

Bridge Safety Monitoring Systems Based on the Internet of Things using Sensors

B.Ranitha¹ C.Tamizhselvi² B.Vinothkumar³

^{1,2,3}Senior Assistant Professor

^{1,2,3}Department of Electronics & Communication Engineering

^{1,2,3}IFETCE, Villupuram, India

Abstract— The basic knowledge about the damage site can reduce information management at the safeguard center and safeguard operation, results in poor save efficiency. Nowadays many new technologies had been implemented based on the automation of bridge safety. The proposed system consists of: Devices available in system can be continually monitored, Communication devices which connecting of whole system with, Database can able to store the condition of bridge. The detected images and required information will be received by the mobile telecommunication via SMS.

Key words: Load Sensor, Accelerometer, Vibration Sensor, SMS, IoT

I. INTRODUCTION

It is very essential to monitor the bridges as there happens many accidents and incidents in our day to day life. It also leads to safety maintenance and long term of its life span. The main reason behind them includes not having of any proper. In this study, associate degree iot based bridge safety observance system is developed exploitation the pic microcontroller technology .and analyses transmitted from monitoring devices .This system can monitor and analyze in real time the conditions of the bridge and its environment ,including the bridge vibration, actual loads on the bridge and other safety conditions.

II. PROPOSED SYSTEM

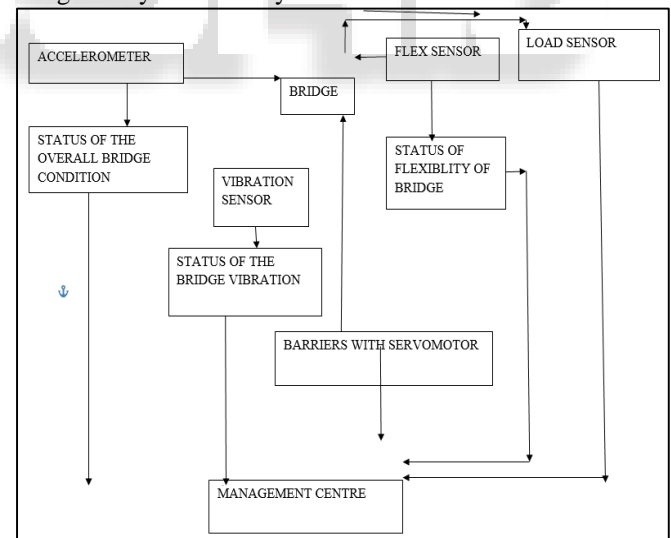
The IOT wireless sensor network and smart building technologies are adopted to solve various problems of bridge safety information transmission and management by developing an iot based bridge safety monitoring system capable of monitoring the environmental the environmental data of bridge and transmitting the data to the mobile devices of bridge safety management staff for reference and documentation. So for this the system is being developing an application in which everything is automated so less human efforts are required and this application is very much useful in emergency condition like prevent from flood, earthquakes. The system developed in this study can help to promote advancements of bridge safety management. This system aims at developing an application that is useful for the people working at the bridge departments or for bridge engineers. 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. 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.

III. BLOCK DIAGRAM

The communication between bridge and monitoring centre is takes place via gsm module .The gsm module itself act as server through which status of the condition of bridge is transmitted to the monitoring centre. The monitoring devices like vibration sensor are continuously monitoring the structural health of bridge. It has technology called MBM (Monitoring based management) that enables maintenance engineers to monitor the conditions of bridge in real time. The components that which are used to detect the strain, acceleration, cracks, etc...The system includes the desktop application which is useful for the engineers working in bridge department to monitor the current position of bridge.

There are two important chunks in system i.e., Vibration sensor and load sensor which sends the details of bridge strength to the management centre. All the collected environmental data sent to the server system. So that as per situation, management center takes immediate action for bridge safety and security.



A. Pic Microcontroller:

16f877 PIC Microcontroller is used for triggering the gate pulses of the MOSFETs and for controlling those pulses so that the MOSFETs are turned ON and OFF in the desired sequence.

B. GSM Modem:

This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port to communicate and develop

embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily.

C. Accelerometer

Accelerometer is a device that measures proper acceleration. The proper acceleration measured by an accelerometer is not necessarily the coordinate acceleration (rate of change of velocity). Instead, the accelerometer sees the acceleration associated with the phenomenon of weight experienced by any test mass at rest in the frame of reference of the accelerometer device. Accelerometers have multiple applications in industry and science. Accelerometers are used to detect and monitor vibration in rotating machinery.

IV. PROJECT IMPLEMENTATION



V. CONCLUSION & FUTURE WORK:

Bridge health condition monitoring in real time has been popular issue. The sensor technology is continuously advancing and condition monitoring has never been accurate and easier before. With the help of wireless technology smart sensor is developing for securing bridges.

This future system can also checks the water level and the position of bridge for safety purpose. In the emergency conditions like earthquake, flood, etc...the faculty of broadcast the message is added. The main aim of bridge monitoring system is to save the lives of the people to protect from accident.

REFERENCES

- [1] Chae, M. J. Ph. D., P.E., Yoo, H. S., Kim, J. R., Cho, M. Y., Ph. D. "Bridge condition monitoring system using wireless Network (cdma and zigbee) International Journal of Engineering Science and Computing ISARC2016.
- [2] Priyanka Ramdas Rathod¹, Prof. Ajay S. Wadhawe²" Wireless Sensor Network in Railway Industry", August 2016.
- [3] Mr.M.V.N.R.P.Kumar¹, Ms.B.Hombal², Miss. J.D. Kadam³, Mr. A. B. Yadav⁴, Mr. B.M. Pawar⁵. "Bridge Condition Monitoring System Using PIC Microcontroller" International Journal of Research in Advero Technology, Vol.3, No.5, May 2015
- [4] 1Arunkumar.G.C, 2Chandrakanth .S. R, 3Chethankumar.M, 4Karthik.V, 5Santosh Chavan." Bridge Condition Monitoring System Using Wireless Network", International Journal on Advanced Electrical and Computer Engineering (IJAECE) Volume -2, Issue - 3, 2015
- [5] Mr. Shivraj A. Patil, Sagar V. chavan, "design of condition monitorin system for bridge structure using Realtime damage detection algorithm", International Journal Of Research Publications In Engineering And Technology [IJRPET] Dec. -2015
- [6] B. Gates, N. Myhrvold, P. Rinearson, and D. Domonkos, "The road ahead," 1995.
- [7] C. Alippi, R. Camplani, C. Galperti, and M. Roveri, "A robust, adaptive, solar-powered WSN framework for aquatic environmental monitoring," IEEE Sensors Journal, vol. 11, no. 1, pp. 45–55, 2011.