Low Cost Embedded Based Flood Detection and Warning System

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Abstract: ***Current problem in developing countries is flood which is more dangerous and harmful to human beings. When flood occurs transmitter unit detects flood levels such as safe, medium and risk. In medium and risk situation different alert siren signals. Warning communities of the incoming flood provides an effective solution to this by giving people sufficient time to evacuate and protect themselves and their property. The cost of the project is very low and effective method for real time applications.***

Keywords: ***Encoder and Decoder Unit, Float sensor, Microcontroller, RF Transmitter, RF Receiver***

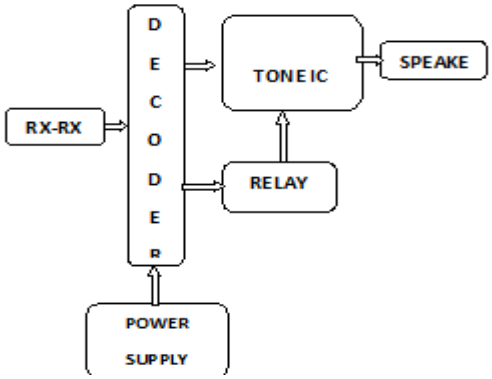
I. INTRODUCTION

Due to rapid climate change in recent decades, an increase in the severity of flood-related damages is observed. This causes serious destruction to residential properties and it also threatens public safety, particularly residents in the coastal regions or in the areas with heavy rainfalls. Our project solve this problem by implementing a flood detection. Although several commercial flood warning systems are currently available, many of them are either expensive or unable to identify multiple water levels. In this system we will connect float sensor at different levels in river bank. RF Transmitter connected with microcontroller via Encoder. Flooding situations are detected by float sensors with are placed distinctly in the water ways. When flood occurs transmitter unit detects flood level encoded and transmitted using RF Transmitter.

II. BLOCK DIAGRAM

A.transmitter

The RF Receiver with decoder is placed in river bank to alert people early in order to evacuate bank in emergency. But controller only runs on +5V, so regulated by regulator IC7805 to provides +5V.It is used to microcontroller, LCD, RF Module.



B.receiver

III. BLOCK DIAGRAM DESCRIPTION

In Transmitter LCD is operated in 4-bit Mode in which data pins RS, EN, D4, D5, D6 and D7 are connected to PIC16F877A Microcontroller RC0, RC1, RC4, RC6 and RC7 pins of PORTC respectively. Digital Input Float Sensor -1 and 2 are to PORTB. HTI2E Encoder inputs AD8 and AD9 are connected to PORTB Receiver decoder AD8 connected to SEL1 pin of UM3561 sound generator IC AD9 is connected to relay driver in order to control power for UM3561 sound generator.

When flood level rises to float sensor – 1 it is detected by microcontroller medium flood level which triggers AD8 and AD9 pin of HTI2E encoder, triggered data is
encoded and transmitted using RF transmitter. RF Receiver receives transmitted signal and decoded by HT12D decoder, AD8 triggers SEL1 pin of UM3561 sound generator IC and AD9 is to trigger the relay switch ON UM3561 to produce fire engine siren sound to alert people that medium flood level is detected in distant water way. When both float – 1 and 2 sensors are triggered transmitters senses that Risk of flooding about to arise, it triggers only RF
Transmitter only AD9 pin of HT12E encoder, triggered data is encoded and transmitted using RF Transmitter. RF Receiver receives transmitted signal and detected by HT12D decoder. AD9 is trigger the relay to switch ON UM3561 to produce police siren sound to alert people that High risk flood level is detected in distant water way to alert people early in order to evacuate bank in emergency

A. Pic16f877a microcontroller

It is a microcontroller with the maximum operating speed of 20MHz and 40 pin IC. It has inbuilt A/D converter and PWM module. The conversion of A/D converter output is a 10 bit digital number. It has five PORTS on it starting from PORTA –PORTE. the frequency range 4MHZ to 40 MHZ.

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PIC16F887A has eight interrupt source in it. External interrupt, timer interrupt, PORTB state charge. Parallel slave port, Read/ Write, A/D converter, Serial receive /Transmit, PWM EEPROM write operation. Interrupts are associated with below five Register INTCON, PIE1, PIR1, PIE2, and PIR2.

B. Float sensor

There are different types of float sensor are available in market but in this project we used vertical reed float switches. Reed float switches are some of the most prevalent level sensors in common use. Reed switches open or close an electrical circuit based on certain external conditions; in a float switch, this means liquid levels. Reed float switches usually hang vertically in the liquid medium, and come in either "normally open" or "normally closed" position. Both features a glass reed contained within the float, with two metal prongs that open or close the circuit depending on whether or not they are touching. Magnets outside the glass reed rise and fall with the position of float, Connecting or disconnecting the metal prongs as needed.

Normally closed float switches features a completed electrical circuit when the device is in its prone position. Rising liquid levels move the magnets such that the connection is served and the electrical circuit disrupted. This can be useful in application like emergency tank shutoffs. In normally open switches, the magnets bring the metal prone together to complete the electrical circuit, activating any attached electronics.

C. *C*.RF module

In many project we use RF modules for transmit and receive the data because it has high volume of applications then IR. RF signal travel in the transmitter and receiver even when ther is an obstruction. It operates at a specific frequency of 433MHz. operating voltage 5v. low power consumption. RF transmitter receives serial data and transmits to the receiver through an antenna which is connected to the transmitter. The transmitter consists of three pin namely Vcc, din and ground. The input voltage from 3v to 12v. The transmitter consumes a minimum current of 9mA and can go as high as 40Ma during transmission. This signal is then modulated using the ASK and then sent on air at a frequency of 433MHz. The speed at which it can transmit data is around 10Kbps.

IV. RESULT

In this paper we found the result that to observed severity of flood-related damages. External interrupt, timer interrupt, PORTB state charge. Parallel slave port, Read/ Write, A/D converter, Serial receive /Transmit, PWM EEPROM write operation. The transmitter consumes a minimum current of 9mA and can go as high as 40Ma during transmission. We found many methods for finding to avoid these damages. Float sensor and RF module etc.

V. CONCLUSION

The flood detection and warning system has been successfully designed and implemented. The prototype is tested in river environment to check the effectiveness of the system. This system successfully indicates the percentage of the low level of water, it produces ambulance sound. Next whenever the water level is raised from low level, generate the fire alarm.it is boon for the society.

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