

# REAL TIME MONITORING FOR LANDSLIDE USING GSM

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## ABSTRACT

*This paper seeks to reduce and prevent the damage of landslides, landslide monitoring is very important to the prediction and estimation of the landslide hazard and prevention. This system is composed of seismic and PIR vibration sensors and the alert is transmitted to the remote people via GSM infrastructure. Landslides are geological phenomena causing significant loss of life and loss of properties in damages each year in many countries. Therefore technology has to be developed to capture relevant signals with minimum monitoring delay. This project design to detect landslides, which includes the development and implementation for real time monitoring*

*Index Terms -PIR sensor, vibration sensor, GSM, Landslide monitoring system, alert message*

## I. INTRODUCTION

Landslides are one of the worst geological hazards the causes of landslides are mainly to due to intense rainfall or earthquake. A landslide is largely unpredictable and occurs within short spans of time, which can cause great property losses and casualties. Therefore landslide monitoring and warning are imperative to save lives and reduce damage. A landslide is a event where part of earth slips down a steep surface. Although there are many remote sensing techniques for landslide investigation.

Ramesh et al.[1], Real-time Wireless Sensor Network for Landslide Detection and this paper discusses the development of a wireless sensor network(WSN) to detect landslides, which includes the design, development and of a WSN for real time monitoring, the development of the algorithms needed that will enable efficient data collection and data aggregation. Rose et al. [2], Landslide Monitoring with Sensor Networks: Experiences and

Lessons Learnt from a Real-World Deployment this paper presents an autonomous landslide monitoring system based on wireless sensor networks. Self-contained, autonomous software programs (“software agents”) are embedded into the wireless sensor nodes. In cooperation with each other, the software agents are continuously collecting and analyzing sensor data, such as recorded ground acceleration and the orientations of the sensor nodes along the slope. Giorgetti et al.[3], A robust wireless sensor network for landslide detection presented a WSN designed for landslide monitoring and risk analysis.

The main objective of this paper is to detect the landslide and to inform the people who are living nearest to the landslide prone area. This system is designed to measures the underground movements and movements of objects such as humans, animals, vehicles etc., It is very useful for the people those who are living in a prone area by giving the alert message. This decreases the great property losses and

casualties . due to availing the alert message the people gets alert and saves their life from that disaster.

To achieve this, it is important to collect, store, manipulate, display and analyze a data with fast handling and effectively .the data are collected by sensors and it is transmitted by the GSM through the UART protocol which is placed in various places in the landslide prone area.

### OVER VIEW OF PROPOSED SYSTEM

In traditional monitoring system methods which is based on geological sensors , rain gauges, accelerometer, tilt sensors, pore pressure sensors, dielectric moisture sensors, geophones ,etc.

This system has been implemented using AT89S52 Microcontroller which consist of 40 pins, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory.

This Kind of monitoring system exist problem with forecast accuracy and error .this system overcomes by using geological sensor ,PIR sensor with GSM. The seismic sensor senses the underground movement when it reaches above the threshold point .PIR Detects if there are moving object in the landslide prone area. if it is detected it sends the message Landslide Detected.

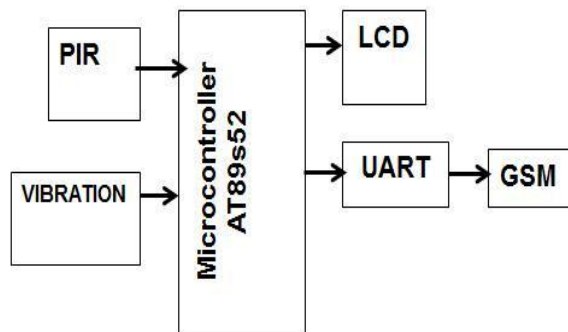


Fig1.Block diagram of proposed landslide monitoring

### CONSTRUCTION AND WORKING PRINCIPLE

The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the Indus-try-standard 80C51 instruction set and pin out.

A vibration sensor is a device that uses the piezoelectric effect to measure pressure, acceleration, strain or force by converting them to an electrical signal. A **Passive Infrared sensor (PIR sensor)** is an electronic device that measures infrared (IR) light radiating from objects in its field of view. PIR sensors are often used in the construction of PIR-based motion detectors (see below). Apparent motion is detected when an infrared source with other, such as a human, passes in front of an infrared source with another temperature, such as a wall

