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Smart System Sensor Network for Building Monitoring

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ABSTRACT

Analyzing the stability of the building is needed in measurement process for all buildings in the Cities Earthquake damage & structural behavior of the building can be monitoring using low power sensor network an applications of wireless sensor networking monitoring and controlling of energy in residential and commercial buildings. In addition to that we are developing fire sensor, gas sensor network to detect and to alert the people who were inside the buildings, alert message to nearby hospitals, ambulances, police stations at the time of emergency cases like earthquake, firing, gas leakage occurring in the building accelerometer, vibration sensors are used to monitor and detect the damages occurred in the building communication is established between transmitter and receiverbasestationis through mobile station.

Key words: Accelerometer sensor, Micro electro mechanical system (MEMS), strain sensor.

I.INTRODUCTION

Now a days due to environmental disorders and man-made hazards building can be subjected to damage during their operational life time due to seismic events, unforeseen foundation settlements at the same time due to material aging, design error are occurred in tall buildings and high-cost buildings and more human lives are lost [4]. This can be avoided by monitoring the buildings periodically and update to the people who wants is the key step to guarantee an adequate level of safety and serviceability to get detailed information about the change in the seismic events [6]. Possibilities outreaching of fire, gas leakage separate equipment is essentially needed and they must install to the buildings here to detect the earthquake accelerometer, detect the possibilities out breaking of fire and gas leakage, fire and gas sensors install the modules [9]. To measure settlement and plastic hinge activation after an earthquake the vibration sensors are used at lowest level of the building.
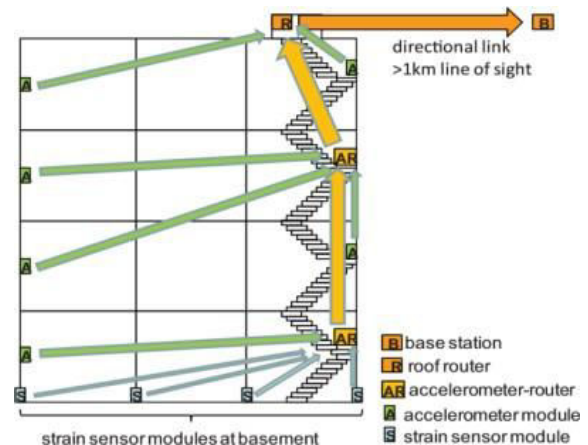

Fig.1.Network Architecture of the Monitoring System.

The microprocessor-based system is built for controlling a function or range of functions and is not designed to be programmed by the enduserin the someway a PC is defined as an embedded system. An embedded system is designed to perform one particular task albeit with different choices and options.

Embedded systems contain processing cores that are either micro controllers or digital signal processors. Micro controllers are generally known as "chip", which may itself be packaged with other micro controllers in a hybrid system of Application Specific Integrated Circuit (ASIC).

An embedded system is a combination of both hardware and software, each embedded system is unique and the hardware is highly specialized in the application domain. Hardware consists of processors, microcontroller, IR sensors etc. On the other hand, Software is just like a brain of the whole embedded system as this consists of the programming languages used which makes hardware

work. As a result, embedded systems programming can be a widely varying experience.

3D accelerometer sensor is placed at each floor of the building to measure horizontal acceleration during an earthquake Fire and gas sensors which are placed in each level of the building to detect the smoke and fire that affect the building. LCDmodulecanbeplacedatthetopofthebuildingtosho wwwarningmessageswhensmoke and fire rises the data from sensor networks is transmit to receiving base station (mobile station) through wirelessly inside the mobile station Main advantage of usingmobileappismoredetailedinformationcouldbeco nveyedfromthestructuralbehavioraswell as the actual condition of the building structure.

2. EXISTING SYSTEM

Nowadaysduetoenvironmentaldisordersandman-madehazardsbuildingcan be subjected to damage during their operational life time due to seismic events,unforeseenfoundationsettlements.Atthesameti meduetomaterialaging,designerror is occurred in tall buildings and high-cost buildings and more human lives are lost.

Existing systems were developed using complete hardware modules like GSM, GPS etc and manual operating system. It is very difficult to carry if the handling system is bulky.

3. PROPOSEDMETHOD

Internet of Things (IoT) is the new model, which comprises a large number of intelligent objects and smart devices that communicate with each other over the internet. In several areas, IoT devices are used that make the daily routine of users easier. Here to detect the earthquake accelerometer and vibration sensor modules are used, to detect the possibilities out breaking of fire and gas leakage, fire and gas sensor modules are installed respectively to measure settlement and plastic hinge activation after an earth quake the vibration sensors are used at lowest level of the building.

