

INTELLEAGENT RAILWAY TRANSPORT SYSTEM USING MICRO-CONTROLLER

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ABSTRACT

The system designed is used to prevent accidents due to land slide, earthquake, flood. It can be most efficient in areas like Konkan Railways or we can use it at the places like Malin, Pune. where a big disaster took place in last year due to mountainslide. So such accidents can be prevented along railway line or in any other places. There appear frequently natural phenomena such as collapse, landslide along the railway line, which badly threaten the transport safety of the railway. This system adopts the method of auto-monitoring, and the monitoring content is the earth's surface deformation. At the front, through high-accuracy displacement sensor, the deformation signals of the dangerous mountains can be acquired, then data collection is carried out at the regular intervals, using the GPRS wireless communication technology, and the real-time monitoring and pre-alarm for dangerous mountains can be achieved. This method is simple, convenient and penetrating, with lower-cost and higher-accuracy. This system can be used along the railway line or in any other places where chances of earthquake or landslide is high.

1.INTRODUCTION

Our country is one of the gravest countries in the world which have most serious geological disaster. Day by day the geological disaster gets worse, and endangers people's lives and property directly, affects the sustainable development of our society's economy. There appears frequently some natural phenomena such as the mountain collapse, mountain slide and so on along the line of railway, which badly threaten the traffic and transport safety of the railway. The slide and collapse can destroy the line, prevent the train from running, endanger the station, smash the station house up; destroy the railroad bridge and other facilities, cut off the tunnel, destroy the bright cave, and bring about the traffic accidents with turning over the train and people's death. Railroad is one of projects which suffer the most serious and frequent collapse and slide. According to annual land and resources of our country gazette, in 2003, it happens more than 20 times of all kinds of geological disasters including collapse, slide, mud-rock flow, and karst collapse, and so on, which relate to twelve main-railroads lines, and interrupt drives for more than 500 hours in total, and the direct economic losses is up to more than 500,000,000 yuan. Therefore, to build a set of perfect and reliable system for monitoring and pre-alarm in long-range and real-time along railroad lines with dangerous mountains has extremely important significance. This system adopts high-accuracy displacement sensor such as laser sensor to monitor and alarm for abrupt collapse, and can monitor the horizontal and vertical displacement of the mountain, through which it can be acquired that the situations such as sedimentation, displacement and abrupt collapse of the mountain, flood detection, track sliding and through the wireless network the related data can be transported to the monitor centre. Through low filtering, A/D conversion, it is made into digital signal, which then is transmitted by GPRS to the monitoring centre, so that the staff can know about trends of mountain timely. The core problem of this system is that the output signals of high-accuracy sensor have certain extent reduces after low filtering, which decreases the measure accuracy of the system, therefore it is greatly important to make error analysis of receiving terminal signals. Under laboratory condition, two parallel baffles are

fixed in the machine tool, the distance of which should be in the monitoring range of the sensor fixed in one end. For example, taking one millimeter as unit, change the displacement and observe the output signals, finally the error is rectified through comparing the measure voltages with actual voltages.

