iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** III **Month of publication:** March 2018

DOI: http://doi.org/10.22214/ijraset.2018.3743

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue III, March 2018- Available at www.ijraset.com

Cardio Respiratory Based Bio-med Sensor for Human Detection and Localization

Kavitha.V. P[1], Kiranya. G. S[2], Kirthana. R[3], Rajeshwari. R[4]
[1,2] *Electronics and Communication Engineering, Velammal Engineering College(India)*

Abstract - Accidents and traumas are the most frequent causes of health impairments among firemen, determined by the nature of their occupation. A firefighter who was left paralyzed in a freak accident will not have secure system to protect him. Their work is directly related with the exposure to harmful fire and physical factors. Thus, the accident rate was 70.3. These accidents were responsible for the period of work disability three times higher (293.5 days/100 workers) than eight times higher (770.2 days/100 workers) in the 50-59 age groups. According to recent survey about 40% people in that job are died due to accident and sudden paralysis. Here, we implement the system to rescue the fireman. In fired building, the fireman will have the wearable device embedded with heart rate monitoring system. The heart rate of the fireman is monitored and it is alerted. The location can be mapped and the fireman location can be detected. The wireless voice communication is enhanced between the fireman and rescue crew. Here, the heart rate is monitored and it will updated on the mobile, so that crew can view the heart rate and the crew team will have the mobile Application in which they can communicate with the fireman through voice using wireless technology. The system is advanced and both monitoring and alerted can be done.
Keywords- firefighter, heartrate, localization, communication.

I. INTRODUCTION

A firefighter (also fireman and fire)is a rescuer extensively trained in firefighting, primarily to extinguish hazardous fires that threaten life, property and/or the environment. The complexity of modern, industrialized life has created an increase in the skills needed in firefighting technology. The fire service, also known in some countries as the fire brigade or fire department, is one of the three main emergency services. From urban areas to aboard ships, firefighters have become ubiquitous around the world.
Firefighters and fire apparatus at the scene of a factory fire in Grand Rapids, Michigan.

The goals of firefighting are (in order of priority):

Save life
Save property
Save the environment

The skills required for safe operations are regularly practiced during training evaluations throughout a firefighter's career.

II. EXISTING SYSTEM

In the existing system ,the fireman will get into the building with safety suits and he will use wireless to communicate the crew team. Initial firefighting skills are taught during a local, regional or state approved fire academy. Depending on the requirements of a department, additional skills and certifications such as technical rescue and pre-hospital medicine may also be acquired at this time.

III. PROPOSED SYSTEM

In this project, advanced fireman secure system is implemented. The Heartbeat of the fireman is measured using the heart beat sensor and that sensor unit is interfaced with the microcontroller. The pulse of the heart is measured and the information will be given to the microcontroller, the received information can be updated on the mobile; the Communication between microcontroller and mobile is done via Wi-Fi. Here, the location detection unit also adopted, that is wireless transceiver which is interfaced with microcontroller and placed at each section of the building, it will communicate with the wireless transceiver on the fireman wearable and the location can be detected and mapped. The Wi-Fi is also interfaced with the wearable device, the crew unit will

have the mobile with application which converts the voice signal to text signal and it will give the text signal to Wi-Fi. The hand glove also placed with watch unit, so that specific signal can be viewed. Here, the location detection unit also adopted, that is wireless transceiver which is interfaced with microcontroller and placed at each section of the building, it will communicate with the wireless transceiver on the fireman wearable and the location can be detected and mapped. Here, in this hand glove which have two commands : one is rescue and another one is call the man power.

