

EARTHQUAKE DETECTION USING GSM AND MONITORING

¹MERIN GRACE BEN, ²SNEHA THOMAS, ³SHIPHIA PHILIP

Final year B.Tech
Computer Science Department

Abstract— Abstract: Nowadays thousands of people are dying because of earthquake. Because earthquake strikes without warning. So we would like to implement a system which detect earthquake before occurrence. This project is implemented by detecting the vibrations which occurring under the earth. When the values of vibration create a massive variation signal will be sent to the gsm and a real time graph of the earthquake will be plotted too.

I. INTRODUCTION

Nowadays thousands of people suffers a lot from earthquake. It is mainly because earthquake strikes without warning and it cause a great damage to human structures such as buildings, roads, rails, factories, dams, bridges etc, and thus cause heavy damage to human property. The impact created by earthquakes particularly in hilly areas and mountains which are tectonically sensitive causes landslides and debris fall on human settlements and transport system on the lower slope segments, inflicting damage to them. Main defect for the earthquake is that it strikes without warning. So we need to been taken care of it as early as possible. Only way is to avoid the disaster. Our authorities are only considering and bothering the situations and crisis after the occurrence of earthquake. So we need to detect the earthquake before its occurrence. By using sensors, accelerometers and network we can detect the vibrations which occurring under the earth. When the threshold voltage of the system crosses the vibration of the earth the signal will be passing to a central station through GSM.

II. EXPERIMENTAL SETUP

The system contains two modules one input module and a output module. The first module consist of

1. Arduino
2. Accelerometer
3. GSM
4. Wifi module

The MEMS Sensors, having the X and Y coordinates which are used for sensing the movements in all directions, are used to find out the disturbance in all directions. While MEMS observe the movements, it sends a signal to PC. When the signal is detected the buzzer will turn on and inform the common people about the danger and a message will send to the central station through GSM network. In the central station the information will be forwarded to the saved mobile numbers like fire and safety, police station, hospital etc.

GSM

GSM (Global System for Mobile communication) is a digital mobile telephone system that is widely used in many parts of the world. GSM uses a variation of Time Division Multiple Access (TDMA) and is the most widely used of the three digital wireless telephone technologies (TDMA, GSM, and CDMA).

GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. GSM operates in the 900MHz, 1800MHz, or 1900 MHz frequency bands. GSM has been the backbone of the phenomenal success in mobile telecoms over the last decade. Now, at the dawn of the era of true broadband services, GSM continues to evolve to meet new demands. One of GSM's great strengths is its international roaming capability, giving consumers seamless service. This has been a vital driver in growth, with around 300 million. In the Americas, today's 7 million subscribers are set to grow rapidly, with market potential of 500 million in population, due to the introduction of GSM 800, which allows operators using the 800 MHz band to have access to GSM technology too. The mobile communications has become one of the driving forces of the digital revolution. Every day, millions of people are making phone calls by pressing a few buttons. Little is known about how one person's voice reaches the other person's phone that is thousands of miles away. Even less is known about the security measures and protection behind the system. The complexity of the cell phone is increasing as people begin sending text messages and digital pictures to their friends and family. The cell phone is slowly turning into a handheld computer. All the features and advancements in cell phone technology require a backbone to support it. The system has to provide security and the capability for growth to accommodate future enhancements. General System for Mobile Communications, GSM, is one of the many solutions out there. GSM has been dubbed the "Wireless Revolution" and it doesn't take much to realize why GSM provides a secure and confidential method of communication.

MEMS

Micro-Electro-Mechanical Systems (MEMS) is the integration of mechanical elements, sensors, actuators, and electronics on a common silicon substrate through micro fabrication technology. While the electronics are fabricated using integrated circuit (IC) process sequences (e.g., CMOS, Bipolar, or BICMOS processes), the micromechanical components are fabricated using compatible "micromachining" processes that selectively etch away parts of the silicon wafer or add new structural layers to form

the mechanical and electromechanical devices. MEMS promises to revolutionize nearly every product category by bringing together silicon-based microelectronics with micromachining technology, making possible the realization of complete systems-on-a-chip. MEMS is an enabling technology allowing the development of smart products, augmenting the computational ability of microelectronics with the perception and control capabilities of micro sensors and micro actuators and expanding the space of possible designs and applications. Microelectronic integrated circuits can be thought of as the “brains” of a system and MEMS augments this decision-making capability with “eyes” and “arms”, to allow micro systems to sense and control the environment. Sensors gather information from the environment through measuring mechanical, thermal, biological, chemical, optical, and magnetic phenomena. The electronics then process the information derived from the sensors and through some decision making capability direct the actuators to respond by moving, positioning, regulating, pumping, and filtering, thereby controlling the environment for some desired outcome or purpose. Because MEMS devices are manufactured using batch fabrication techniques similar to those used for integrated circuits, unprecedented levels of functionality, reliability, and sophistication can be placed on a small silicon chip at a relatively low cost.

III. TECHNOLOGY DESCRIPTION

HARDWARE-Components

1. MEMS
2. GSM
3. Micro controller
4. Accelerometer

The softwares used are :

Embedded c
Php

IV. CONCLUSION

The real time system designed for the detection of earthquake. This system is developed using ATmega328 microcontroller. The main components used in this system are sensors, GSM and wifi module. In the proposed project, various types of real time conditions are tested. This project can be also useful to the scientists for their studies on earthquakes using the graphs plotted and future conditions.

REFERENCES

- [1].http://ioc3.unesco.org/itic/files/itsu20_doc711.pdf
- [2].http://en.wikipedia.org/wiki/Tsunami_warning_system.
- [3].http://ioc3.unesco.org/itic/files/itsu20_doc711.pdf
- [4].way2students.com/wpcontent/uploads/2010/08/TSUNAM.doc.
- [5]. http://www.nti.org/e_research/e3_9a.html.
- [6].<http://www.iris.edu/news/newsletter/vol7no2/> pag