



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 7, July 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.118



9940 572 462



6381 907 438



ijirset@gmail.com



www.ijirset.com

Simulation of IoT Based Structural Damage Detection

Sambhram², Dr.Deekshitha S Nayak¹, Mr.Akshaya Krishna N², Sukanya¹, Sahana Shetty¹,
Krishang Shetty²

Department of Electronics & Communication Engineering, Mangalore Institute of Technology & Engineering,
Karnataka, India¹

Department of Civil Engineering, Mangalore Institute of Technology & Engineering, Karnataka, India²

ABSTRACT: Structural damage detection is the process of evaluation of the structure in order to detect, locate and access the damage. The concept of linking any gadget to the Internet and other linked devices is known as the Internet of Things. The Internet of Items (IoT) is a massive network of interconnected things and people that all collect and share data on how they are utilized and the world around them. This paper focuses on the simulation of IoT based structural damage detection.

KEYWORDS: Internet of things, structural damage detection, proteus.

I. INTRODUCTION

IoT depicts the consents of the residents and belongings that can be linked at any given moment, at any place, with any person, employing some network plus some broadband utility for researching the real-time behaviour of concrete buildings. The IoT is primarily based on the principles of Ambient Intelligence, insidious computing, and ubiquitous computing [1]. Structural damage is a natural part of engineering structures, and it is prone to spreading owing to a variety of environmental and mechanical reasons. Structures age and have a shorter design life as a result of short and long term damages, making the monitoring process a crucial feature for structures. Numerous structural damage diagnosis approaches have been created as a result of significant improvements in information processing techniques [2].

II. RELATED WORK

The majority of Structural Damage Detection (SDD) systems described in the Structural Health Monitoring (SHM) literature are centralized, requiring data to be transferred from all sensors in the network to a single processing unit in order to assess the structural status. These methods have primarily been found to be feasible for wired SHM systems; however, transmission and synchronization of large data volumes in WSNs has proven to be difficult. The Internet of Things (IoT) is a network of smart sensors that combines sensing and transmission of various structure responses to remote computers that process and monitor them in real time [3]. In recent years, the wireless sensor-based inspection methodology has become more widespread. To assess the position and severity of the damage, a variety of vibration and feature-based output-only damage detection approaches are applied [4]. This paper contributes in the application of IoT based structural damage detection using simulation in proteus software

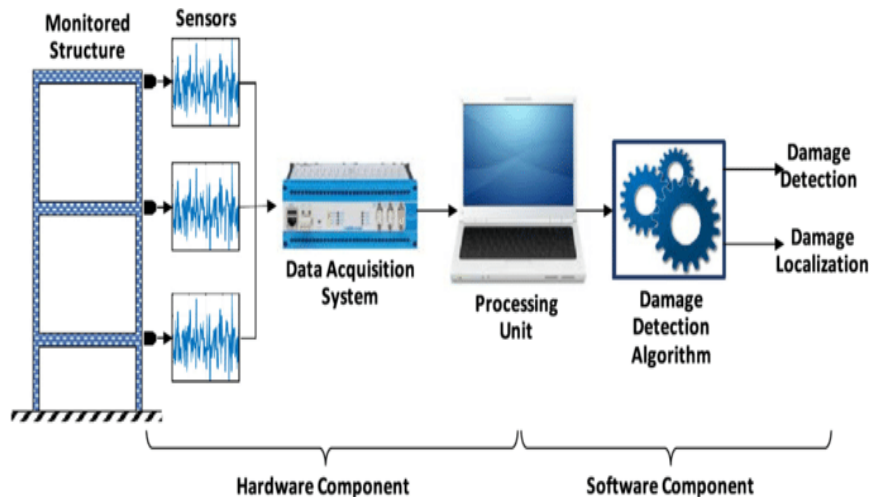


Fig.1: Structural damage detection

III. METHODOLOGY

Software simulation

Proteus Design Suite is utilized to perform the simulation. In Proteus, the microcontroller simulation is accomplished by adding a hex or debug file to the microcontroller portion on the schematic. The device, as well as any analogue and digital devices linked to it, is then co-simulated. This makes it suitable for a wide range of project prototyping applications, including motor control, temperature control, and user interface design. Using this software structural damage detection system is designed.

