

A New Type of Automatic Alarming Device To Rescue Accident Injured In Time

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Abstract

The motorcycle accident is a major public problem in many countries. Despite awareness campaign, this problem is still increasing due to rider's poor behaviors such as speed driving, drunk driving, riding with no helmet protection, riding without sufficient sleep, etc. The numbers of death and disability are very high because of late assistance to people who got the accident. These cause huge social and economic burdens to people involved. Therefore, several research group and major motorcycle manufacturers including have developed safety devices to protect riders from accidental injuries. However, good safety device for motorcycle is difficult to implement and very expensive.

Keywords—components; crash sensor, Gsm, Gps, sensor, Relay, Dc motor, Arm board...

Introduction

Embedded systems are electronic devices that incorporate microprocessors with in their implementations. The main purposes of the microprocessors are to simplify the system design and provide flexibility. Having a microprocessor in the device means that removing the bugs, making modifications, or adding new features are only matters of rewriting the software that controls the device. Or in other words embedded computer systems are electronic systems that include a microcomputer to perform a specific dedicated application. The computer is hidden inside these products. Embedded systems are ubiquitous. Every week millions of tiny computer chips come pouring out of factories finding their way into our everyday products.

Embedded systems are self-contained programs that are embedded within a piece of hardware. Whereas a regular computer has many different applications and software that can be applied to various tasks, embedded systems are usually set to a specific task that cannot be altered without physically manipulating the circuitry. Another way to think of an embedded system is as a computer system that is created with optimal efficiency, thereby allowing it to complete specific functions as quickly as possible. Embedded systems designers usually have a significant grasp of hardware technologies. They used specific programming languages and software to develop embedded systems and manipulate the equipment. When searching online, companies offer embedded systems development kits and other embedded systems tools for use by engineers and businesses.

Embedded systems technologies are usually fairly expensive due to the necessary development time and built in efficiencies, but they are also highly valued in specific industries. Smaller businesses may wish to hire a consultant to determine what sort of embedded systems will add value to your organization. An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious.

The enlargement of micro technology has many Features like size, efficiency and capital. For a large scale device micro fabrication is used because of its smallness, applicability and lessening of material utilization. Micro technology and electronics have great scope of innovation. MEMS can be mounted on the ARM Lpc microcontroller wirelessly. A is the microcontroller proposed in this methodology which has inbuilt ADC conversion. By using MEMS many succession of external components can be eliminated. "Gaining data, storage of data, data filtering, statement interfacing and networking" are included hence it is called elegant included MEMS. MEMS equipment not only makes the utensils much lesser but also makes them much improved. The chief inspiration for this investigation is to make the human-robot interface more flexible and simpler for the user. Static and of low fidelity, with accommodation solely the result of the form and placement of furniture and fixtures. Smart homes aim to extend awareness, increase control over systems, and enhance the security, healthfulness, and safety of the environment through sensing, inference, communication technologies, decision-making algorithms, and appliance control

However, the real-time processing of occupant activity has historically been costly in terms of computing and Memory requirements and often relies on technologies considered intrusive of people's privacy (e.g., cameras). As a result, these efforts have focused on systems associated with the built environment such as the design and placement of furniture and fixtures. Practical occupant sensing in smart homes remains of low fidelity including such ON/OFF sensor activations as room changes, door openings/closings, appliance actuations, etc.

A logical progression for the use of high fidelity sensing maybe seen in its central importance to assistive robotics. As Green and Walker describe, the notion of assistive robotics frequently conjures images of a self-contained humanoid servant in which all robotic and intelligence challenges have been addressed. Finding this to be an unlikely possibility in

the near term and seeking to move beyond the conventional static smart home, we envision an environment containing robotic components that take advantage of the capabilities and higher level thinking of the user to operate in a collaborative manner; working with rather than for the user.

The authors' past investigations into possible forms and use models for assistive robotics have considered appliances such as a hospital over-the-bed table, continuum surfaces, and intelligent storage for personal items.

Ease of use

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious. All embedded systems are including computers or microprocessors. Some of these computers are however very simple systems as compared with a personal computer. The very simplest embedded systems are capable of performing only a single function or set of functions to meet a single predetermined purpose. In more complex systems an application program that enables the embedded system to be used for a particular purpose in a specific application determines the functioning of the embedded system.