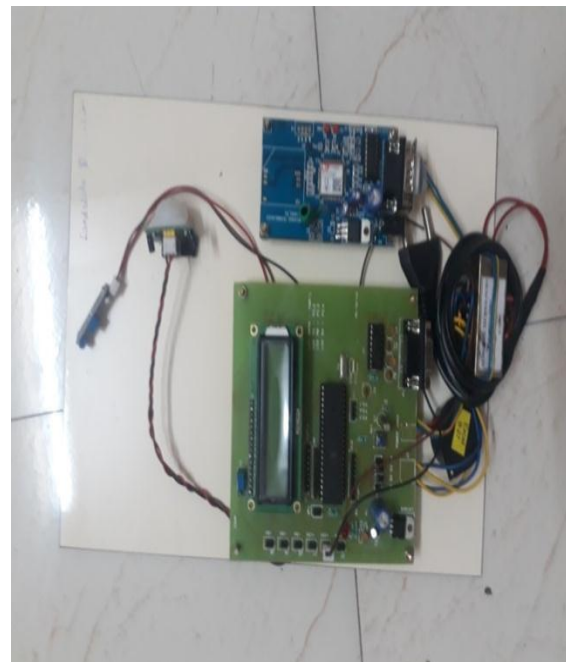


Fig2.Experimental setup of landslide monitorin

LCD is used for monitoring purpose with three pins. pin1 is for VSS Ground, pin2 is for VDD power 5v, pin3 is for VEE LCD contrast adjustment. an LCD properly before the character we need, has to be displayed. For this a number of commands have to be provided to the LCD before inputting the required data. The commands will be discussed in the later part of this tutorial.

LCD doesn't know about the content (data or commands) supplied to its data bus. It is the user who has to specify whether the content at its data pins are data or commands. For this, if a command is inputted then a particular combination of 0s and 1s has to be applied to the Control lines so as to specify it is a Command on the other hand if a data is inputted at the data lines then another combination of 0s and 1s has to be applied to the control lines to specify it is data.

**Call control :**

**Table1.commands of call control**

Command	Description
ATA	Answer command
ATD	Dial command
ATH	Hang up call
ATL	Monitor speaker loudness
ATM	Monitor speaker mode
ATO	Go on-line
ATP	Set pulse dial as default
ATT	Set tone dial as default
AT+CSTA	Select type of address
AT+CRC	Cellular result codes

**SOFTWARE REQUIREMENTS**

**8051- C51 C Compiler**

The Keil C51 C Compiler for the 8051 microcontroller is the most popular 8051 C compiler in the world. It provides more features than any other 8051 C compiler available today. The C51 Compiler allows you to write 8051 microcontroller applications in C that, once compiled, have the efficiency and speed of assembly language. Language extensions in the C51 Compiler give you full access to all resources of the 8051.

The C51 Compiler translates C source files into reloadable object modules which contain full symbolic information for debugging with the µVision Debugger or an in-circuit emulator. In addition to the object file, the compiler generates a listing file which may optionally include symbol table and cross reference information.

**FEATURES**

Nine basic data types, including 32-bit IEEE floating-point, Flexible variable allocation whit, data, b data, i data, x data, and p data memory types, Interrupt functions may be written in C, Full use of the 8051 register banks, Complete symbol and type information for source-level debugging Use of AJMP and ACALL instructions Bit-addressable data objects, Built-in interface for the RTX51 Real-Time Kernel, Support for dual data pointers on Atmel, AMD, Cypress, Dallas Semiconductor, Infineon, Philips, and Transcend microcontrollers,

Support for the Philips 8xC750, 8xC751, and 8xC752 limited instruction sets, Support for the Infineon 80C517 arithmetic unit.

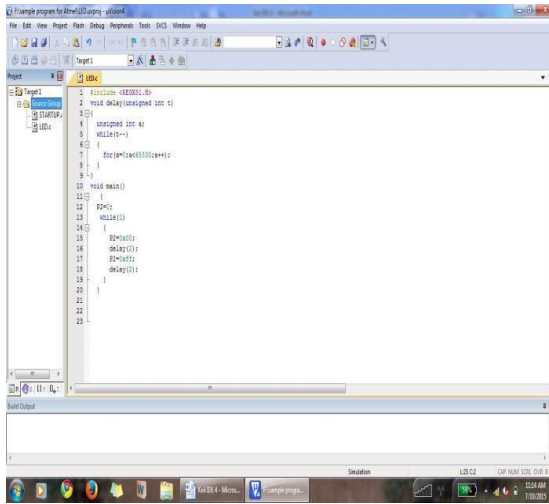


FIG3.KEIL software preview

## EXPERIMENTAL RESULTS

The monitoring of landslides is done by using LCD. The values of PIR and Vibration sensor it reads by micro controller and it is sent the message LANDSLIDE DETECTED to the people through message who are living the prone area.

When the start button is pressed the program starts to work from the first stage . It is continuous loop program if its is necessity in charging the operation the Restart button can be send.

The value of ground movements which ranges from the 10Hz to 100 Hz . If anomaly is detected that is if it reaches above the threshold value which is fixed it starts to detect LCD shows PIR=1, Vib = 0 that is the detection of landslide and object moving.

## CONCLUSION

The monitoring of landslides is done by using LCD. The values of PIR and Vibration sensor it reads by micro controller and it is sent the message LANDSLIDE DETECTED to the people through message who are living the prone area.

Finally our system which detects the Landslide and sent to the nearest people and also with object detection .

Which can extended with detecting the landslide before affecting the landslide before affecting and sending Message to all the people who are living in the prone area.

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