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FLASH FLOOD INTIMATION OVER GSM NETWORK TO THE STATION MASTER

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Abstract- The main objective of this paper is to detect rising water level in a river before the railway track at a reasonable distance from the rail track and intimate that to the nearest station master through GSM, to detain train movement. A programmable Microcontroller of 8051 family is interfaced with a water level sensor. Sensor will send an interrupt to the microcontroller indicating that it has crossed the danger point. So whenever there is an occurrence of such flood the sensor sends a logic signal to the microcontroller that is programmed in such a way that it will send an alert stored SMS through RS232 protocol to the SIM mounted GSM modem to the station master's mobile number to detain train movement and to avoid accidents. An LCD display is also made to indicate the status. The power supply consists of a step down transformer 230/12V. This is converted to DC using a Bridge rectifier and it is then regulated to +5V using a voltage regulator 7805/7812 which is required for the operation of the microcontroller, GSM modem and other components.

Keywords:- Atmel89S52,Max 232C, Level sensor, gsm, voltage regulator ,lcd

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INTRODUCTION

The global climate change during the first half of the twentieth century has brought a tremendous impact on the high mountainous glacial environment. Due to faster rate of ice and snow melting, possibly caused by the global warming, the sea level is increasing rapidly and resulting in sudden discharge of large volume of water and debris causing flooding of the low lying areas. With this ever increasing regularity of flood damage a definite need has emerged for an early warning for regions deemed to be at high risk from flooding. Furthermore, the high level of damage to properties and loss of live are the underlying factor in the development an early warning system Flood level monitoring system.

2. OVERVIEW:-

In this proposed work a water sensing arrangement is made which is interfaced to a programmable microcontroller. During flash flood conditions if the device senses a rise in water level beyond a danger mark at a considerable distance from railway tracks, it will alert the station master via SMS. Hence, train services of that route can be detained to prevent accidents. An LCD display is also attached to indicate the status.

Fig. 1: PCB

3.   INTRODUCTION TO COMPONENTS:-

3.1 MAX 232C:

The MAX232 is an integrated circuit first created in 1987 by Maxim Integrated Products that converts signals from a TIA-232 (RS-232) serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.
The drivers provide TIA-232 voltage level outputs (approx. ± 7.5 volts) from a single five volt supply via on-chip charge pumps and external capacitors. This makes it useful for implementing TIA-232 in devices that otherwise do not need any other voltages.
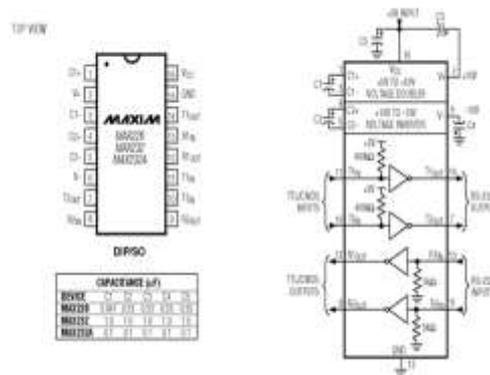
Fig. 2: max232c

3.2 GSM modem:-

GSM (Global System for Mobile) / GPRS TTL-Modem is SIM900 Quad-band GSM / GPRS device, works on frequencies 850 MHZ, 900 MHZ, 1800 MHZ and 1900 MHZ. It is very compact in size and easy to use as plug in GSM Modem. The Modem is designed with 3V3 and 5VDC TTLinterfacing circuitry, which allows User to directly interface with 5V Microcontrollers as well as 3V3 Microcontrollers.

Fig. 3: GSM Model

3.3 ATMEL89S52:

The AT89S52 is a low-power, h igh performance CMOS 8- bit microcontroller with 8K bytes of in-system programmab le Flash memo ry. The device is manufactured using Atmel's high -density nonvolatile memo ry technology and is compatible with the industry standard 80C51 and 80C52 instruction set and pin out. The on-chip Flash allows the program memo ry to be reprogrammed in-system or by a conventional nonvolatile memo ry programmer. By co mbin ing a versatile 8-bit CPU with in-system programmable Flash ona monolithic chip, the At mel AT89S52 is a powerful micro- controller wh ich provides a highly-flexible and cost-effective solution to many embedded control applications.

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Fig. 4: ATMEL89S52

Features of the microcontroller:

- It is a 8-b it microcontroller.
- Fully Static Operat ion: 0 Hz to 33 M Hz
- 256 x 8-bit Internal RAM.
- Th ree 16-bit Timer/Counters.