The ability to have programs means that the same embedded system can be used for a variety of different purposes. In some cases a microprocessor may be designed in such a way that application software for a particular purpose can be added to the basic software in a second process, after which it is not possible to make further changes. The applications software on such processors is sometimes referred to as firmware.

Arm processor review:

ARM stands for Advanced RISC Machines. It is a 32 bit processor core, used for high end application. It is widely used in Advanced Robotic Applications. It performs number of instruction in a single cycle compare with other controllers it have advanced features. The Arm CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2141/42/44/46/48 are ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale. Serial communications interfaces ranging from a USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power.



History and Development:

- ARM was developed at Acron Computers ltd of Cambridge, England between 1983 and 1985.
- RISC concept was introduced in 1980 at Stanford and Berkley.
- ARM ltd was found in 1990.
- ARM cores are licensed to partners so as to develop and fabricate new microcontrollers around same processor cores.

Key features:

1. 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.
2. 8 kB to 40 kB of on-chip static RAM and 32 kB to 512 kB of on-chip flash memory. 128-bit wide interface/accelerator enables high-speed 60 MHz operation.
3. In- System Programming/In-Application programming (ISP/IAP) via on-chip boot loader software. Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1 ms.

Historical Background

The invention of the transistor at Bell Telephone Laboratories in 1947 sparked a fast-growing microelectronic technology. Jack Kilby of Texas Instruments built the first integrated circuit (IC) in 1958 using germanium (Ge) devices. It consisted of one transistor, three resistors, and one capacitor. The IC was implemented on a sliver of Ge that was glued on a glass slide. Later that same year Robert Noyce of Fairchild Semiconductor announced the development of a planar double-diffused Si IC. The complete transition from the original Ge transistors with grown and alloyed junctions to silicon (Si) planar double-diffused devices took about 10 years. The success of Si as an electronic material was due partly to its wide availability from silicon dioxide (SiO₂) (sand), resulting in potentially lower material costs relative to other semiconductors.

GSM

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM (Global System for Mobile communication) is a digital mobile telephone system that is widely used in Europe and other parts of the world. GSM uses a variation of Time Division Multiple Access (TDMA) and is the most widely used of the three digital wireless telephone technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its

own time slot. It operates at either the 900 MHz or 1,800 MHz frequency band. It supports voice calls and data transfer speeds of up to 9.6 kbit/s, together with the transmission of SMS (Short Message Service).

History In 1982, the European Conference of Postal and Telecommunications Administrations (CEPT) created the Group Special Mobile (GSM) to develop a standard for a mobile telephone system that could be used across Europe. In 1987, a memorandum of understanding was signed by 13 countries to develop a common cellular telephone system across Europe. Finally the system created by SINTEF lead by Torleiv Maseng was selected.

In 1989, GSM responsibility was transferred to the European Telecommunications Standards Institute (ETSI) and phase I of the GSM specifications were published in 1990. The first GSM network was launched in 1991 by Radiolinja in Finland with joint technical infrastructure maintenance from Ericsson. By the end of 1993, over a million subscribers were using GSM phone networks being operated by 70 carriers across 48 countries. As of the end of 1997, GSM service was available in more than 100 countries and has become the de facto standard in Europe and Asia.

Basic concept of GPS



Basic concept of GPS

A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites high above the Earth. Each satellite continually transmits messages that include

- The time the message was transmitted

- Precise orbital information (the ephemeris)
- The general system health and rough orbits of all GPS satellites (the almanac).

The receiver uses the messages it receives to determine the transit time of each message and computes the distance to each satellite. These distances along with the satellites' locations are used with the possible aid of trilateration, depending on which algorithm is used, to compute the position of the receiver. This position is then displayed, perhaps with a moving map display or latitude and longitude; elevation information may be included. Many GPS units show derived information such as direction and speed, calculated from position changes.

Three satellites might seem enough to solve for position since space has three dimensions and a position near the Earth's surface can be assumed. However, even a very small clock error multiplied by the very large speed of light^[35] — the speed at which satellite signals propagate — results in a large positional error. Therefore receivers use four or more satellites to solve for the receiver's location and time. The very accurately computed time is effectively hidden by most GPS applications, which use only the location. A few specialized GPS applications do however use the time; these include time transfer, traffic signal timing, and synchronization of cell phone base stations.