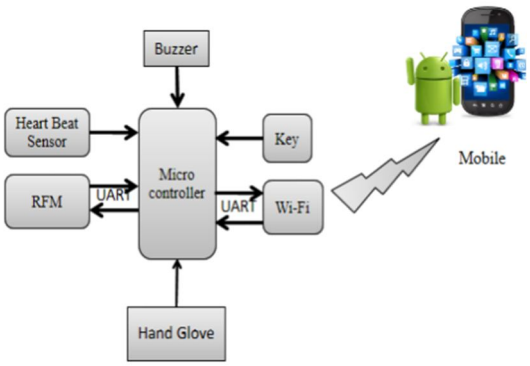


Fig. 1 Blockdiagram of the overall system

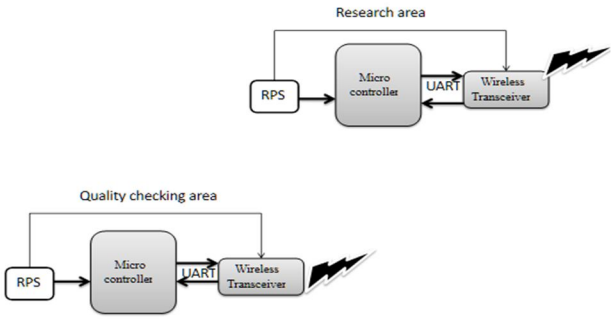


Fig. 2 Example of location unit

IV. HARDWARE COMPONENTS

A. Pic Controller

Peripheral Interface Controller (PIC) was originally designed by General Instruments .In the late 1970s, GI introduced PIC 1650 and 1655 – RISC with 30 instructions.PIC was sold to MicrochipFeatures: low-cost, self-contained, 8-bit, Harvard structure, pipelined, RISC, single accumulator, with fixed reset and interrupt vectors.

1)High-performance RISC CPU:

- Only 35 instructions to learn: - All single-cycle instructions except branches
- Operating speed: - DC – 20 MHz oscillator/clock input - DC – 200 ns instruction cycle
- Interrupt capability
- 8-level deep hardware stack
- Direct, Indirect and Relative Addressing modes

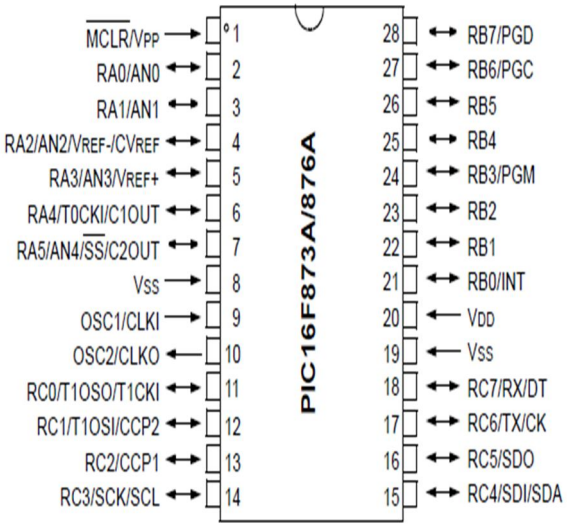


Fig. 3 Pin Diagram of PIC

B. ESP8266 WIFI Module

ESP8266 is an impressive, low cost WIFI module suitable for adding WIFI functionality to an existing microcontroller project via a UART serial connection. The module can even be reprogrammed to act as a standalone WIFI connected device–just add power! The feature list is impressive and includes: 802.11 b/g/n protocol Wi-Fi Direct (P2P), soft-AP Integrated TCP/IP protocol stack. This guide is designed to help you get started with your new WIFI module so let's start! The hardware connections required to connect to the ESP8266 module are fairly straight-forward but there are a couple of important items to note related to power: The ESP8266 requires 3.3V power–do not power it with 5 volts. The ESP8266 needs to communicate via serial at 3.3V and does not have 5V tolerant inputs. ESP8266 on-board processing and storage capabilities allow it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. With its high degree of on-chip integration, which includes the antenna switch balun, power management converters, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.

