WIRELESS DISASTER INFORMATION SYSTEM

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ABSTRACT

In times of huge disaster such as earthquake, information needs increase among victims and rescuers. Social ferment rises within afflicted area and the damage is spread, if the needs of information are not satisfied. In this research we developed an information system for disaster victims as a distributed autonomous system u sing a wireless network. This system consists of many sub systems. These sub systems are robust for collecting disaster information because they are small and simple. An authorized user can register information using one of the sub systems that is working correctly. Asynchronously, they search another sub system via wireless network, and then they communicate to each other in order to exchange information they have. As a result, the information will be shared within a wide area by those processes like a bucket brigade.

Keywords: 8051 Microcontroller, Sensor, IC, Op-Amp, LCD , DISW

I .INTRODUCTION

We are going to present advance Tsunami Warning System which helps minimize loss of life and property. We are using PIEZO electric vibration sensor to sense earth quake and its intensity. Due to earth quake the water height in Sea increases so we are sensing sea water level. These two sensors will be placed at least 20 km from the sea coast. The reading from these two sensor is transmitted using 433 Mhz FM transmitter to the coastal area. The FM receiver receives the transmitted data and AT89C52 process the data. We are using LCD to display the earth quake and the increased water level. If water level increased from the certain value, meaning tsunami is coming so buzzer starts beeping. Previous statistics show the initial tsunami wave from the 1700 event reached the coast in 20 to 30 minutes. So time is limited. Geologic history showed waves with this event were as high as 30 feet. So you must get at least that high above sea level. Tectonic earthquakes are a particular kind of earthquake that are associated with the Earth's crustal deformation; when these earthquakes occur beneath the sea, the water above the deformed area is displaced from its equilibrium position

Our project has multiple features which includes.

- Earth quake warning system
- Tsunami warning system
- Flood warning system
- Fire warning

II. 8051 MICROCONTROLLER

The microcontroller is the heart of the proposed embedded system. It constantly monitors the digitized parameters of the various sensors and verifies them with the predefined threshold values and checks if any corrective action is to be taken for the condition at that instant of time. In case such a situation arises, it activates the actuators to perform a controlled operation.

III. SENSORS

A. TEMPERATURE SENSOR

(LM35DZ) can measure from 0°C to 100°C. However, the output is 0V at 2°C. Therefore, the voltage of minus is required in order to measure 0°C. Since the minus power supply is not used with this equipment, the measurable temperature is above 2°C. The output of a sensor goes up by 10mV for every 0°C. The output voltage in 32°C is 300mV.

The output voltage of a sensor is amplified by an operational amplifier, and is inputted into the base of transistor .The temperature sensitivity adjusting the gain of an operational amplifier by VR.

So in the normal mode when temperature is below 60C the output or LM358 is not sufficient to drive transistor BC 548. When temperature raise above 60C the output of LM358 is about 3V which is sufficient to drive transistor thus microcontroller get positive voltage.

B. LEVEL SENSOR WATER

This sensor is based on the fact that water is not pure water which is nonconductor, but it is impure which is slightly conductor.

Water sensor is nothing but a series of very close PCB tracks. In normal mode these tracks are not conducting, but when some water fall on these tracks these line slightly start conducting and some positive voltage is available at the base of transistor so NPN transistor is on and NPN transistor provide a negative voltage as a pulse to the microcontroller.

C. PIEZO SENSOR

The PIEZO electric vibration sensor is used to sense earth quake. We use IC LM358 as a main component. Pin no 8 is connected to the positive supply. Pin no 4 is connected to the negative voltage. One capacitor is grounded from the pin no 3 for noise cancellation. Output is available on the pin no 1. Sensor is connected to the pin no 3. In case of high intensity of vibration, LM 358 gives 5v.