3D accelerometer sensor is placed at each floor of the building to measure horizontal acceleration during an earthquake Fire and gas sensors which are placed in each level of the building to detect the smoke and fire that affect the building LCD module can be placed at the top of the building to show warning messages when smoke and fire rises. The data from sensor networks is transmitting to receiving base station (mobile station) through

mobile app wirelessly. Inside the mobile station is inserted. Main advantage of using mobile app is more detailed information could be conveyed from the structural behavior as well as the actual condition of the building structure.
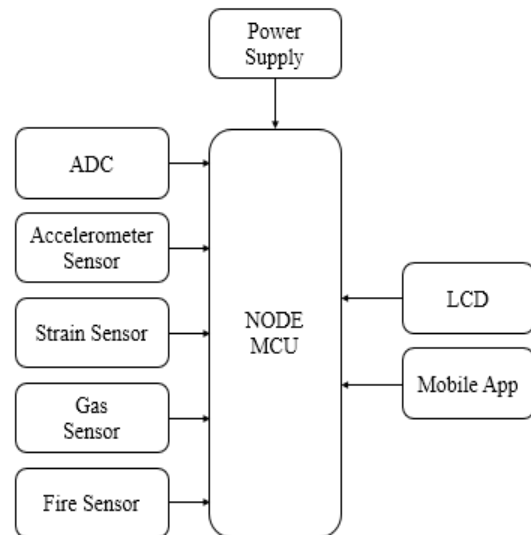

Figure 1: Block diagram of the proposed method

Processing System

A data processing system is a combination of machines, processes and people that for a set of input produces defined set of outputs. The inputs and outputs are interpreted as data, facts, information depending on the interpreter's relation to the system. Node MCU unit is used to process the information coming from the sensor networks and produce the output. Finally this output will be transmitted to the mobile station.

Sensor Architecture

MEMS sensor modules are used to monitor the building structure Rain (vibration) sensing module and acceleration sensing module. The vibration and accelerometer sensor is combining called as MEMS sensor.

A main challenge for the designing of given accelerometer is the sensitivity-bandwidth linearity in all three axes. The data coming out from this sensor is analog in nature, by using ADC; the output of accelerometer is converted into digital and

converted output is passed to microcontroller. The Rain sensor is a longitudinal combination finger capacitor. It operates on the principle that as the foil is subjected to stress, the resistance of the foil changes in a defined way. The module makes use of fire sensor and comparator to detect fire up to a range of 1 meter that Gas sensor can be placed at the each level of the building to measure gas leakage. They are used in gas leakage detecting equipment in family and industry, are suitable for detecting of LPG, natural gas avoids the noise of alcohol and cooking fumes and cigarette smoke.

Wireless System

An efficient and greater awareness of the commercial buildings like hotels, schools, hospitals, industries etc. is needed for the people. The sensor network which can sense the natural calamities occurring in the environment and transmits the data wirelessly to nearby base Mobile Station. Multi-hop network architecture is used in order to form a forceful wireless communication link from all sensor modules including strain sensor, fire and gas sensor. A router module can be placed at the roof of the building to forward the data between the sensor networks and the receiver base station. To improve the vertical floor-to-floor propagation it is necessary to place router close to staircase of the building.

4. SOFTWARE USED:

The software used by the Arduino is Arduino IDE. Arduino IDE is a cross-platform application written in Java, and is derived from the IDE for the Processing programming language and the Wiring project. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and is also capable of compiling and uploading programs to the board with a single click. There is typically no need to edit make files or run programs on command.
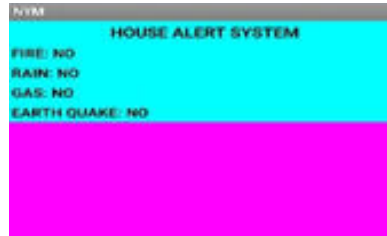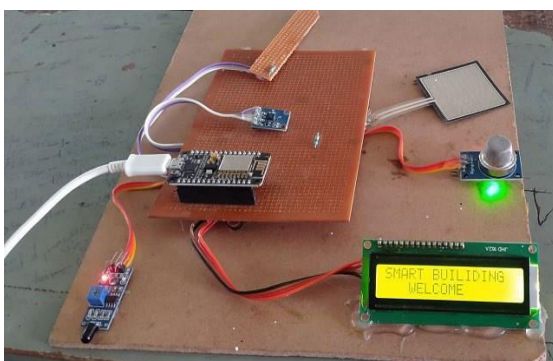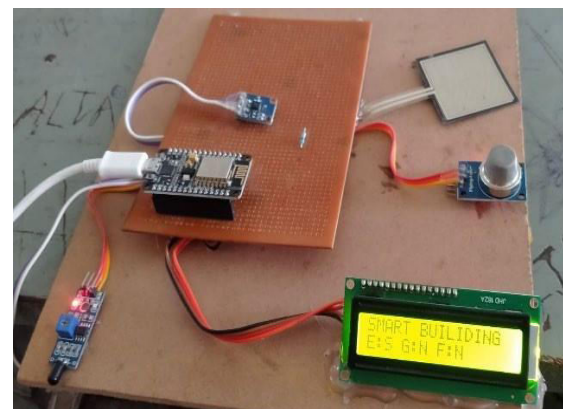
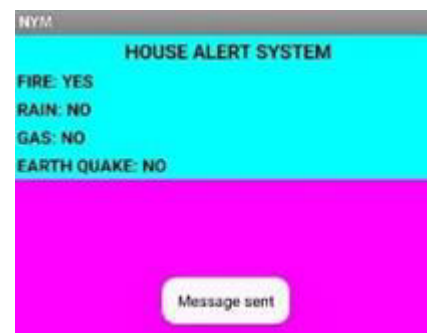## 5. RESULTS