Crash sensor

The crash sensors must be able to detect a collision and convert it into corresponding signals within a matter of milliseconds. The accelerating forces acting on the sensors immediately after a collision can be as high as 100 g (100 times the earth's gravitational force). The measurement principle employed by the crash sensors is usually based on the effect of inertia. When a vehicle is stopped abruptly by an impact, all bodies or objects which are not firmly fixed to the vehicle will continue to move at the impact speed. The sensors' design enables them to measure this acceleration and relay it to the control unit as usable data. Many Volkswagen models are fitted with ultra-fast pressure sensors in the

front doors to detect a collision from the side. When the vehicle is hit from the side, the outer door panel is pushed inwards, creating excess pressure inside the door. If the change in air pressure exceeds a certain limit, the sensor will relay a corresponding signal to the airbag control unit. Acceleration sensors are furthermore fitted in the vicinity of the C-posts so that collisions from the side which do not cause deformation of the front doors can also be detected.

Relay

A relay is a simple electromechanical switch made up of an electromagnet and a set of contacts. Relays are found hidden in all sorts of devices. In fact, some of the first computers ever built used relays to implement Boolean gates. In this article, we will look at how relays work and a few of their applications. A relay is used to isolate one electrical circuit from another. It allows a low current control circuit to make or break an electrically isolated high current circuit path. The basic relay consists of a coil and a set of contacts. The most common relay coil is a length of magnet wire wrapped around a metal core. When voltage is applied to the coil, current passes through the wire and creates a magnetic field. This magnetic field pulls the contacts together and holds them there until the current flow in the coil has stopped. The diagram below shows the parts of a simple relay.

Existing System

In earlier system, the accident cannot be intimated to the emergency vehicle automatically. There should be the need of manual power. So we go for the proposed system to overcome the disadvantage.

Proposed System

The automatic alarming device is comprised of a controller, crash sensors and angle sensors module, a GPS module, and a GSM module. The controller obtains data from crash and angle sensors module. The detection algorithm built in the controller detects whether an accident occurs. If the algorithm detects an accident, the controller sends a command to the GPS module, to obtain the location of the current vehicle,

and then sends a command to the GSM module. The severity of the accident is known from the values which the microcontroller gets from the sensors. That parameter is also attached with the sensor and sent to monitoring section.

Related work

With the advent of science and technology in every walk of life the importance of vehicle safety has increased and the main priority is being given to reduce the alarming time when an accident occurs, so that the wounded lives can be attended in lesser time by the rescue team. This paper provides the design which has the advantages of low cost, portability, small size and easy expansibility. The platform of the system is ARM along with MEMS, Vibration sensor; GPS and GSM, interfacing which shortens the alarm time to a large extent and locate the site of accident accurately. This system can overcome the problems of lack of automated system for accident location detection. Consequently, the time for searching the location is reduced and the person can be treated as soon as possible which will save many lives. This system will have broad application prospects as it integrates the positioning systems and the network of medical based services. The accident can be detected by both vibration sensor and MEMS sensor which will give the accurate information. The controller will process the data, as soon as input is received by the controller the alarm is ON and message is sent through the GSM module. The geographical coordinates and the time of the site of the accident is detected by the GPS module. An alternate condition is given by pressing a switch, in order to interrupt the flow of sending the message in case of no casualty; this will help to save time.

Keil software

It is possible to create the source files in a text editor such as Notepad, run the Compiler on each C source file, specifying a list of controls, run the Assembler on each Assembler source file, specifying another list of controls, run either the Library Manager or Linker (again specifying a list of controls) and finally running the Object-HEX Converter to convert the Linker output

file to an Intel Hex File. Once that has been completed the Hex File can be downloaded to the target hardware and debugged. Alternatively KEIL can be used to create source files; automatically compile, link and convert using options set with an easy to use user interface and finally simulate or perform debugging on the hardware with access to C variables and memory. Unless you have to use the tools on the command line, the choice is clear. KEIL Greatly simplifies the process of creating and testing an embedded application.

