Devlopment of an IOT Based Flood Gate control and alerting people about floods.

Paramesh R[1],Dileep Kumar K S[2],Sameena H S[3]

[1]Associate Professor,
Dept. Of CSE,
Global Academy Of Technology
Bengaluru, VTU,India
[2]AssistantProfessor,
Dept. Of ECE,
Global Academy Of Technology
Bengaluru, VTU,India
[3]AssistantProfessor,
Dept. Of CSE,
Global Academy Of Technology
Bengaluru, VTU,India

Abstract: Conventional visual investigation instruments, which are regularly done every year, can just recognize evident harms like interruption, breaks or rust on the outside of scaffolds. Progressed non-damaging and ruinous assessment devices are normally connected when visual review can't give adequate data. Other than these methods building surveyors can direct geometric disfigurement investigation that gives extra data to harm identification of structures. The execution of suitable strategies for information securing and examination to recognize changes to the material, geometric and dynamic qualities of structures is condensed under the term Structural Health Monitoring (SHM). The basic thought of SHM is to decide a typical conduct of flawless structures and to get subjective ends from changes of this conduct identified with the present wellbeing status. Data about changes inside the dynamic attributes of structures can be identified by applying accelerometers, which are a segment of Ambient Vibration Methods (AVM) as a fundamental piece of SHM. Examination of speeding up estimations can infer common frequencies that rely upon weight, material, anxiety just as the geometry of the article. Thus this information can be utilized to determine extra data about the limit and state of a structure. In this paper we present an estimation framework dependent on minimal effort accelerometers that all things considered performs estimations with high precision. This self-governing operatable gadget includes a memory card space, an inside battery, a waterproof lodging and temperature safe parts. Also continuous information move can be gotten through remote LAN or USB association with a PC. Every single vital advance of information procurement, preparing furthermore, elucidation of vibration checking will be displayed on a commonsense model.

Keywords: Structural Health Monitoring, Ambient Vibration Methods, IOT, Flood Gate Control Distress alarm.

I. INTRODUCTION

The web of Things is that the enlargement of the present Internet services thus on accommodates every and each object that exists during this world or probably to exist within the coming back future. This text discusses the views, challenges, and opportunities behind a future web that totally supports the “things”, furthermore as however the items will facilitate within the style of a additional synergistic future web. Things having identities and virtual personalities operative in sensible areas exploitation intelligent interfaces to attach and communicate at

intervals social, environmental, and user contexts. The worldwide network of interconnected pc networks supported a typical communication protocol, the web suite (TCP/IP) whereas a factor is associate object not exactly placeable. The planet around us is packed with objects, sensible objects and therefore the existing service supplier is understood because the web. The convergence of the sensors like sensible objects, RFID based mostly sensing element networks, and therefore the web provides rise to the web of Things. With the enlarged usage of sensors, the data, furthermore as distributed information, is increasing. Sensible devices area unit currently connected to the web exploitation their communication protocol and unceasingly aggregation and process the information.

Internet of things (IoT) is that the network of physical devices, vehicles, home appliances, and various things embedded with physics, software, sensors, actuators, and network property that allows these objects to connect and exchange information. Every issue is unambiguously identifiable through its embedded computing system but is prepared to inter-operate among the prevailing net infrastructure. IoT describes a system where things at intervals the physical world, and sensors among or attached to those things, are connected to the net via wireless and wired web connections. These sensors will use varied kinds of native space connections like RFID, NFC, Wi-Fi, Bluetooth, and ZigBee. Sensors may have wide space property like GSM, GPRS, 3G, and LTE.

The web of Things will helps us in achieving

- Connect each inanimate and living things.
- Use sensors for knowledge assortment.
- Change what kinds of item communicate over associate degree scientific discipline Network.

Bridges area unit unendingly subjected to damaging effects of cloth aging, widespread corrosion of steel reinforcing bars in concrete structures, corrosion of steel structures and parts, increasing traffic volume and overloading, or simply overall deterioration and aging. These factors, combined with defects of favor and construction and accident, prompt the deterioration of bridges and result in the loss of load-carrying capability of bridges. The condition of heavily used urban bridges is even worse: one in three are classified as aging or unable to accommodate stylish vehicle weights and traffic volume. Therefore, a giant sort of those structures would love strengthening, rehabilitation, or replacement, but public funds do not appear to be generally procurable for the specified replacement of existing structures or construction of latest ones.

