling. In case the parameter values are beyond the threshold values then an alert sound is given to the people. This implementation is greatly useful to provide safety for thehuman.

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