Survey on MyHelper (IOT based Bridge Monitoring System)

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ABSTRACT:In this paper we propose a system implementing bridge monitoring system using Internet of Things (IOT). This system detects the water pressure, water level and load of vehicles.If the water pressure, water level and vehicle load cross its threshold value then it generates the alert and auto barrier. Bridge monitoring system is significant to health diagnosis of bridges and flyovers. Lots of bridges in the cities built on the river are subject to deterioration as their lifetime is expired but they are still in use. These bridges are dangerous to use for people. Due to high water level, water pressure, heavy rains, heavy load of vehicles, these bridges may get collapse which in turn leads to disaster. That's why these bridges are requiring to continuous monitoring using Internet of things. So I am proposing a system which consists of a water level sensor, vibration sensor, IR sensor, tilt sensor, NodeMCU microcontroller, and android mobile application.

Keywords: IOT, Android Application, NodeMCU Microcontroller, IR Sensor, Alert Generation, Water Level Sensor, Vibration Sensor, Tilt Sensor.

INTRODUCTION

In this paper, proposed system will avoid death of people due to bridge collapse. I can determine which bridge requires repairing before it gets break. Traffic can be routed prior of bridge collapse as alert of extreme levels are continuously monitored on IOT server. Propose system consist of NodeMCU microcontroller, android application, sensors like vibration sensor, tilt sensor, water level sensor, IR sensor.

The Internet of Thing is the network of physical devices, home appliances, vehicles, and other items embedded wit with electronics, software, sensors, actuators, and connectivity which enables these things to connect and exchange data, creating opportunities for more direct integration of the physical world into computer-based systems, resulting in efficiency improvements, economic benefits, and reduced human exertions.

LITERATURE SURVEY

In this paper business intelligence system applied to health monitoring of bridge structures in Costa Rica. The final prototype consists of a set of web reports with interactive visualization elements that allow immediate and flexible queries about the condition of national bridges. The queries are based on the definition of a set of strategic indicators related to specific characteristics of bridges including their structural condition, functionality and

environmental variables. This information is essential to support decision-making in investment planning processes in the public works sector by central government institutions. [1]

The proposed system consists of a wireless Data Acquisition Unit (DAQ), a mobile public network, a structural health data evaluation, a management middleware, a GIS and graphical user interface module. The sensors in the DAQ gather the bridge health signs and transmit them promptly via the public mobile networks to the management and evaluation middleware for further processing. Based on the national bridge inventory rating scale, an early warning fuzzy logic based engine is developed to process the status of a given bridge and alert the concerned operator/s regarding any abnormality. Furthermore, an interactive Google map is used to show the status of each bridge along with its exact location. [2]

The objective of the project is to implement a solution for communicating devices that monitor, in real-time, the structural health of a bridge. The implementation is based on 6LoWPAN, a standard based on the IPv6 protocol over low-power and lossy networks to support the Internet of Things. We employ open hardware platforms and emphasize the singularities of embedded systems, such as a limited number of operations, low power consumption, and low bandwidth capability. The prototype shown in this work uses the 6LoWPAN standard in a network environment that connects with a real Bridge Management System, with the aim of optimizing the maintenance of road structures. [3]

This system is composed of: (1) monitoring devices installed in the bridge environment; (2) communication devices connecting the bridge monitoring devices and the cloud-based server; (3) a dynamic database that stores bridge condition data; and (4) a cloud-based server that calculates and analyses data transmitted from the monitoring devices. This system can monitor and analyse in real time the conditions of a bridge and its environment, including the waters levels nearby, pipelines, air and other safety conditions. The detected data and images are transmitted to the server and database for users to have real-time monitoring of the bridge conditions via mobile telecommunication devices. [4]

This paper describes multi-agent system employment in WSNs for bridge condition assessment using the dynamic response in which a bridge’s fundamental frequency is measured. The main focus was the development of an autonomous system performing in-network processing. The issues such as large energy consumption to execute in-network processing and time delay are taken into account by control mechanism in the process. The process should be conducted only if a heavy vehicle passes over the bridge. [5]

PROPOSED SYSTEM

We are proposing a system which consists of a water level sensor, vibration sensor,tilt sensor, IR sensor, Wi-Fi

module,NodeMCU microcontroller and android application.The system propose android application which will inform users about the status of bridge whether it is vibrate or weight overload or measure water level through IR, Vibrator, Water level Sensors.To check the water level,I will use the water level sensor and if the water level crosses the certain limits then the brigades will automatically closed. Detect the vibrations of the bridge I will use the vibration sensor. Some additional feature is: Immediately alert message will be broadcast to: 1. Traffic police, 2.Municipal office. 3.Localized people through IOT.

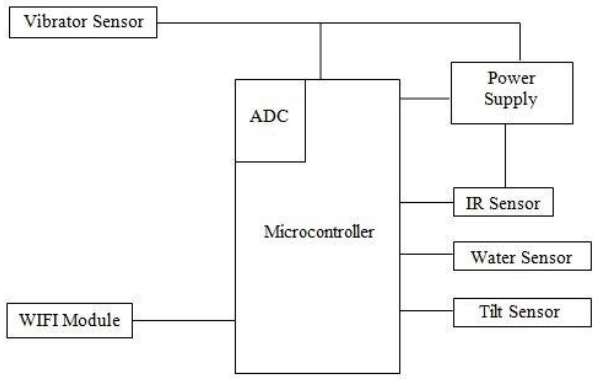

Fig 1: Propose System Block Diagram

Water Level Sensor-A water sensor is a device used in the detection of the water level for various applications.A level sensing device is designed to measure the level of flow substances including liquids, slurries and granular materials.There are also continuous level sensors; however, these sensing modules can only detect the level of flow of a substance with a specific range.

Vibration Sensor- Vibration sensors are sensors for measuring, displaying, and analysing linear velocity, displacement and proximity, or acceleration.

IR Sensor- An infrared sensor is used to sense certain characteristics of its surroundings.It does this by either emitting or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion.

Tilt Sensor-A tilt sensor is used for measuring the tilt in multiple axes of a reference plane.Tilt sensors measure the tilting position with reference to gravity and are used in numerous applications. They enable the easy detection of orientation or inclination.

REFERENCES

[1] Cesar Garita, Giannina Ortiz, "Development of a Business Intelligence Prototype for Bridge Health Monitoring", IEEE International Conference on Information Systems and Computer Science (INCISCOS), 2018.

[2] Amro Al-Radaideh, A. R. Al-Ali, SalwaBheiry, Sameer Alawnah, "A Wireless Sensor Network Monitoring System for Highway Bridges", IEEE 1st International Conference on Electrical and Information Technologies ICEIT,2015.

[3] Christian Lazo, Paulo Gallard, and Sandra C'espedes,"A Bridge Structural Health Monitoring System Supported by the Internet of Things", IEEE COLCOM 2015.

[4] Miss.PoojaKrishnathPatil, Prof.Dr.S.R.Patil, "Structural Health Monitoring system using WSN for bridges", IEEE International Conference on Intelligent Computing and Control Systems ICICCS 2017.

[5] JinLian Lee, Yaw Yauan Tyan, Ming Hui Wen, Yun Wu Wu, “Development of an IoT-based Bridge Safety Monitoring System”, Proceedings of the 2017 IEEE International Conference on Applied System Innovation IEEE-ICASI 2017.

[6] Ittipong Khemapech, Watsawee Sansrimahachai, and ManachaiToahchoodee, “A Real-time Health Monitoring and Warning System for Bridge Structures”, IEEE 2016.