Bridges can suffer structural deterioration attributable to aging, misuse or lack of correct maintenance. Among the many factors that have a diode to the dissatisfactory condition of bridge structures, one issue that has been neglected is that the unsatisfactory scrutiny and look of existing structures. the foremost common objectives for look a bridge ar to urge quantitative information concerning the structural behavior therefore on substantiate vogue assumptions and to produce period feedback throughout construction (especially true for complete fresh bridges). Thereby arranging maintenance or repair actions (especially for existing bridges). Within the later, the watching system is employed to extend the security of the structure and supply early warning of associate degree acceleration of the known degradations that are being monitored. There are several bridges in Japan and China that are terribly advanced as compared to the observation systems in Konkan. Thus our aim is to develop a system that's reliable, low cost and additional economical for Indian bridges. This technique won't solely be helpful for the railway bridges however conjointly for the road bridges, footbridges

II RELATED WORK AND EXISTING SYSTEM

A literature survey may be a section that shows the varied analysis and analysis created within the field of your interest and also the results already revealed. it's the foremost vital half it provides the direction within the space of your analysis. Some failures area unit sudden and harmful, and a few failures simply take their time. Structural Health observation (SHM) will be terribly useful in serving as a warning device for preventing each sort of failures. Bridge Engineers would like scientific tools which may provide fast data concerning the health of a bridge. Such instrument shall supplement the periodical manual inspections. However, once failures happen with any quite structure there's loss of human lives, cash and lots of additional, most of the days. For instance, throughout the bridge construction boom of the 1950's and 1960's, very little stress was placed on safety review and maintenance of bridges. This modified 235 foot Silver Bridge at purpose Pleasant, WV, folded into Ohio, on Dec. 15, 1967. Forty six folks were killed. Hence to make sure the security of bridges, the Bridge Health observation System was introduced. a number of the prevailing technologies/methods for Bridge Health observation System area unit as delineate. The paper [1] provides AN IoT-based bridge safety observation system is developed mistreatment ZigBee technology. This technique consists of: (1) observation devices put in within the bridge environment; (2) communication devices connecting the bridge observation devices and also the cloud-based server; (3) a dynamic info that stores bridge condition knowledge; and (4) a cloud-based server that calculates and analyzes data transmitted from the observation devices. This technique will monitor and analyze in real time the conditions of a bridge and its atmosphere, as well as the waters levels near, pipelines, air, and alternative safety conditions. The paper [2] provides data on a technology cited as MBM (Monitoring based Maintenance) that allows the bridge Maintenance engineers to look at the condition of the bridge in a very amount of time. The sensors place in on main cables, hangers, Decks, towers, etc. observe the strain, acceleration, Temperature, and wind. The sensory inputs unit of measurement processed to represent the condition of the bridge against unstable masses and wind masses. The paper [3] provides CONAGUA1 presently monitors stream levels in an automatic fashion on their web site, thence visible for everybody at any region, however particularly for those living close to riverbanks. However, it's famous that observation isn't automatic since a gauge performs this task by mensuration stream stages with a l mm metric rule, then, the information collected area unit captured manually and area unit displayed on the CONAGUAs web site. The paper [4] provides information concerning the investigation of the planning of a water level device that's ready to observe and management the amount of water in an exceedingly bound storage tank or an identical water storage system. The system foremost senses the number of water out there within the tank by the amount detector half then adjusts the state of the pump in accordance with the water level data. This electronic style achieves automation through successive logic enforced employing a flip flop. A seven-phase show and a relay-based motor pump driving circuit area unit a part of this integrated style. The paper [7] gives the information about how a self-governing gadget works.

