

# SMART IoT BASED BRIDGE MONITORING AND DAMAGE DETECTION USING ANDROID APP

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**Abstract** - Bridge monitoring system is significant to health diagnosis of bridges and flyovers. This report is proposed and developed a novel architecture for large span bridge monitoring. A 3-level distributed structure is adopted in the monitoring system, which includes central server, intelligent acquisition node and local controller. Acquisition nodes are located across the bridge. One local controller manages all the acquisition nodes. Every acquisition node has 4 channels, which can sample displacement, acceleration, strain of bridge. To get high precision data, a 10 bits A/D converter. Compare to the traditional method, the proposed architecture has two features. First, the acquisition node is a smart device based on powerful digital signal processor. Signals of field sensors are analyzed and real time compressed in the acquisition node. Only the processing results are sent to local controller through IEEE 802.11 wireless network. This operation can relieve load of central server and decrease demand of communication bandwidth. Second, 4G wireless network is utilized to provide enough bandwidth for real-time data transmission between local controller and central server. Running results show that the proposed system is stable and effective.

**Key Words:** Bridge, Arduino, Bluetooth, Android App, Sensors.

## 1. INTRODUCTION

Bridges and flyovers are critical in many regions, being used over several decades. It is basic to have a framework to screen the strength of these extensions and report when and where support activities are required. Progressions in sensor innovation have brought the mechanized continuous extension wellbeing checking framework. Many long range connects in Korea and in Japan have received this ongoing wellbeing observing framework. However, current system uses complicated and high cost wired network among sensors in the bridge and high cost optical cable between the bridge and the management center, which increases the overall cost of installation and maintenance cost of health monitoring system. The entangled wiring additionally makes the establishment and repair/substitution process troublesome and costly. In this undertaking a thought of extension wellbeing observing framework utilizing remote is proposed. For short distance (among sensors in the bridge) IEEE 802.11 wireless communication, ESP8266 is used as wireless network. This innovation can be called MBM (Monitoring

Based Maintenance) that empowers the scaffold upkeep engineers screen the state of the extension progressively. The sensors installed on various parts of the bridge monitors the vibration, traffic, weight of the vehicles, measurement of water level etc. At any point of time if any of these parameters cross their threshold value the communication system informs the management center giving an alarm for taking precautionary measures. The complete parameters of the bridge are taken by an arduino processor and sent to another module which is located in a short distance. Here the communication established is using ESP8266 that uses wireless transmitter and receiver circuitry. The receiver module takes the parameters from the transmitter and sends a message with all the parameters to a database center. The communication established between the intermediate module and the database center is using IEEE 802.11 technology.

## 2. FEASIBILITY STUDY

Feasibility study is a survey of possible computerization based on the next management of objectives related to an analysis of the existing facilities within the company. Feasibility study is done by evaluating the existing system of the area undertakes investigation and generating ideas for the new style. The objective of feasibility study is the key factors considered during feasibility are:

1. Economic Feasibility.
2. Technical Feasibility.
3. Operational Feasibility.

Now, system analyst has to examine whether computerized system is feasible in the point of view of economical. Technical and behavioral. Also system analyst has to consider the feasibility factors of analyzers of the system. In the following points it is studied that whether our system is feasible or not. It is a newly developed system to replace the current system by changing the present system.

### 2.1 Economic Feasibility

Economic analysis is the frequently used method for evaluating the effectiveness of the candidate system. Let us see the benefits of candidate system over present system.

1. There is no wastage of time as before since computer does all the work.
  2. Money is saved due to qualified computer engineer and programmer, since they are able to work out all the problems I hardware and software.
  3. Scope of accounts department reduced to great changes in the software as per requirement.
  4. No wastage of stationary and paper.
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## 2.2 Technical Feasibility

To develop the proposed system, we require following technical parts:

1. Monitor and keyboard: The computerized system follows all technical parts affected to technical views. The computerized system does not require any specific type of hardware.

## 2.3 Operational Feasibility

This study deals with the following issues:

Is there sufficient support for the project from the management of the project and user has been involved in planning and development of project. When the proposed system was tested for above-mentioned issues, it was found that result was tending towards being positive and leading the system to make operationally feasible.

## 3. CONCLUSION

The study was to be completed in limited period of time, so it is not possible study the whole "One Town One Job". It is hoped that they would be considered in the near future for further implementation of One Town One Job is built with some added features. Although today software's are available in the market which uses various One Town One Job techniques considering the progress rate of each module in the project, we have tried our level best and succeeded to a certain extent in developing software. The system suits the needs of the users. It is generalized to include many functions and as per the user requirements the system can be customized for specific needs. The system is flexible enough to be integrated with others and there is scope for expanding the system as well.

## REFERENCES

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