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On Time Assist For Victim Trapped In Collapsed Building Enhanced With IOT Technology

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Abstract: In recent times, casualties are occuring frequently in building construction work. The aim of the project is to detect and save the victims trapped in the building where the disaster is occurred. Piezoelectric plate is the vibration sensing device which is used in this project to sense the vibration from the trapped person. The vibration signal sensed from the trapped person is received by the ARMLPC2148A processor and send the data to the collecting unit by using IOT technology where the rescue team are alerted by the collecting unit. The details about the victims trapped under debris are updated in the database to indentify the people who are alive and the information about the location is received continuously.

Keywords: Collapsed Building, Piezoelectric plate, ARMLPC2148A, IOT technology

I. INTRODUCTION

The victims trapped under debris building are detected and rescued by the rescue team. In the existing system the piezoelectric plate will sense the vibration from the victims and send the data to the microcontroller where the signal is converted into digital signal by ADC pin in the processor. The system consist of detecting unit and data collecting unit. The signal is given to the wireless transmission (RFM) through Serial Peripheral Interface (SPI). The RFID reader will give the information about worker whether they are IN or OUT. The problem in the existing method is if the victim is beyond the range of communication then the rescue team cannot save the person. The information can be send with in the range.RFM transmitter and receiver will increase the size of the hardware and cost of implementation is also increased.

II. PROPOSED METHOD

In the proposed method the victims trapped in the collapsed building are detected and the data is collected by the data collecting unit. By proper processing of these data, the status of the victims are under debris can be easily detected by the rescue team.

2.1 Block Diagram

The detecting unit and the data collecting unit are involved in the system. The piezoelectric plate is a vibration sensing device which is tied up in the victim hand. If the signal is sensed by the plate then the victim is alive. The output from the plate is send to the preamplifier which amplifies the signal where the signal is in millivolts. Amplified signal is send to the ADC pin of the ARMLPC2148A processor where the analog signal is converted into digital signal. Location of the trapped victim is identified by Global Positioning System (GPS). This is the operation performed in data detecting unit. Data from the detecting unit is transmitted to the collecting unit via WI-FI. The data received from the detecting unit is updated continuously in the database of the system. The advantage of the proposed method over the existing method is, a separate RFID reader is not required to identify whether the person is IN or OUT because the data about the workers will be uploaded in the system with an unique ID number of the device which is tied up in the workers hand. The simulation tool used in the project is PROTEUS 7.0 which is a perfect tool to test the design before developing a real system. The data collecting unit is shown below.

2.2 ARMLPC2148A

LPC2148 is the widely used IC from ARM-7 family. It is manufactured by Philips and it is preloaded with many

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inbuilt peripherals making it more efficient and reliable option for the beginners as well as high end application developer. The features of controllers are as follows On-chip static RAM and Flash program memory are 8 to 40KB and 32 to 512KB respectively.128 bit wide interface enables high speed 60 MHz operation.

In-System/In-Application programming (ISP/IAP) through on-chip boot-loader software. Single flash sector is 400ms and programming of 256 bytes in 1ms. Two 32-bit timers/external event counters, PWM unit and Watchdog timer. In addition, the LPC2148 provides 8KB of on-chip RAM accessible to USB by DMA. It is a 10-bit ADC provides a total of 6/14 analog inputs, with conversion times as low as 2.44 us per channel. It is one of the widely used microcontroller family in embedded system application.

2.3 Piezoelectric Plate

A piezoelectric plate is a device that uses the piezoelectric effect, to measure charges in pressure, temperature, acceleration by converting them to an electric charge. It is found in useful application, such as the production and detection of sound, generation of high voltages, electronic frequency generation. The working is normally, the charges in a piezoelectric crystal are exactly balanced, even if they are not symmetrically arranged. The effects of the charges exactly cancel out, leaving no net charge on the crystal faces. Now the effects of the charges no longer cancel one another out and net positive and negative charges appear on opposite crystal faces. By squeezing the crystal, a produced voltage across its opposite faces and that's piezoelectricity.

III. SOFTWARE PROFILE

3.1 Simulation Tool:

Proteus 7.0 is a Virtual System Modelling (VSM). It combines animated components, circuit simulation and microprocessor models to co-simulate the complete microcontroller based designs. Before constructing a physical prototype in real time this is the perfect tool for engineers to test their microcontroller designs.

3.2 CCS compiler:

A compiler is a computer program (or set of programs) that transforms source code written in a programming language (the source language) into another computer language (the target language, often having a binary form known as object code).The most common reason for wanting to transform source code is to create an executable program. Built in libraries that work with all chips for RS232 serial I/O, I2C, discrete I/O and precision delays. Integrates with MPLAB IDE and other simulators and editors for source level debugging. Standard HEX file and debug files ensure compatibility with all programmers. Formatted print allows easy formatting and display in HEX or decimal. Efficient function implementation allows call trees deeper than the hardware stack. Source code drivers included for LCD modules, keypads, 24xx and 94xx serial EEPROM's, X10, DS1302 and NJU6355 real time clocks, Dallas touch memory devices, DS2223 and PCF8570 serial SRAM, LTC1298 and PCF8591 A/D converters, temperature sensors, digital pots, I/O expander and much more. Access to hardware features from easy to use C functions, timers, A/D, EEPROM, SSP, PSP, USB, I2C and more. 1, 8, 16 and 32 bit integer types and 32 bit floating point. Assembly code may be inserted anywhere in the source and may reference C variables. Automatic linking handles multiple code pages. Inline functions supported to save stack space; Linker will automatically determine the best architecture or it can be manually specified. Compiler directives determine if tristate registers are refreshed on every I/O or if the I/O is as fast as possible.

3.3 Embedded C programming language

Machine Code, Low level language, i.e., assembly, High level language like C, C++, Java, Ada, etc, Application level language like Visual Basic, scripts, Access, etc. Embedded systems programming is different from developing applications on a desktop computers. Key characteristics of an embedded system, when compared to PCs, are as follows: Embedded devices have resource constraints(limited ROM, limited RAM, limited stack space, less processing power)• Components used in embedded system and PCs are different; embedded systems typically uses smaller, less power consuming components. Embedded systems are more tied to the hardware. Two salient features of Embedded Programming are code speed and code size. Code speed is governed by the processing power, timing constraints, whereas code size is governed by available program memory and use of programming language. Goal of embedded system programming is to get maximum features in minimum space and minimum time.

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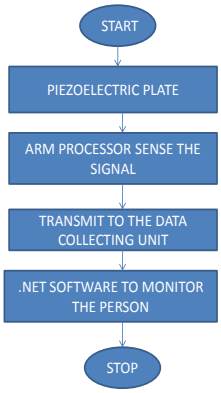
IV. FLOWCHART



V. CONCLUSION

It is a new sensitive life detection system using piezoelectric plate for locating human beings under collapsed buildings. The proposed system can remotely detect the vibration of human beings trapped survivors under collapsed buildings. By proper processing of these data, the status of the person under trap can easily judged. . In Our project aim is to save the human from the disaster. In this project we use Piezoelectric plate , it sense the vibration created by trapped person in disaster area so the ARM connected is to collect the data and sent the data to the Data colleting unit by using Wi-Fi. Then the Data collect unit alerts the Rescue team.

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