3.4 LCD display:-

LCD (Liquid Crystal Display) screen is an electronic display module and find a swide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

Fig. 5: Liquid Crystal Display

4. OBJECTIVE AND WORK – FLOW:-

The objectives of the proposed work are:
•Study of gsm technology.
•Study of working and interfacing of GSM module.
•Study of 8051 microcontroller programming using embedded C.
•To learn about the basic of eagle software.
•Implementation of the required circuit on the PCB.
•Testing of the project.
The work – flow model for the project is –
•Literature review of GSM technology . GSM module 8051 programming and with basic designing.
•To further carry on with designing.
•Programming of the microcontroller and interfacing of the devices along with testing of the circuit on PCB.
•Finalizing the project work accompanied with the aim of successful testing of the project and completion of the project report.

5. SOFTWARE REQUIREMENTS:-

Keil an ARM Company makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, evaluation boards, and emulators for ARM7/ARM9/Cortex-M3, XC16x/C16x/ST10, 251, and 8051 MCU families.
Compilers are programs used to convert a High Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors.
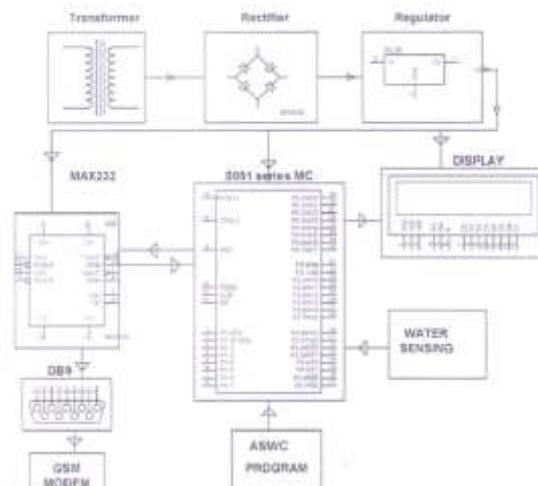
6. BLOCK DIAGRAM:-

Fig. 6 Block diagram Of flash flood intimation system
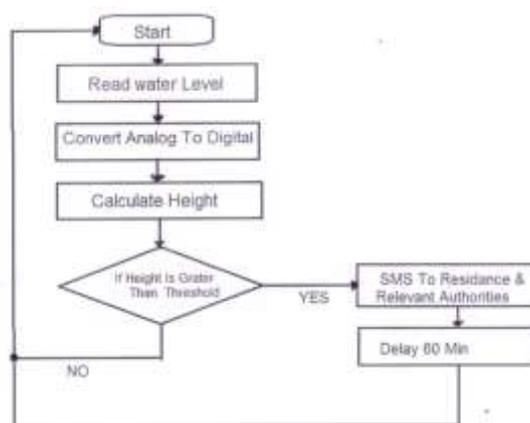
7. FLOW CHART:-

Fig. 7 flowchart of system works

The system reads the water level through the water level sensing device and by converting the analog signal to digital it calculates the height is greater than the threshold defined by the designer the system sends the SMS to the concerned authorities regarding the rise in the water level. The system further keeps on checking the level of the water and provides an efficient notification

8. WORKING OF PROJECT:-

Flash flood intimation for GSM Network Consist of the Rectifier and filter circuit which gives an pulsating DC voltage. The output of filter circuit gives to the regulator. The working of regulator to gives a ripple free output pure DC voltage. It also consists of GSM modem

which connected to the microcontroller 8051. When the water level sensor gives an instruction or sends the signal to microcontroller 8051. It gives the signal to GSM modem. The GSM modem is a type of modem which has a SIM card socket. It fully works on GSM .i.e. Global service for mobile when the GSM modem generates a massage signal then it send to the mobile.

The flood intimation level indicator in interface with the microcontroller GSM modem send a signal to station master the station master gives that signal to train driver to stop the train in same time. In GSM modem the SMS system is used in it the |GSM modem SEND a massage to mobile and the mobile show that massage on the display. LCD display used to generate a massage which send by GSM modem on mobile.

9. ADVANTAGES:-

- Immediate warning provided by the GSM system as compared to satellite monitoring.
- Cheap operation cost provided through use of SMS service.
- Rapid growth of mobile industry.
- Availability of mobile to nearly every household or locality.
- Ability to inform the authorities directly without any middleman being involved.

10. FUTURE SCOPE:-

The future scope of this project can be adding a very special feature of changing the stored phone number according to the user requirement. This can be achieved by interfacing an EEPROM along with a keypad to the microcontroller for storing the desired contact number.

11. CONCLUSION:-

The proposed flash flood detection system automatically detects the water level of river without any human intervention. Railway accidents can be avoided and minimized if we use sence kind of Automated system. This project avoid accident those takes place because of floods.

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