

BRIDGE SURVEILLANCE SYSTEM

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Abstract: GSM is the most popular technology used in mobile communication based control system can act as an embedded system that can control and monitor appliances and other devices. There is an automation process by using GSM technology which provides water level indication in various applications like dam, water reservoirs, groundwater monitoring etc. The system allows the user to effectively monitor the water level via mobile by sending commands in the form of SMS and receiving water level status. The type operation to be performed depends on the nature of the SMS sent. The main part includes the development of the system that is capable to detect water level using microcontroller. The sent SMS is stored and polled from the receiver mobile station and then the required control signal is generated and sent to the intermediate hardware that we have designed. According to the command received in form of the sent message. The microcontroller is used for processing the network protocols. The system can process the data that has been collected based on the water level. Though this technology is initially meant for dam monitoring, it can be easily adapted to other fields.

Keywords: Microcontroller, Load cell, level sensor, continuity sensor, Lamp, Relay, Buzzer, Gate, GPS, GSM

I. INTRODUCTION

The concept of our project is based on the accident which was occurred on 3 August 2016 at Mahad. The bridge on Savitri river was get collapsed. Many cars, buses flown away in the river. The flood took many buses and cars along with it. So there was loss of human life. So we try to control such type of accidents by using this concept.

Many times the construction of the bridge is old. So whenever there is heavy rainfall in the region of the bridge, then there is possibility of flood. So there might be reduction in strength of the bridge. Sometimes life of the bridge gets reduced, but people travelling over the bridge are unaware of that. Heavy vehicles travelling on a bridge, so such type of accidents are occurred.

II. PROBLEM STATEMENT

Many times the construction of the bridge is old. So whenever there is heavy rainfall in the region of the bridge, then there is possibility of flood. So there might be reduction in strength of the bridge. Sometimes life of the bridge gets reduced, but people travelling over the bridge are unaware of that. Heavy vehicles travelling on a bridge, so such type of accidents are occurred.

In case of the river flood, sometimes the water of river flows over the bridge. Also at such situation people are travelling over the bridge. It is risky for the human life.

In India there is no such type of traffic control system, human security system is not available. So in our project we try to control such type of accidents by introducing traffic control system

III. BLOCK DIAGRAM

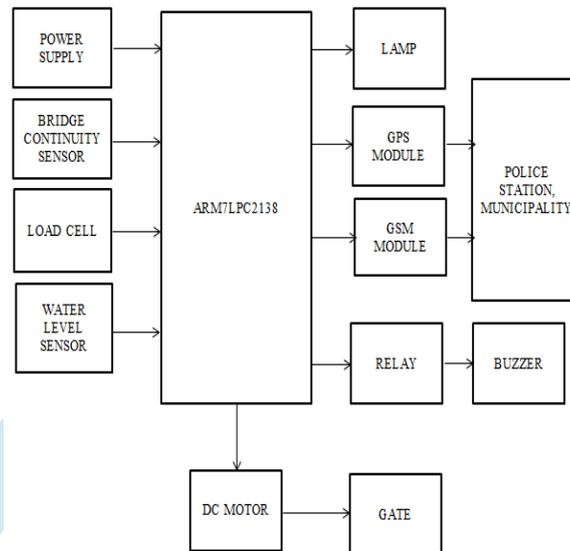


Fig. 1 Block diagram of Bridge Surveillance System

IV. WORKING

In this system we are using the ARM 7 controller to monitor the overall system. In this proposed system we have used the bridge continuity sensor to check the continuity of bridge. The continuity sensor is actually a simple cable. Whenever the bridge collapses, this cable will break. In such critical conditions the gates will get automatically closed. For this purpose we have used the DC motors for automatic movement of the gates. This will give a high alert to people. Also this will give the alert to the municipality and nearby hospitals by using the GSM and GPS.

The system uses the load cell for checking the overload problem. The load cell converts the force into the electrical signals. Whenever there is excessive load on the bridge, then there may be a possibility of collapsing the bridge. In case of such excessive load condition the load cell will give high output to the microcontroller and the gates will be automatically closed.

The water level sensor continuously checks the water level in river and gives alert in case of flood conditions. Sometimes in the night time the people do not able to understand the water level. So in case if there is heavy rain or flood conditions, the high alert will be given to people using lamp which is placed nearby gate. Also the buzzer will be turned on in such critical conditions to alert the people.