Projects

The user of KEIL centers on “projects”. A project is a list of all the source files required to build a single application, all the tool options which specify exactly how to build the application, and – if required – how the application should be simulated. A project contains enough information to take a set of source files and generate exactly the binary code required for the application. Because of the high degree of flexibility required from the tools, there are many options that can be set to configure the tools to operate in a specific manner. It would be tedious to have to set these options up every time the application is being built; therefore they are stored in a project file. Loading the project file into KEIL informs KEIL which source files are required, where they are, and how to configure the tools in the correct way.

KEIL can then execute each tool with the correct options. It is also possible to create new projects in KEIL. Source files are added to the project and the tool options are set as required. The project can then be saved to preserve the settings. The project is reloaded and the simulator or debugger started, all the desired windows are opened. KEIL project files have the extension

Simulator/Debugger

The simulator/ debugger in KEIL can perform a very detailed simulation of a micro controller along with external signals. It is possible to view the precise execution time of a single assembly instruction, or a single line of C code, all the way up to the entire

application, simply by entering the crystal frequency. A window can be opened for each peripheral on the device, showing the state of the peripheral. This enables quick trouble shooting of mis-configured peripherals. Breakpoints may be set on either assembly instructions or lines of C code, and execution may be stepped through one instruction or C line at a time. The contents of all the memory areas may be viewed along with ability to find specific variables. In addition the registers may be viewed allowing a detailed view of what the microcontroller is doing at any point in time. The Keil Software 8051 development tools listed below are the programs you use to compile your C code, assemble your assembler source files, link your program together, create HEX files, and debug your target program. μ Vision2 for Windows™ Integrated Development Environment: combines Project Management, Source Code Editing, and Program Debugging in one powerful environment.

- C51 ANSI Optimizing C Cross Compiler: creates relocatable object modules from your C source code,
- A51 Macro Assembler: creates relocatable object modules from your 8051 assembler source code,
- BL51 Linker/Locator: combines relocatable object modules created by the compiler and assembler into the final absolute object module,
- LIB51 Library Manager: combines object modules into a library, which may be used by the linker,
- OH51 Object-HEX Converter: creates Intel HEX files from absolute object modules.

What's New in μ Vision3?

μ Vision3 adds many new features to the Editor like Text Templates, Quick Function Navigation, and Syntax Coloring with brace high lighting Configuration Wizard for dialog based startup and debugger setup. μ Vision3 is fully compatible to μ Vision2 and can be used in parallel with μ Vision2.

Advantages

The proposed algorithm almost outperforms other algorithms in each category from Z Tables except for the path length.

In order to locate the Fermat point of a triangle, the largest angle of the triangle must be less than or equal to 120° .

- Ease of controlling.
- Fast response.
- The module can be made into various forms as per the area of application.
- User friendly- One need not to know about the robot, as they can control by hand movement.

Conclusion and future scope

This paper provides the design which has the advantages of low cost, portability, small size and easy expansibility. The platform of the system is ARM along with MEMS, Vibration sensor; GPS and GSM, interfacing which shortens the alarm time to a large extent and locate the site of accident accurately. This system can overcome the problems of lack of automated system for accident location detection. Consequently, the time for searching the location is reduced and the person can be treated as soon as possible which will save many lives. This system will have broad application prospects as it integrates the positioning systems and the network of medical based services.

The accident can be detected by both vibration sensor and MEMS sensor which will give the accurate information. The controller will process the data, as soon as input is received by the controller the alarm is ON and message is sent through the GSM module. The geographical coordinates and the time of the site of the accident is detected by the GPS module. An alternate condition is given by pressing a switch, in order to interrupt the flow of sending the message in case of no casualty; this will help to save time of medical rescue team and unnecessary alarming which creates havoc in such unusual conditions. The accident location automatic detection will help us to provide security to

the vehicles and to the lives of the people. The high priority is given to the lives of the people. Hence, this paper provides a feasible solution to traffic hazards and it gives security to vehicle and reduces loss of valuable lives and property.

Result

The project “A New Type of Automatic Alarming Device to Rescue Accident Injured in Time” been successfully designed and tested. Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC’s and with the help of growing technology the project has been successfully implemented.

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