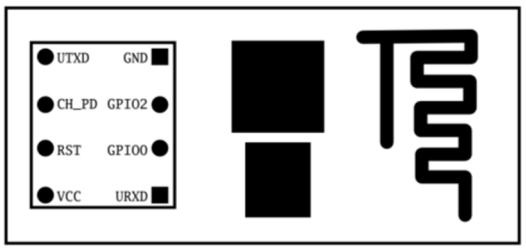


Fig.4 ESP8266 WIFI Pinout

1)ESP8266 Pin Description: ESP8266 has 8 pins, 4 in the row of 2. The first pin on the top left is GND. The two pins right from the GND are GPIO 2 and 0. The pin on the top right side is the RX pin and the pin on the lower left is TX. These are the pins for communication. The middle pins on the bottom are CH_PD (chip power-down) and RST (reset).The main thing to remember is, that this device works with 3.3V; Even the RX and TX pins. Controller or many USB to serial converters work with 5V.

C. Regulated Power Supply:

Almost all electronic devices used in electronic circuits need a dc source of power to operate. The source of dc power is used to establish the dc operating points (Q-points) for the passive and active electronic devices incorporated in the system. The dc power

supply is typically connected to each and every stage in an electronic system. It means that the single requirement common to all phases of electronics is the need for a supply of dc power. For portable low-power systems batteries may be used, but their operating period is limited. More frequently, however, electronic equipment is energized by a power supply, derived from the standard industrial or domestic ac supply by transformation, rectification, and filtering.

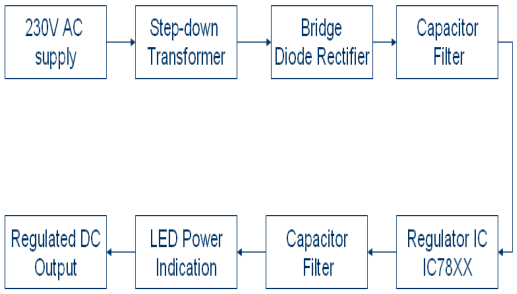


Fig 5. Block diagram of RPS

D. LCD Display

More microcontroller devices are using 'smart LCD' displays to output visual information. The following discussion covers the connection of a Hitachi LCD display to a PIC microcontroller. LCD displays designed around Hitachi's LCD HD44780 module, are inexpensive, easy to use, and it is even possible to produce a readout using the 8 x 80 pixels of the display. Hitachi LCD displays have a standard ASCII set of characters plus Japanese, Greek and mathematical symbols.

A 16x2 line Hitachi HD44780 display

For a 8-bit data bus, the display requires a +5V supply plus 11 I/O lines. For a 4-bit data bus it only requires the supply lines plus seven extra lines. When the LCD display is not enabled, data lines are tri-state which means they are in a state of high impendance (as though they are disconnected) and this means they do not interfere with the operation of the microcontroller when the display is not being addressed.

The LCD also requires 3 "control" lines from the microcontroller.

Enable (E)	This line allows access to the display through R/W and RS lines. When this line is low, the LCD is disabled and ignores signals from R/W and RS. When (E) line is high, the LCD checks the state of the two control lines and responds accordingly.
Read/Write (R/W)	This line determines the direction of data between the LCD and microcontroller. When it is low, data is written to the LCD. When it is high, data is read from the LCD.
Register select (RS)	With the help of this line, the LCD interprets the type of data on data lines. When it is low, an instruction is being written to the LCD. When it is high, a character is being written to the LCD.

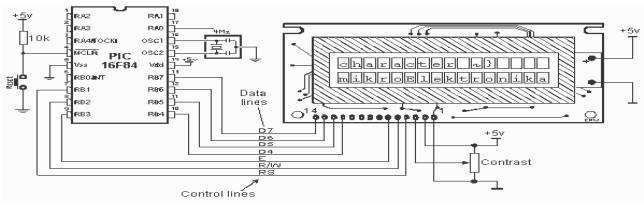


Fig.6 Interface of LCD and Microcontroller

E. UART

A (Universal Asynchronous Receiver/Transmitter) UART is the microchip with Programming that controls a computer's interface to its attached serial devices. Specifically, it provides the computer with the RS-232C Data Terminal Equipment (DTE) interface so that it can "talk" to and exchange data with modems and other serial devices. Serial transmission is commonly used with modems and for non-networked communication between computers, terminals and other devices.