III The Proposed IOT Based Flood Gate Control

The system collects the info from sensors and therefore the status is collected by the controller and is transferred to the wireless network. This information at the transmitter is shipped to the receiver and is analyzed. Analyzed information is shipped to the management center and an alert message is distributed to the operator mobile variety. The detectors like overload sensor, water Flood detector, and vibration sensors are used as sensing devices. These sensors are going to be chargeable for sensing the load on the bridge, pressure of the water, level of the water rising within the watercourse and vibration of the bridge. The info detected by sensors can get reborn into an electrical signal. The devices that generate output are typically referred to as actuators (sound

buzzer). Each of the detector and mechanism are jointly referred to as an electrical device. The electrical signal can get transmitted to the Arduino. The server can receive information from a microcontroller exploitation GSM, then it'll transfer the info more to the net application employing a servlet. A servlet may be a tiny Java program that runs inside an online server. Servlets receive and answer requests from internet clients, during this manner, the admin can get the info and alert are going to be generated through buzzer and machine barrier on the bridge. If it's necessary then the admin assigns the task to the workers for maintenance.

IV Scope of the work

This work provides a brief overview of bridge condition monitoring schemes. It additionally proposes the employment of wireless communication and web systems technologies as a method of providing remote observance capabilities for structural members or authorities like PWD. However, the employment of those technologies as represented isn't restricted to the employment of those authorities. The initial intent of the analysis wasn't to work out the simplest technology to hold out the project however rather to produce samples of observance procedures and information from a spread of tests that were monitored victimization this idea. Another focus of this study is to produce many completely different observance techniques which will be applied to a structural member to enable it to be monitored throughout its life. These techniques embrace sensors and devices that will offer information associated with water flood, load, and vibration, Image capturing, voice message and detection the situation. The mobile application has been built to alert the remote authority using android. The advantageous product has been implemented, which is economical, reliable and feasible.

V Proposed system architecture

A microcontroller will be thought of a self-contained system with a processor, memory, associate degreed peripherals and might be used as an embedded system. As shown in the Figure 5.1 Liquid crystal display monitors use a combination of a backlight and tiny filters, controlled by an electrical current, to produce images. Shunt DC motors are used in constant speed applications like drilling machine, lathe, and textile machines .Sensors are used to measure physical quantities such as temperature, light, pressure, sound, and humidity. They send signals to the processor. GSM is associate open and digital cellular technology used for transmittal mobile voice and knowledge services operate at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands. In addition to the Internet Protocol (IP), GPRS supports X.25, a packet-based protocol that is used mainly in Europe. GPRS is an evolutionary step toward Enhanced Data GSM Environment (EDGE) and Universal Mobile Telephone Service (UMTS).

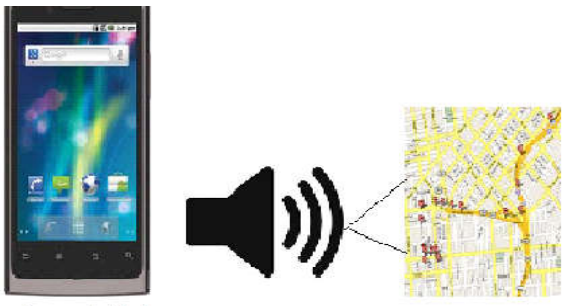

Figure 5.1 Android Receiver Side

VI. Experimental setup

In the experimental setup totally five modules are present, and these modules are

1. Hardware module
2. Software module
3. Water Flood sensor module
4. Vibration sensor module
5. Overload sensor module

Module 1

Module Name: Hardware Module

Functionality: It is responsible for the Monitoring the condition of bridge and for capturing the incident.

Input: The 5V power supply inputs are given.

Output: The message is sent to respective authority.

Algorithm: The hardware required are connected through wireless network through the GSM from which it can be controlled. The main Centre part of the experimental set up is the microcontroller. Here we are using the 8051 based Philips SST 89E516RD2 microcontroller. The 89E516RD2 are 80C51 microcontrollers with 64kB flash and 1024 B of data RAM. The system is faster and has more storage.

Module 2

Module Name: Software Module

Functionality: The Embedded programming language is used and android app is built to control the activities of the hardware.

Input: AT commands is the input.

Output: Voice announcement will be done.

Requirements:

Keil C Compiler
Flash magic
Android sdk

Module 3

Module Name: Water Flood Sensor Module

Functionality: Float Sensor which operates automatically when water level goes up or down with respect to specified level.

Input: The 5V power supply is given.

Output: Gate will be closed accordingly and the message is sent to respective authority.

Algorithm:

Check for possible outcome if not continue the loop.
If yes generate interrupt to MCU and sends data to LCD.
Invoke AT commands to LCD and sends message to PWD department. Voice announcement to be done to the localities.

