

AUTOMATIC RAILWAY PRE-ANNOUNCING SYSTEM WITH WIRELESS COMMUNICATION

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I 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. 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. At present, the methods used for solid monitoring are mainly some traditional monitoring methods, which exist problems of low degree of automation and poor efficiency in common; since imported high-accuracy gauging device whose price is so expensive that it is unsuitable for long-time observation in field scene, and harmful for extension to popularize. Specifically for the current situation of landslide monitoring along the railroad in our country, it is suggested that we should study and develop a set of "Real-time monitoring and pre-alarm system for dangerous mountains along the railway line". 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, and through the wireless network the related data can be transported to the monitor centre. Based on some factors, for example the related mathematic model, meteorological and geological information, the forecast can be made for the mountain displacement and the landslide, and the purpose of monitoring and pre-alarm of long-range and real-time can be arrived at. This system has the merits of low-cost, high-accuracy of monitoring, and strong degree of automation, and it can reduce the damages greatly of the landslide and collapse for the railroad transport when be installed and used along the railroad line.

II INTRODUCTION OF COMPONENT

2.1 Power supply unit

This section needs two voltages viz., +12 V & +5 V, as working voltages. Hence specially designed power supply is constructed to get regulated power supplies.

2.2 ARM processor

ARM is computer processor based RISC architecture. A RISC-based computer design approach means ARM processors require significantly fewer transistors than typical processors in average computers. This approach reduces costs, heat and power use. The low power consumption of ARM processors has made them very popular: The ARM architecture (32-bit) is the most widely used architecture in mobile devices, and most popular 32-bit one in embedded systems.

ARM processor features include:

- Load/store architecture.
- An orthogonal instruction set.
- Mostly single-cycle execution.
- A 16x32-bit register
- Enhanced power-saving design.

2.3 IR TX & IR RX

IR transmitter and receiver are used to detect the traffic density of 2 lanes. In each lane we are using 3 sections such as 60%, 90% and 120% of traffic has be detecting with the help of IrTx and IrRx of both the lanes. Here the function of IrTx is used to transmitted the ir signals and ir receiver is used to receive the ir signals which is transmitted by Tx and the o/p of ir goes high and relay will be in the deactivate mode. If any obstacle is detected in between IrTx and Ir Rx the Ir Rx output goes low and relay gets activated and indicates the traffic density.

2.4 RF transmitter

This is 2-channel Radio Frequency Transmitter specially tuned with its RF Receiver part in carrier frequency. Each zone are set with one channel and transmits their presence to moving vehicle's RF Receiver unit.

2.5 RF receiver

This is also a 2-channel RF Receiver specially tuned with its counter part RF Transmitter in carrier frequency. When vehicle enters into any zone that zones RF signals are received by this unit. Thus depend upon the channel signals it receives from transmitting end that channel output of RF Receiver goes HIGH. This HIGH signal is fed to ARM7 chip through Buffer & Driver and Switching stage for further processing.

2.6 Variable power supply

A very good designed circuit of a regulated stable adjustable power supply using IC LM317T. LM317T is a very famous IC and easily available in the market comes with 3 pins, supporting input voltage is from 3 volt to

40 volt DC and delivers a stable output between 1.25 volt to 37 volt DC. It is a very high performance IC contains a built in current limiter, built in thermal overload protection & safe area protection.

2.7 Buffers

Buffers do not affect the logical state of a digital signal (i.e. a logic 1 input results in a logic 1 output whereas logic 0 input results in a logic 0 output). Buffers are normally used to provide extra current drive at the output but can also be used to regularize the logic present at an interface.

2.8 Drivers

This section is used to drive the relay where the output is complement of input which is applied to the drive but current will be amplified.

2.9 Relays

It is a electromagnetic device which is used to drive the load connected across the relay and the o/p of relay can be connected to controller or load for further processing.

2.10 Indicator

This stage provides visual indication of which relay is actuated and deactivated, by glowing respective LED or Buzzer.

III SYSTEM & METHODOLOGY

In the above shown block diagram the system works based on the sensors it is implemented using ARM controller which is the heart of the proposed system. When train is travelling in the mountain areas we can't judge where is dangerous areas so this system is implemented in order to reduce such situations when the train will be near to mountains or obstacles the IR sensors gets activated and it sends signal to arm gradually the ARM controller reduces the speed of the train along with according to signals the speed of the train may be varied.

