

RESEARCH ARTICLE



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BRIDGE COLLAPSE DETECTION SYSTEM TO PREVENT ACCIDENT

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ABSTRACT

This paper describes Bridge Detection System along with Water overflow on Bridge and Landslide with warning arrangement. An Accelerometer used in this Bridge Collapse Detection System in order to detect any movement in Bridge structure. Accelerometer is used to detect the Landslide to prevent the accident in hilly areas. Along with the Accelerometer Microcontroller ATmega 328 and alarm system including LED Display is the key component in the major working of this project.

KEYWORD: Accelerometer, Water level sensor, ATmega 328, XBee, LED Display Board, GSM.

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I. INTRODUCTION

At Mumbai-Goa highway accident occurs on British Era bridge in which near about 38 peoples lost their lives. After the incident the government remained in the dark about the victim and number of vehicles fall into the river. That was false alarm, many dead bodies are missing. Accident on bridges takes place frequently, as a result number of peoples lost their life and property. The approach of this project is detection of bridge collapse, water overflow on bridge and landslide with warning arrangements. Bridge collapse detection system which has accelerometer fitted on bridge structure to detect any movement in bridge structure. In hilly areas there is a possibility of land-slide, so we again use accelerometer sensor to detect the landslide. The accelerometers outputs will be connected to microcontroller ATMEGA 328. If there is bridge collapse and landslide happen the microcontroller will shut down the barrier present at the entry of bridge so that vehicle entering on bridge can be avoided and also it will activate warning alarm system including LED display.

II. PROPOSED SYSTEM

The proposed system consists of various sensors for monitoring data and transmitting to microcontroller. If condition such as bridge collapse, water overflow and landslide occurs it is detected by particular sensor and information about the event is sent to the microcontroller. In case of any fault detect message is sent to control room as well as message will be displayed on LED Display Board and also activate buzzer using GSM Technology.

III. BLOCK DIAGRAM

Fig 3.1 shows the transmitter section in which accelerometer, water level sensor is connect to microcontroller. All the data from sensors is read by the microcontroller and particular information is sent by XBee.

Fig 3.2 shows the receiver section in that receiver receives the data from transmitter by XBee and stores it in memory card. If data is above threshold value it will activate warning alarm system. The GSM message is send to the control room and then displayed on LED display board and buzzer starts using GSM technologies. Then the control room

sends SMS will be sent to National Disaster Relieving Force or State Disaster Relieving Force.

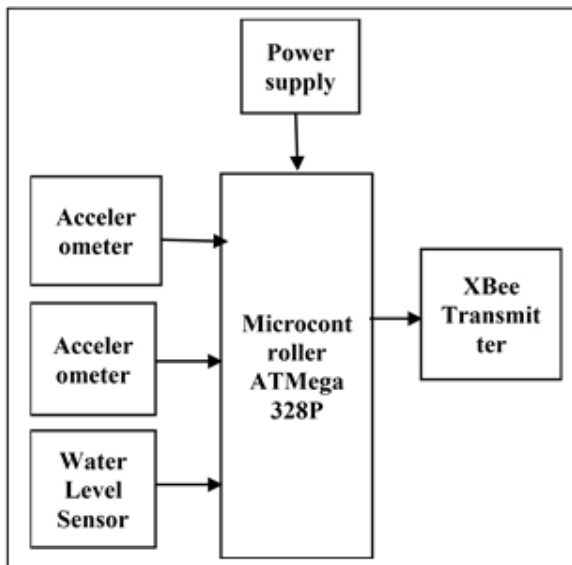


Figure 3.1 Transmitter Section

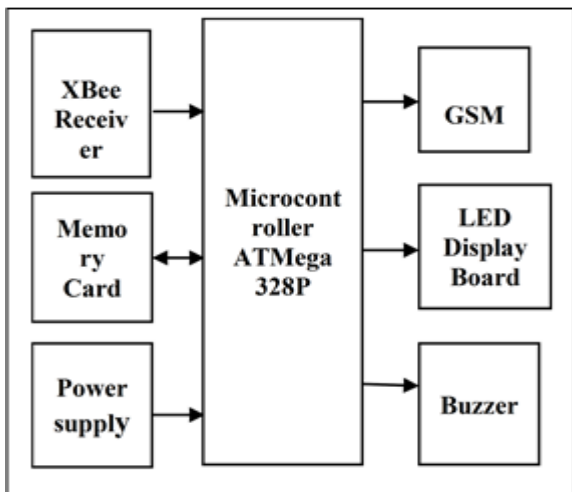


Fig 3.2: Receiver section

IV. RELATED TO WORK

Prof. P.C. More and Prof. S.N. Kharade[1] proposed in paper "Landslide Warning System using Wireless Sensor Network", includes some wireless sensor monitoring node distributed on the hillside; they construct a wireless data connection network based on XBee. This combines GSM technology and wireless technology.

M. Kawatanib, T. Hayashikawab[3] proposed a research was intended to established a bridge damage detection approach employing only direct analyses of train- induced vibration by means of introducing soft computing methods. In this approach, different from identifying the structural

damages using inverse analyze, the possible damage pattern of the bridge.

"Study of Smart Sensors and their Applications"[6]. In this paper they studied the water level sensor, ultrasonic sensor and motion sensor etc to avoid water overflow, landslide and avoid the accident on the road.

V. RESULT



Fig 5.1: Transmitter side PCB

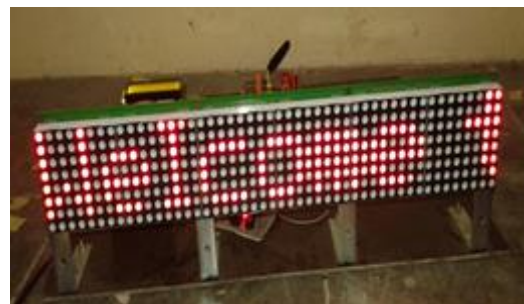


Fig5.2: Prototype Model

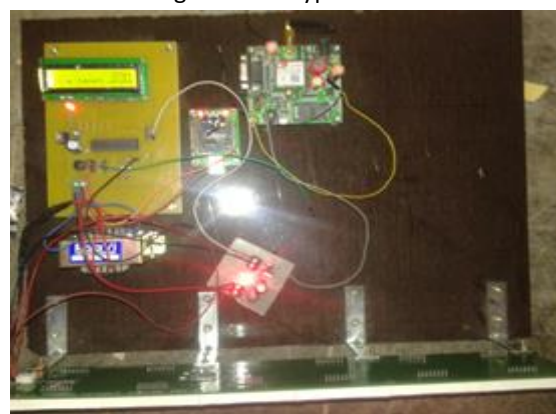


Fig5.3: Receiver Side PCB

Above picture shows the working proposed system. Fig 5.1 shows the transmitter side PCB including all sensor connect to microcontroller ATmega328. Fig 5.2 shows the prototype model showing the Welcome message on the LED display board. Fig 5.3 shows the receiver side PCB having the GSM and XBee module.

VI. CONCLUSION

The design system for bridge collapse detection can be used for alerting the person and very useful to save someone's life. This system will be useful to prevent disasters which can be caused due to bridge collapse, water overflow on bridge and landslides with the help of sensors such as accelerometer and water level sensor. Message send to control room through GSM for controlling and displayed on LED board which are placed at bridge side. On the whole system proves to be very efficient. The experimention and result prove that the system is easily imple-mentable in real time.

VII. REFERENCES

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