Module 4

Module Name: Vibrator Sensor Module

Functionality: Vibration Sensor Alarm recognizes movement or vibration.

Input: The 5V power supply is given.

Output: The message is sent to respective authority.

Algorithm:

Check for possible outcome if no continue the loop.
If yes generate interrupt to MCU and sends data to LCD.
Invoke AT commands to LCD and sends message to PWD department. Voice announcement to be done at the localities.

Module 5

Module Name: Overload Sensor Module

Functionality: Load cells are designed to sense force or weight of the vehicle.

Input: The pressure is given.

Output: The gate will be closed.

Algorithm:

Check for possible outcome if no continue the loop.

If yes generate interrupt to MCU and sends data to LCD.

Invoke AT commands to LCD and automatically the gate closes

Steps for Implementation:

The sensors required are all embedded and connected to the microcontroller which is programmed before for its individual functionality. The software is developed in an android development environment and it is installed in the guardian phone. The required data is fed to the system and the action can be made using the android application by the user. The hardware is all installed on board and the connection is provided by the GSM for instant message tracking. The hardware is provided with the power supply and are driven by various kinds of motors. Hardware and software architecture with minimum requirements, which supports an operating system on which Java toolkit and Media player applications can be developed and deployed.

VII Experimental Results

This section describes the obtained results of the experimental setup. The snapshots are shown below for each module .The message from each module will be displayed on the LCD as shown in Figure 7.1

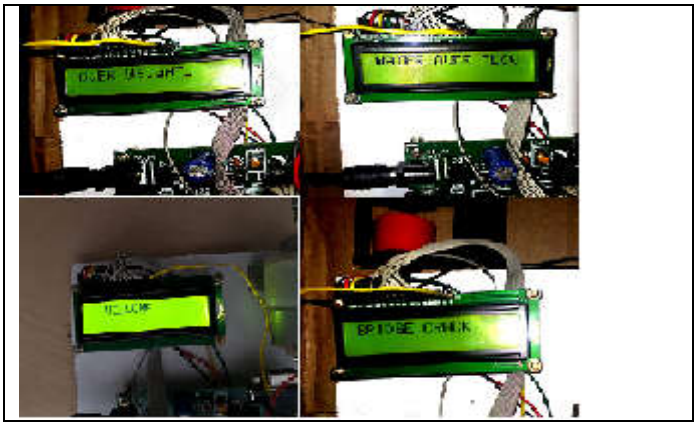

Figure 7.1 shows how data appear information appearing on the screen

The IOT app is developed using android studio through which mail will be sent to the concern authority which is placed near bridge as shown in Figure 7.2.

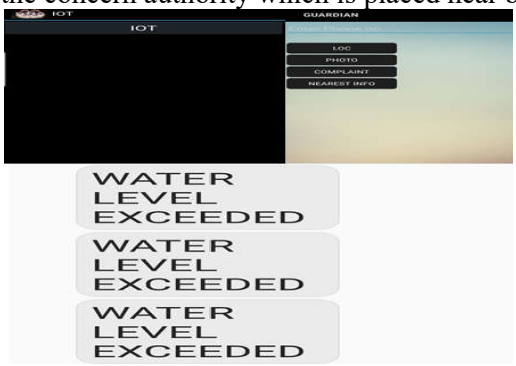

Figure 7.2 shows information appearing on the guardian app

VIII. Conclusion

In this paper, a multi-functional wireless bridge observance system has been developed for coincidental reading of Water Flood device, vibration sensors, and overload sensors. The sensing capabilities of those nodes satisfy the immediate needs for economic, low-maintenance load ratings and short dynamic measurements additionally to providing the hardware practicality for development of a semi-permanent continuous bridge watching system and. in depth laboratory and field testing and development are performed to supply a reliable radio transmission protocol capable of sustaining an oversized variety of nodes with high information output in period of time. The flexibility of this wireless device network to duplicate the performance of cable-based deployments, in terms of a range of sensors and sampling rates to boot as triple-crown data analysis, signals a breakthrough within the wireless device. The IOT technologies are enforced to tell the output of the sensors and this method will save the lives of the many individuals. This method can facilitate to scale back huge disasters in the future.

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