IV. RESULTS & DISCUSSIONS

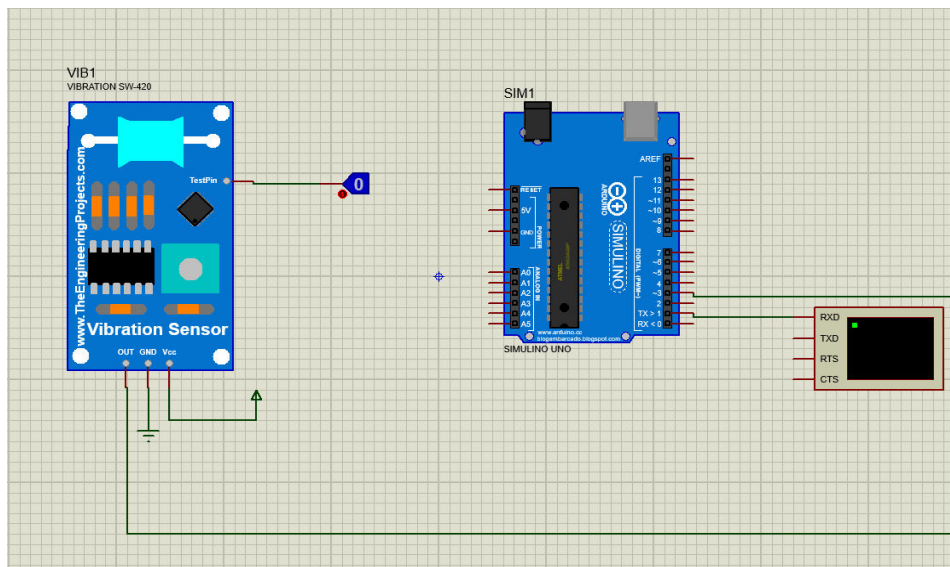


Fig.2: Structural damage detection system

Fig.2 mainly depicts the structural damage detection system in simulation. It mainly consists of a vibration sensor which detects vibration, a microcontroller, a virtual terminal which is mainly used to view the data coming from the serial port and also used to send the data to serial port and a logic toggle which is mainly used to give the input to the sensor. There are two cases that is when there is no damage and when the damage is detected. In the first case,



vibration sensor input value as 0 so here ~~value~~ is not detected therefore virtual terminal displays No Damage. In the second case, vibration sensor input value as 1 so here ~~value~~ is detected therefore virtual terminal displays Damage detected.

V. CONCLUSION

Internet of Things (IoT) has infiltrated numerous factors of human life in recent years, including cities, residences, universities, industrial facilities, organisations, agricultural settings, hospitals, and medical centres. Several characteristics, such as data generation/consumption and online services, improve everyday life and activities in IoT environments around the world. The software implementation of structural damage detection is determined. With the aforementioned concerns in mind, this framework is created to efficiently detect damage in the existing state of structures with cost effective.

REFERENCES

- [1] Biliie F. Spencer, and Jennifer Bridge, “Structural damage detection using smart sensors”, IEEE Proc. of Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems, Vol. 69, pp.12-18, 2014.
- [2] Y.J. Yana, L. Chengb, Z.Y. Wua, and L.H. Yam, “Development in vibration-based structural damage detection technique”, Mechanical Systems and Signal Processing, Vol 21, pp 2198–2211, 2007.
- [3] Scott W. Doebling, Charles R. Farrar, Michael B. Prime, and Daniel W. Shevitz, “Damaged identification and health monitoring of the structural and mechanical systems”, IEEE, Vol 27, 2019.
- [4] Serkan Kiranyaz, Mohammed Hussein, Moncef Gabbouj, and Daniel J. Inman, “A review of vibration-based damage detection in civil structures: From traditional methods to Machine Learning and Deep Learning applications”, Mechanical Systems and Signal Processing, pp.12-28, 2004.



INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor: 8.118



ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



www.ijirset.com

Scan to save the contact details