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"IOT BASED HEALTH MONITORING SYSTEM FOR BUILDING AND BRIDGES"

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1. Abstract

Internet of Things (IoT) technology has been widely used in various fields, including healthcare and building infrastructure. In this research paper, we propose an IoT-based health monitoring system for buildings and bridges. The system is designed to monitor the structural health of buildings and bridges in real-time and alert the authorities in case of any damage or abnormalities. The proposed system uses sensors that are placed at various locations on the building or bridge to collect data on temperature, humidity, vibration, and other parameters. The data collected is then transmitted to a central server using wireless communication technology. The server analyses the data and generates alerts if any anomalies are detected. This paper describes the design and implementation of the proposed system, its advantages, and its potential applications.

2. Introduction

The safety and stability of buildings and bridges are of utmost importance to ensure the well-being of people and the economy. Structural damage and failures can cause significant damage to property and life. Traditional methods of health monitoring are often expensive, time-consuming, and require manual intervention. Therefore, there is a need for an automated, real-time monitoring system that can detect anomalies and alert the authorities in case of any potential dangers.

The proposed system is an IoT-based health monitoring system that uses sensors to monitor the health of buildings and bridges in real-time. The system can detect anomalies in the structure, such as cracks, deformation, and vibrations, and alert the authorities before any significant damage occurs.

To overcome such incident we can have data-acquisition systems which can be used in structural and seismic monitoring projects ranging from simple beam-fatigue analysis, to structural mechanics research, to continuous monitoring of large complex structures. Our systems provide remote, unattended, portable monitoring for and bridges. They are compatible with a wide variety of sensors and peripherals to fit your exact needs. This report aims to simplify the process of selecting bridge health Bridge engineers have many responsibilities and it is impossible to expect one to know. Our system will sense the water level angle, if crack in the bridge will be sensed signal will be given to the vehicles to stop and will automatically give red signal, will close the gate and will send details of sensor to control room.

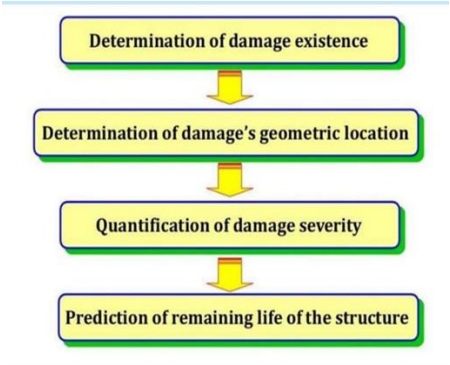
3. IOT

The Internet of things (IoT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to

collect and exchange data. The IoT allows objects to be sensed or controlled remotely across existing network

Infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.

4. Problem Definition



5. Existing System

Now days the structural stability of the bridge is monitored by manually and also the traffic control of heavy duty vehicles over the bridge are also done manually. Rather the traditional structure monitoring system can be done using wired technology. Manual control of bridge leads to wastage of manpower and will not be effective during the time of calamities. Also wired system is too expensive, power hungry and difficult to implement and maintain. In this method, the same pattern of the bridge has been designed with the same composition of material as that the one used in the bridge. And by performing several tests like destructive testing on the bridge model, the strength and the life time of the bridge has been calculated.

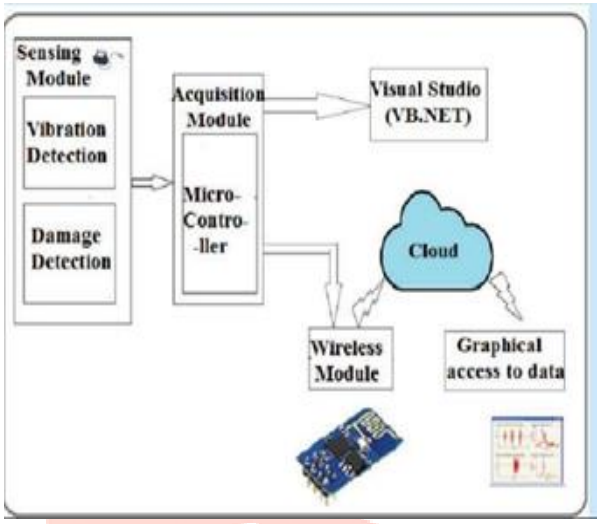
6. Proposed System

IoT based bridge monitoring system is useful at both local and global level. It is useful to understand bridge superstructure and substructure condition assessment. With this IoT system one can monitor various bridges and building health through a single server room.

We'll first have to initialize the port sensor. Then readings should be taken from various sensors. These values should be sent to the server room. In server room values will be displayed on PC. One can determine characteristics of bridge by their threshold value.

The proposed system is an IoT-based health monitoring system that uses sensors to monitor the health of buildings and bridges in real-time.

The system can detect anomalies in the structure, such as cracks, deformation, and vibrations, and alert the authorities before any significant damage occurs.



The IoT-based health monitoring system consists of sensors, a central server, and a user interface. The sensors are placed at various locations on the building or bridge to collect data on temperature, humidity, vibration, and other parameters. The data collected is then transmitted to a central server using wireless communication technology. The server analyzes the data and generates alerts if any anomalies are detected. The user interface allows the authorities to monitor the health of the building or bridge in real-time and receive alerts if any potential dangers are detected.

7. Application

The types of structures that have been the focus of the newly reviewed SHM studies include civil infrastructure such as bridges and building, and laboratory specimens like beams and composite plates.

1. Wireless tilt monitoring of ancient building.
2. Detecting cracks and gap in ancient building.
3. Tilt monitoring for building and bridges.
4. Real time data collection.

8. Methodology

The IoT-based health monitoring system consists of sensors, a central server, and a user interface. The sensors are placed at various locations on the building or bridge to collect data on temperature, humidity, vibration, and other parameters. The data collected is then transmitted to a central server using wireless communication technology. The server analyzes the data and generates alerts if any anomalies are detected. The user interface allows the authorities to monitor the health of the building or bridge in real-time and receive alerts if any potential dangers are detected.

9. Results

The proposed IoT-based health monitoring system has several advantages over traditional monitoring systems. It is cost-effective, automated, and provides real-time monitoring. The system can detect anomalies in the structure before any significant damage occurs, allowing the authorities to take preventive measures. The system can also reduce maintenance costs by detecting potential problems before they become severe.

9. Conclusion

A multifunctional IoT bridge monitoring system has been developed for concurrent deployment of sensors. The sensing capabilities of this nodes satisfies the immediate requirements for economic, low maintenance load ratings and short term dynamic measurement in addition to provide hardware functionalities of long term continuous bridge monitoring system.

10. Future Work

In future work, we plan to expand the proposed system's capabilities to include more parameters, such as wind speed and direction, to provide a more comprehensive analysis of the structural health of buildings and bridges. We also plan to develop machine learning algorithms to predict potential structural failures and develop a predictive maintenance system. Finally, we plan to test the system in real-world scenarios to evaluate its performance and effectiveness.

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12. Abbreviations

IoT - Internet of Things

Flex Sensor

Accelerometer Sensor

GPIO - General Purpose Input Output

Wi-Fi Module ESP8266

Buzzer.