D. INTEGRATED CIRCUIT

Integrated circuits were made possible by experimental discoveries which showed that semiconductor devices could perform the functions of vacuum tubes, and by mid-20th-century technology advancements in semiconductor device fabrication. There are two main advantages of ICs over discrete circuits: cost and performance. Cost is low because the chips, with all their components, are printed as a unit by photolithography and not constructed a transistor.

E. DISW

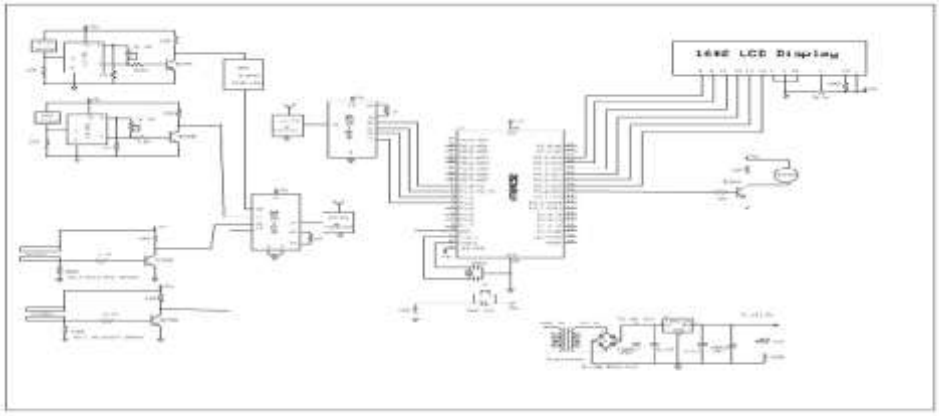

Figure 1.

IV. APPLICATIONS

Natural disasters such as earthquake, tsunami, typhoon and hurricane in addition to annual disaster have frequently happened at many places around the world. Once disaster happened, communication network and information system are seriously damaged and communication means for residents cannot be used in the disaster area. Therefore, it is required to prepare emergency network system which can be quickly reconstructed to recover from the network failure and used to confirm resident's safety and damaged area information. In this paper, a ballooned wireless ADHOC network is proposed to promptly insure communication means to grasp the information with disaster area, resident's safety and relief goods on the occurrence of disaster. By combining multiple ballooned wireless network nodes, a large ADHOC network is organized in the sky on the disaster area and can cover shelters or interrupted communication area as urgent communication means. The system configuration and its function are described. A prototype system is constructed to evaluate its function and performance through several disaster applications such as wide area disaster information and sharing system (WIDIS), VoIP, and omnidirectional video surveillance system.

V. FUTURE SCOPE

Instant disaster information collection for remotely mountainous area using

- UAV: Unmanned Aerial Vehicle
- SAR: Synthetic Aperture Radar
- MVLAN: Multi-hop Mobile Virtual LAN
- Sensor network

A Governmental Computing Cloud Project for disaster Management has been announced recently. To fully take advantage of it, following tasks should be done:

- Establishing real-time information updating and sharing mechanisms

- Working with the NGIS program,
- Developing Web Processing Service (WPS),
- Joining international cooperation projects.

In addition to computer/telecommunications hardware and software, information flow should be examined and improved. In particular, bi-directional

- Emergency information exchange and check mechanism should be built up.
- Human factors should be further studied and
- Elaborated. Communications and interpretations mong researchers, governmental officers, NGOs, NPOs, local communities, and general citizens, should be greatly improved.
- The disaster management information system should be gradually upgraded to a real decision support system, where more intelligent reasoning and prediction models should be installed together

VI.CONCLUSION

Tectonic earthquakes are a particular kind of earthquake that are associated with the Earth's crustal deformation; when these earthquakes occur beneath the sea, the water above the deformed area is displaced from its equilibrium position More specifically, a tsunami can be generated when thrust faults associated with convergent or destructive plate boundaries move abruptly, resulting in water displacement, owing to the vertical component of movement involved. Movement on normal faults will also cause displacement of the seabed, but the size of the largest of such events is normally too small to give rise to a significant tsunami.

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