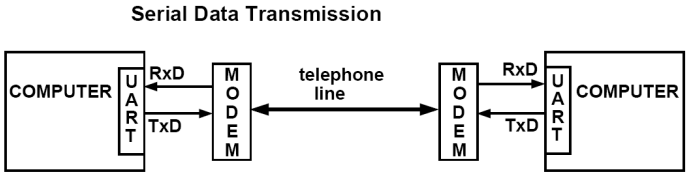


Fig. 7 Serial Data Transmission

F. BUZZER

A **buzzer** or **beeper** is an audio signaling device which be mechanical, electro mechanical or piezoelectric. A piezoelectric element may be driven by an oscillating electronic circuit or other audio signal source, driven with a piezoelectric audio amplifier. Sounds commonly used to indicate that a button has been pressed are a click, a ring or a beep.

V. SOFTWARE PROFILE

A.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.

This integrated C development environment gives developers the capability to quickly produce very efficient code from an easily maintainable high level language. The compiler includes built-in functions to access the PIC microcontroller hardware such as READ_ADC to read a value from the A/D converter. Discrete I/O is handled by describing the port characteristics in a PROGRAM. Functions such as INPUT and OUTPUT_HIGH will properly maintain the tri-state registers. Variables including structures may be directly mapped to memory such as I/O ports to best represent the hardware structure in C.