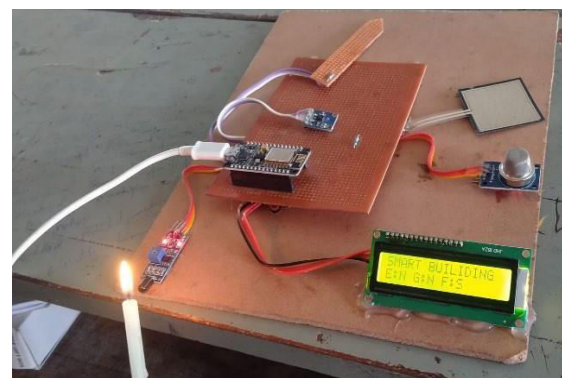Figure: Smart Building Circuit Setup

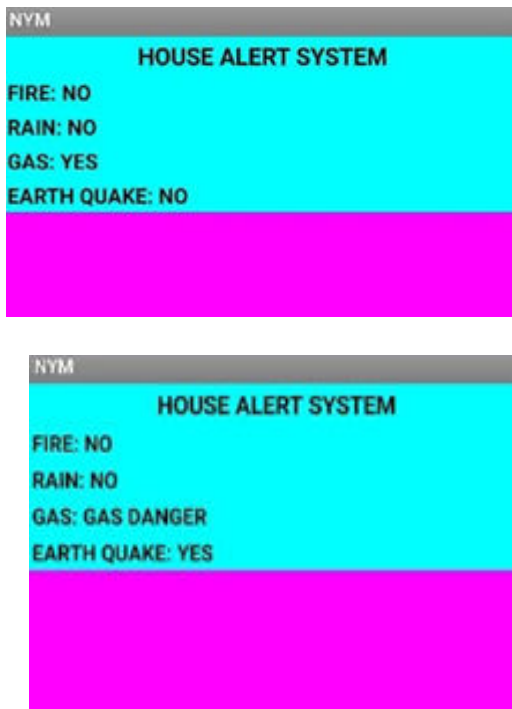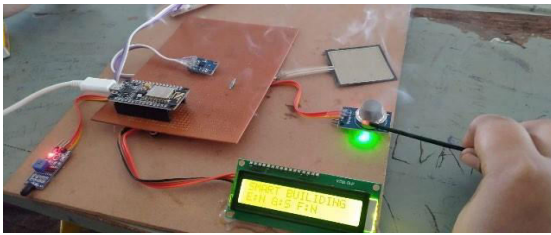
Figure: Setup for Earthquake Sensing

Figure: Setup for Leakage of Gas with Gas Senso

Building monitoring takes advantage of low power enhanced reconfigure ability, more secure data, to realize a solution which offers long battery lifetime and potentially low cost in manufacturing, installation and maintenance, while providing high-quality sensor data at the right time and large number of human lives are saved.

REFERENCES

[1] T.R. Lekhaa, S. Rajeshwari, J. AiswaryaSequeira, S. Akshayaa, "Intelligent shopping cart using bolt esp8266 based on internet of things". 5t International Conference on Advanced Computing &Communication Systems(ICACCS).2019.

[2] Rahul Chaudhari, Sunil Bhagat, ShubhamKanfade, MayuriTaklikar, SnehalBhajikhaye, S. P. Chaware,"Smart trolley in shopping mall". International Journal of Innovations in Engineering and Science, Vol. 3, No.5, 2018.