IV ADVANTAGES

1. This system does not create any harm to passengers.
2. It is simple to design.
3. This application is very useful in any place or area.
4. This application is easy to install and easy to operate.
5. Manpower can be saved.
6. More reliable than manual Operation.

V DISADVANTAGES

1. One time investment of cost.

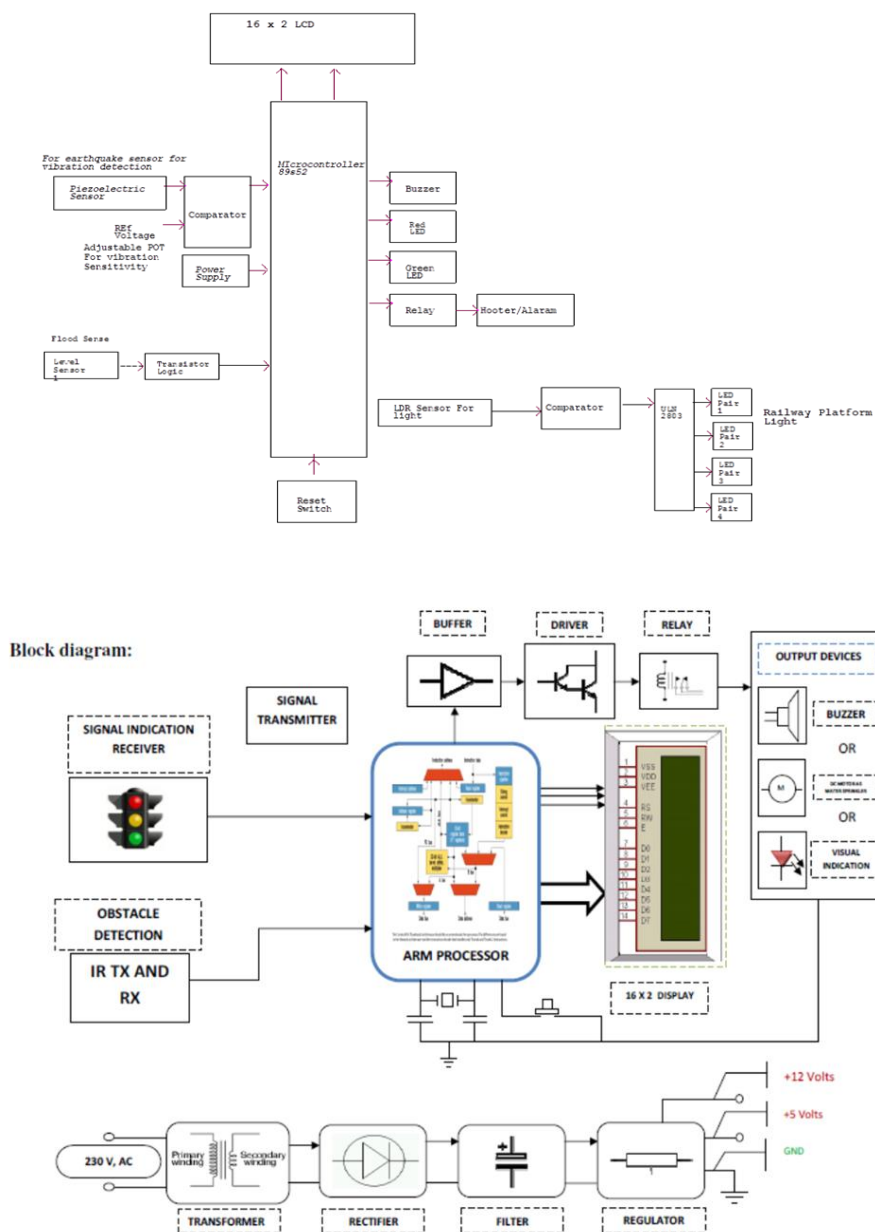
VI APPLICATIONS

1. Vehicle tracking system.
2. Fuel tracking system.
3. Patient Monitoring System.
4. Bio-Feedback control of robotics and applications.
5. Alert SMS.

VII FUTURE SCOPE

We Can use Internet of Things & GSM in our project

VIII BLOCK DIAGRAM EXPLANATION





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