2.REAL TIME MONITORING AND PRE-ALARM SYSTEM

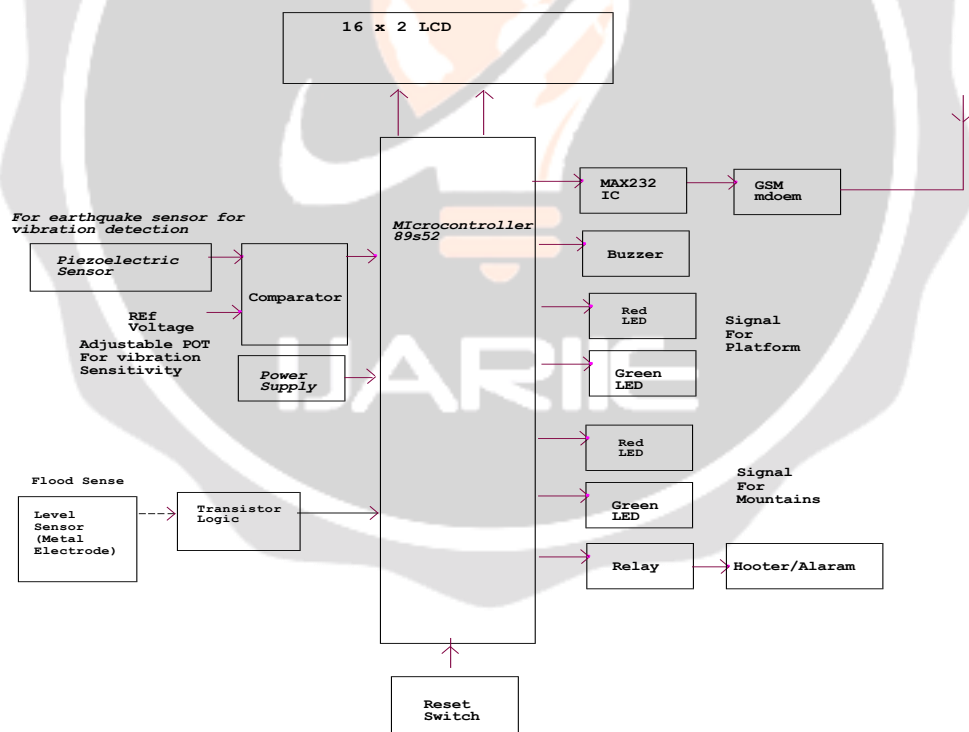
2.1.Microcontroller- In this project we have used a microcontroller 89S52.Which is the heart of the project. This controls all the functions of project which will monitor the Landslide and earthquake.

2.2.Piezoelectric Sensor- This sensor is mainly used for sensing Vibration sensor. Piezoelectric sensor based on the piezoelectric effect it converts vibrations or mechanical signal into electrical signal. With the help of this sensor we will identify where the land slide is occurred or not.

2.3.Comparator- The main function of this block is to Compare between the two thing.Comparator compare the input voltage with reference voltage and produces the output connected to the microcontroller. Comparator block is mainly used when we have to compare.

2.4.Max 232- The Max 232 is used to adjust voltage level between GSM model and microcontroller. This IC also transmit and receive the data from Controller and GSM modem.

2.5.Buzzer- Buzzer is mainly used for indication purpose. with the help of buzzer we can indicate that the Landslide is occurred. Buzzer converts electrical signal into sound.



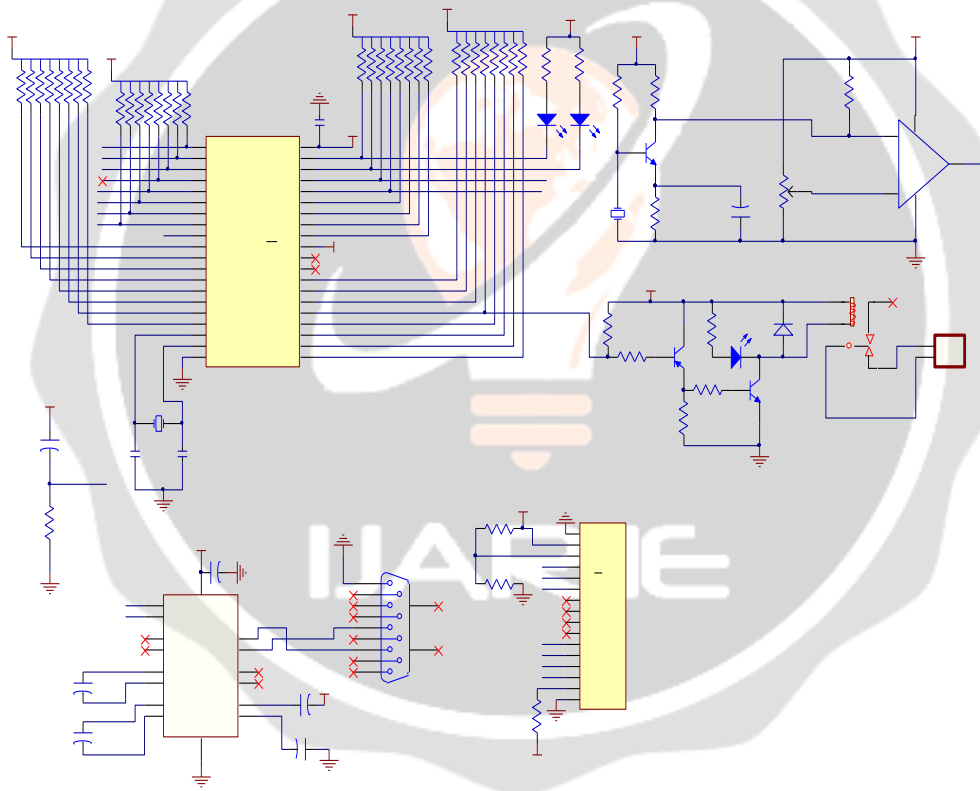
2.6.LCD Display- LCD 16x2 display is used to display the Status of the Present condition. .It has 1/16 duty cycle. It works on +5v supply and also on +3v.