[3] Prasiddhi K., Dhanashri H. Gawali, "Innovative shopping cart for smart cities". 2nd IEEE International Conference on Recent Trends in Electronics Information & Communication Technology (RTEICT), May 19-20, 2017, India.

[4] Dr.Nookala Venu, "Analysis of Xtrinsic Sense MEMS Sensors" International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE), ISSN:2278-8875 Vol 4, Issue:8, August 2015, PP: 7228-7234.

[5] P. Chandrasekar and T. Sangeetha, "Smart shopping cart with automatic billing system through RFID and Zigbee", Int. Conf. Information Communication and Embedded Systems (ICICES), pp. 1-4, India, Feb.2017.

[6] Dr.Nookala Venu, Dr.A.ArunKumar and Karthik Kumar Vaigandla. Review of Internet of Things (IoT) for Future Generation Wireless Communications. International Journal for Modern Trends in Science and Technology 2022, 8(03), pp. 01-08.

[7] IoT Based Smart Shopping Using radio frequency identification by MobeenShahroz, Muhammad FaheemMushtaq, Maqsood Ahmad, SaleemUllah, ArifMehmood , and Gyu Sang Choi -2020.

[8] Corona virus: Haryana Govt orders shops and offices to remain shut on weekends except the shops selling essential goods published on TIMES NOW NEWS by AmarnathYatra in August 2020.

[9] Dr.Nookala Venu, Karthik Kumar Vaigandla, Dr.A.ArunKumar, "Investigations of Internet of Things (IoT): Technologies, Challenges and Applications in healthcare", International Journal of Research (IJR), ISSN: 2236-6124, Volume XI, Issue II, Feb 2022, PP: 143-153.

[10] How Covid-19 impacts Shopping in day-to-day life-BBC by AnnaRahmanan in July 2020.

[11] How has Covid - 19 pandemic impacted the buying habits of consumers? By Hemanisheth Mumbai-The Hindu sept-2020.

[12] Nagaraj, Naveenprabu, Jagadesh, Mahalakshmi published robust low-cost passive UHF RFID based smart shopping trolley in 2020.

[13] H. Ananda Kumar and K. Umamaheswari, "A bio-inspired swarm intelligence technique for social aware cognitive radio handovers," Computers & Electrical Engineering, vol. 71, pp. 925-937, Oct. 2018.

[14] P.C. Warule, GavhanePratiksha S, GhorpadeRutuja V, Joshi Prasad V, RFID, ZigBee and GSM Based Automatic Billing Trolley for Shopping Mall". International Journal of Research in Advent Technology, Vol.6, No.3, March 2018, E-ISSN: 2321- 9637.

[15] K. Gogila Devi, T.A. Karthik, N. KalaiSelvi, K. Nandhini, S. Priya, "Smart Shopping Trolley Using RFID Based on IoT," International Journal of Innovative Research in Computer and Communication Engineering. Vol. 5, Issue 3, 2017.

[16] IoT application on secure Smart Shopping system by Ruinian Li, Tianyi Song, Nicholas Capurso, Jiguo Yu, Jason Couture, and Xiuzhen Cheng – 2017.

[17] 3S Cart: You-Chiun Wang and Chang-Chen Yang's "Light weight interactive Sensor based cart for smart shopping in super market" in 2016.

[18] S. Sojitral and R. G. Patel, "A Review of Smart Shopping Systems", International Research Journal of Engineering and Technology, vol. 3, no. 5, 2016, pp. 2561-2563.

[19] Karne, RadhaKrishna, and T. K. Sreeja. "ROUTING PROTOCOLS IN VEHICULAR ADHOC NETWORKS (VANETs)." International Journal of Early Childhood 14.03: 2022.

[20] Karne, RadhaKrishna, et al. "Optimization of WSN using Honey Bee Algorithm."

[21] RadhaKrishna Karne, Dr TK. "COINV-Chances and Obstacles Interpretation to Carry new approaches in the VANET Communications." Design Engineering (2021): 10346-10361.

[22] Karne, RadhaKrishna, et al. "Simulation of ACO for Shortest Path Finding Using NS2." (2021): 12866-12873.

[23] RadhaKrishna Karne, Dr TK. "Review On Vanet Architecture And Applications." Turkish Journal of Computer

and Mathematics Education (TURCOMAT) 12.4 (2021): 1745-1749.

[24] Karne, Radha Krishna, et al. "GENETIC ALGORITHM FOR WIRELESS SENSOR NETWORKS."