In our project there are three main set points. They are as follows:

1. In condition of flood of the river, water increases to first set point. Then alert to people. When water reaches at second set point, then it is considered as danger condition. So the gate on bridge get closed. And lamp becomes ON and message is sent to the people through GSM.
2. When the load on a bridge is more than the set point then gate on a bridge is automatically closed. Lamp becomes on and the message is sent to the people through GSM.
3. When the continuity of the bridge is gets broken or bridge collapsed, then the gate of the bridge is closed. Lamp becomes ON and also the buzzer becomes ON. The location of the accident place traced by GPS and sent to police station, hospital, and municipality.

In project, we use the small power requirement lamp. We use the red lamp in project to indicate the some signal to people. The lamp is used for alert to the people. When any accident case is occurred then lamp is get on and get alert to the people.

Also the system uses the GPS and GSM module. Whenever there is any kind of critical condition like flood or bridge collapse, then the alert will be given to the municipality, hospitals and police station by using the GSM service, which will be indicating the location of bridge.

V. FLOWCHART

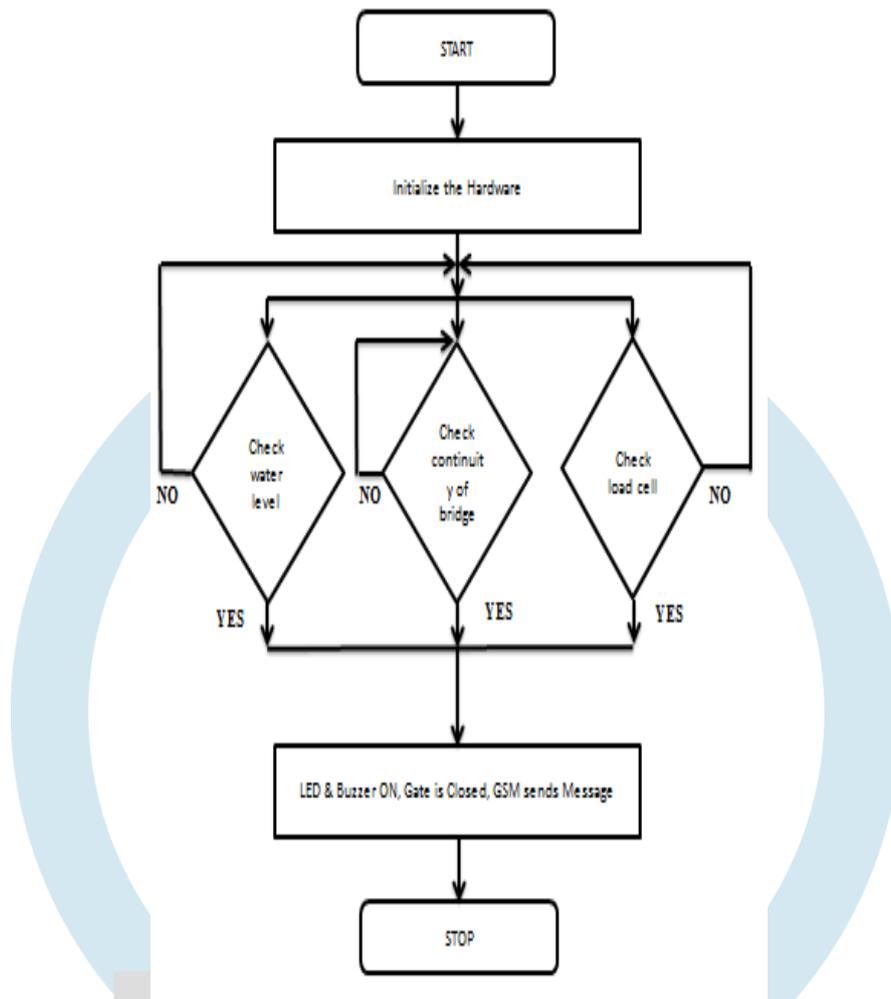


Fig. 2 Flowchart of Bridge Surveillance System

VI. CONCLUSION

A bridge Surveillance system has been developed for checking the continuity of the bridge and flood detection. This system provides the hardware functionality for development of a long-term continuous bridge monitoring system. This system gives alert in case of any faulty condition which will play an important role for saving human life. Also, this system tries to control accidents by using the traffic control system.

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