2.7. LM7805- It is a 3-terminal 1A positive voltage regulator. This device can be used with external components to obtain variable voltage and current.

2.8.Power Supply- It is used to supply the power to Max232 and microcontroller, LCD, etc.

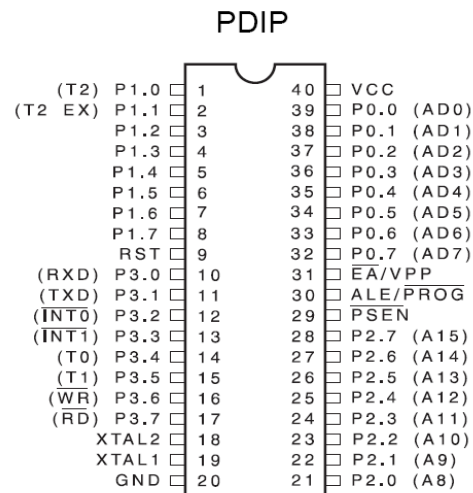
3.WORKING

The system is Eco Friendly System. This system is mainly designed to identify the Land slide, earthquake, track break down & flood detection. So the Damage happens due to those will be avoid. The working of project is very simple, but very useful this system will help to avoid the harm caused due to landslide. In this a piezoelectric and power sensor are used to sense the earthquake, or a vibration after sensing the earthquake they will send the signal to the controller and controller will send the signal to the hooter and it will turn on automatically and signal will change from green to red. And after that microcontroller 89S52 will send the command with the help of Max232to GSM be but at max 232 data will be converted to GSM readable format and then it will pass to the GSM and then it will send alert SMS to the driver to stop train. And one SMS is sent to the ticket room and station. Then they will show on LCD that landslide is happen so the passenger should not buy ticket. Similar working will happen in case of flood detection. The signal will be given by the system so the accident will be prevented.



4.MICROCONTROLLER 89S52

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O



lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation Down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and Interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

5.GPRS COMMUNICATION

Based on the IP address of the packet data communication networks, the real-time data transmission won't be affected when there are masses of modules of GPRS terminal connected to the center of monitor, because the stability and reliability of data transmission are ensured by the application of the whole process TCP connection between the wireless terminal of GPRS and the monitor center in which the mainframe computer is configured to a fixed IP addresses through which all the GPRS wireless terminals connect to the mainframe computer. The GPRS wireless terminals communicate with the base station Of the GSM which is different from the circuit switched data calling. The packets of GPRS are transmitted from the base station of GSM to the SGSN of GPRS, and then to the GGSN for certain process before the packets are submitted to the internet. After internet routing, the IP packets with base station address are received by GGSN and then forward to SGSN and again forward to the base station and finally transmitted to the GPRS wireless terminal the mainframe computer.

6.CONCLUSION

This system can realize the monitoring for signal Points in dangerous region. The core is accuracy of high accuracy survey. Under laboratory condition, by measuring for many times, large amount of data are analyzed and processed and the high-accuracy measurement with error in 0.5% can realize. Taking full advantages of modern electronics, communications, computer and network technology can be resolved that the dangerous mountain can endanger the safety of railway transport. In the part of communications, computer network is used to realize data communications between the remote monitoring and monitoring and management centre, and embedded system is used to achieve GPRS network access to ensure communication. The system, with low cost, high-precision monitoring and strong degree of automation, can greatly reduce the railway traffic hazards caused by the mountain collapse and landslides and flood, when installed along the railway line.

7.ACKNOWLEDGEMENT

We would like to take this opportunity to express our profound gratitude and deep regard to our Prof.S.S.Kadlag, for his exemplary guidance, valuable feedback and constant encouragement throughout the duration of the project. His valuable suggestions were of immense help throughout our project work. His perceptive criticism kept us working to make this project in a much better way. Working under him was an extremely knowledgeable experience for us.

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