B. Proteus 7.0 Simulation Tool

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

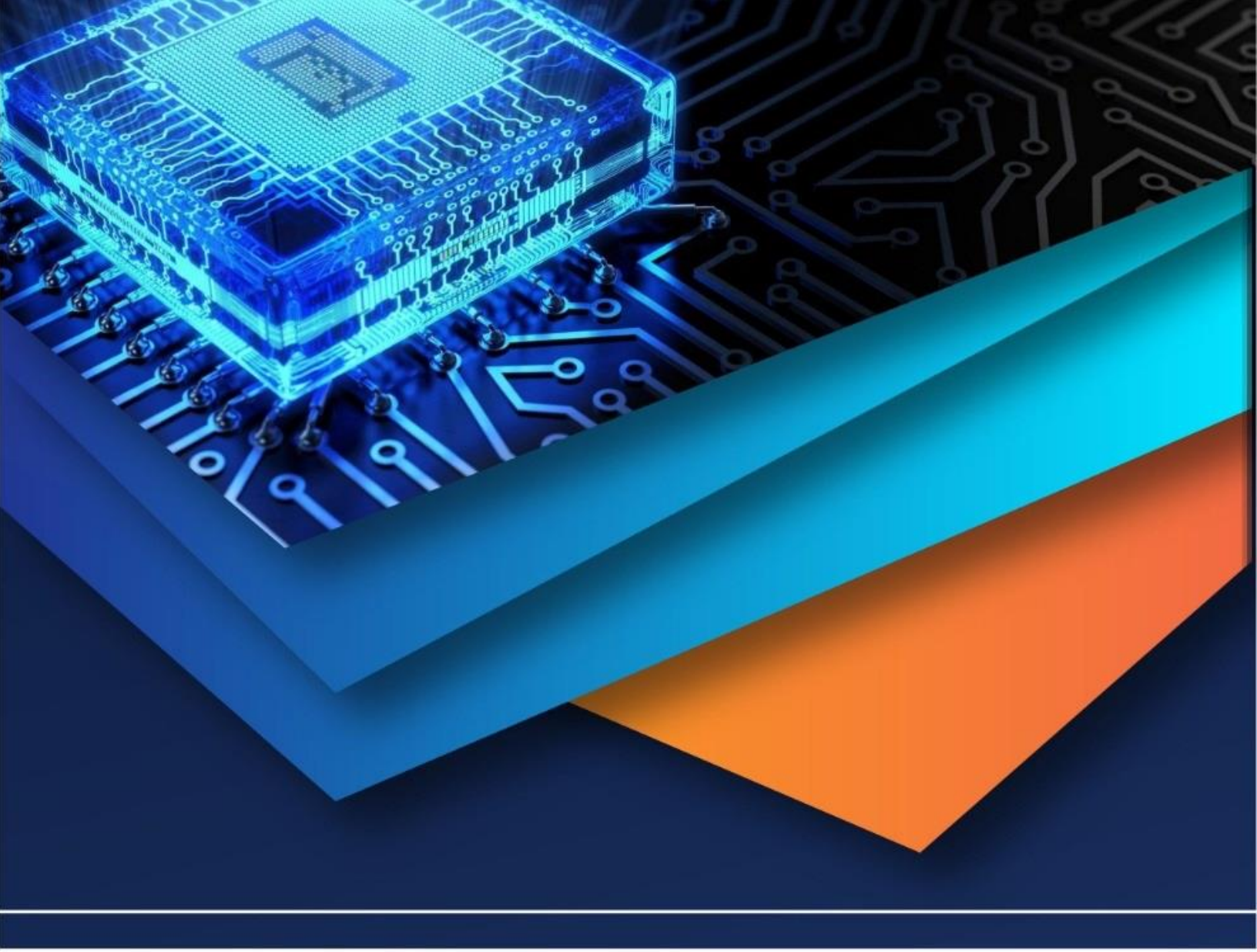
This program allows users to interact with the design using on-screen indicators and/or LED and LCD displays and, if attached to the PC, switches and buttons. One of the main components of Proteus 7.0 is the Circuit Simulation -- a product that uses a SPICE3f5 analogue simulator kernel combined with an event-driven digital simulator that allow users to utilize any SPICE model by any manufacturer. Proteus VSM comes with extensive debugging features.

VI. CONCLUSION

This invention helps to reducing the risk of attending calls significantly and risk associated with initiating or making the call to almost negligible. Accidents can be avoided and proper intimation can be received. the system presents a comprehensive solution for disaster management by efficiently identifying the firefighters in the shortest span of time. The presence of life is identified by detecting the heart pulse which is extracted from the persons wrist and transmitted to a server location. And the information of each individual is passed on to the rescue team using wifi application in voice format and can pinpoint exact location of the firefighter. This project can thus serve as a useful tool to help the firefighters who risk their life to save people in rescue operations. the project serves as a protype to a more efficient rescuing system which can be practically applied in real time situations

REFERENCES

[1] Yongcai Wang , Ji-Jiang Yang , Jianqiang Li .Health sensing by wearable sensors and mobile phones: art of health sensing technologies using body sensor networks and mobile phones,Oct.18,2014.
[2] Y. Amirat , A. Chibani , N. Badache. Event-aware framework for dynamic services discovery and selection in the context of ambient intelligence and Internet of Things: event-aware Framework,Vol.13,Issue I,2016.
[3] Monica Nicoli,Vittorio Rampa ,Sanaz Kianoush , Umberto Spagnolini. Device-free radio vision for assisted living: Leveraging wireless channel quality information for human sensing,Vol.33,Issue II,2016.
[4] Yi-Show Tseng , Li-Chen Fu. Spatio-temporal feature enhanced semi-supervised adaptation for activity recognition in iot-based contextaware smart homes : rich interaction data,2013
[5] Yueng Delahoz , Miguel A. Labrador. Smartphone-based solutions for fall detection and prevention : a floor detection system for indoor environments using a smart phone's camera.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY