ZIGBEE BASED VEHICLE ACCESS CONTROL & PROTECTING SYSTEM

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Abstract: Current driver assistance systems are based on a number of technologies, such as radar, computer vision and sensors. Integrating all of these technologies into a single system is normally a costly and complex solution. We propose a complete Zigbee based driver assistance system solution that leverages the cost-effective, low power and secure wireless networking features of the Zigbee protocol. By using a Zigbee technology we can transfer data very fast and reliable. This project gives protection to vehicle driver in all aspect like vehicle accessing using RFID tag, smoke detection in engine, sudden obstacle detection, detecting alcohol consumption by driver. The project consists of RFID reader, LCD, Smoke sensor, proximity sensor, alcohol sensor and a motor driver with Zigbee communication. Keywords—zigbee ,arduino,RFID.

I. EMBEDDED SYSTEMS

An embedded system is a special-purpose computer system designed to perform one or a few dedicated functions, sometimes with real-time computing constraints. It is usually embedded as part of a complete device including hardware and mechanical parts. In contrast, a general-purpose computer, such as a personal computer, can do many different tasks depending on programming. Embedded systems have become very important today as they control many of the common devices we use.

Since the embedded system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product, or increasing the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale. Embedded means something that is attached to another thing. An embedded system can be thought of as a computer hardware system having software embedded in it. the general characteristics of an embedded system,1.Performs a particular task or has a limited task set.

2. Has a very simple UI or is completely devoid of a UI.
3. Is a feedback-oriented system.
4. In most of the cases, is are part of a larger system.
5. Unlike computers and mobile phones, normal users can't modify the software.

1. ARDUINO

Arduino boards were originally created in 2005 by Massimo Benzi of IVRAE Institute for the need to learn of the computer and electronic students. Arduino is a development board that integrates a microcontroller and its support circuitry with digital and analog inputs and outputs.

It has an open source computing development platform based on an environment for programs creation. The software is written in C or C++ programming language. The Arduino development board is an implementation of wiring, a similar physical computing platform, which is based on the processing multimedia programming environment. This single chip microcontroller has a microprocessor, which comes from a company called Atmel. The chip is known as an AVR. The AVR chip is running at only 16 MHz with an 8-bit core, and has a very limited amount of available memory, with 32 kilobytes of storage and 2 kilobytes of random access memory. Arduino setup build around Atmel microprocessor causes it to be easy and popular to be used in all different kinds of DIY projects.

2. ARDUINO UNO

The Uno is a huge option for your initial Arduino. This Arduino board depends on an ATmega328P based microcontroller. As compared with other types of arduino boards, it is very simple to use like the Arduino Mega type board. .It consists of 14-digital I/O pins, where 6-pins can be used as PWM(pulse width modulation outputs), 6-analog inputs, a reset button, a power jack, a USB connection, an In-Circuit Serial Programming header (ICSP), etc. It includes everything required to hold up the microcontroller; simply attach it to a PC with the help of a USB cable and give the supply to get started with an AC-to-DC adapter or battery.

Fig 2.1 ARDUINO UNO BOARD

So, you know that Arduino is easy to use. But why should you spend time learning how to use this microcontroller board? Well, it's incredibly flexible. With an Arduino, you can do everything from control a robot to manage a home automation project---and plenty besides.

The key benefits of learning Arduino are:

1.You can build awesome projects 2. Arduino is great for programming. 3. You can learn electronics easily

It's a cheap hobby to start.4 Arduino might suit you better than a Raspberry Pi

3. PIN DESCRIPTION :

1).Vin: This is the input voltage pin of the Arduino board used to provide input supply from an external power source.

2)5V: This pin of the Arduino board is used as a regulated power supply voltage and it is used to give supply to the board as well as onboard components.

3). 3.3V: This pin of the board is used to provide a supply of 3.3V which is generated from a voltage regulator on the board

4) .GND: This pin of the board is used to ground the Arduino board.
5). Reset: This pin of the board is used to reset the microcontroller. It is used to Resets the microcontroller.
6) .Analog Pins: The pins A0 to A5 are used as an analog input and it is in the range of 0-5V.
7) .Digital Pins: The pins 0 to 13 are used as a digital input or output for the Arduino board.
8) .Serial Pins: These pins are also known as a UART pin. It is used for communication between the Arduino board and a computer or other devices. The transmitter pin number 1 and receiver pin number 0 is used to transmit and receive the data resp.
9) .External Interrupt Pins: This pin of the Arduino board is used to produce the External interrupt and it is done by pin numbers 2 and 3.
10) .PWM Pins: This pins of the board is used to convert the digital signal into an analog by varying the width of the Pulse. The pin numbers 3,5,6,9,10 and 11 are used as a PWM pin.
11) .SPI Pins: This is the Serial Peripheral Interface pin, it is used to maintain SPI communication with the help of the SPI library. SPI pins include:
12) .SS: Pin number 10 is used as a Slave Select
13) MOSI: Pin number 11 is used as a Master Out Slave In
14) MISO: Pin number 12 is used as a Master In Slave Out
15) SCK: Pin number 13 is used as a Serial Clock
16) LED Pin: The board has an inbuilt LED using digital pin-13. The LED glows only when the digital pin becomes high.
17) AREF Pin: This is an analog reference pin of the Arduino board. It is used to provide a reference voltage from an external power supply.

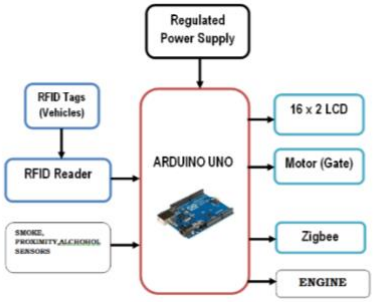
4.APPLICATIONS :

1.)Prototyping of Electronics Products and Systems
Multiple DIY Projects.
2) .Easy to use for beginner level DIYers and makers.
3) .Projects requiring Multiple I/O interfaces and communications.

II. WORKING

1. When the authorized RFID tag brought near to the reader, reader detects the card and switch ON the relay so that engine get started.
2. When the vehicle came near to gate, Zigbee module transmit the data to receiver, so that motor gets turned ON and gate gets opened automatically.
3. Alcohol sensor was placed near the steering. It reads the amount of alcohol consumed and if it is above the limited value. CPU resist the starting of engine.
4. A Smoke sensor was placed in engine and connected to arduino. So when there is abnormal condition on engine, Smoke gets detected and indication was given to driver through buzzer.
5. Proximity sensor was placed in front of vehicle and When a obstacle or person came across suddenly it gives indication and alert the driver.

III . HARDWARE IMPLEMENTATION



1. LCD Interfacing:

It shows the output or the output commands to be displayed so that it is viasable to the user, and it also display the danger instructions and values of the so connected sensors values can also be seen in LCD module. Compared to LED modules it is efficient .

2. RFID MODULE:

Radio frequency identification is a powerful emerging technology that enables companies to achieve total business visibility. By knowing the identity, location and conditions of assets, tools, inventory, people and more, companies can optimize business processes and reduce operational costs. Radio frequency identification (RFID) is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves.

RFID reader module, are also called as interrogators. They convert radio waves returned form the RFID tag into a form that can be pressed on to controllers, which can make use of it. RFID tags and readers have to be tuned to the same frequency in order to communicate. RFID systems use many different frequencies, but the most common and widely used and supported by our Reader 125 KHz.

3. ZIGBEE

ZigBee is an IEEE802.15.4 based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs, designed for small scale projects which need wireless connection. Hence, ZigBee is a low-power, low data rate, and close proximity (i.e., personal area) wireless ad hoc network.

The technology defined by the ZigBee specification is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi. Applications include wireless light switches, electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate wireless data transfer.

4. SMOKE SENSOR

A smoke sensor is a device that senses smoke, typically as an indicator of fire. Commercial and residential security devices issue a signal to a fire alarm control panel as part of a fire alarm system, while household detectors, known as smoke alarms, generally issue a local audible or visual alarm from the detector itself. The Analog Smoke/LPG/CO Gas Sensor (MQ2) module utilizes an MQ-2 as the sensitive component and has a protection resistor and an adjustable resistor on board. The MQ-2 gas sensor is sensitive to LPG, i-butane, propane, methane, alcohol, Hydrogen and smoke. It could be used in gas leakage detecting equipments in family and industry. The resistance of the sensitive component changes as the concentration of the target gas changes.

5 .PROXIMITY SENSOR

"Proximity Sensor" includes all sensors that perform non-contact detection in comparison to sensors, such as limit switches, that detect objects by physically contacting them. Proximity Sensors convert information on the movement or presence of an object into an electrical signal. There are three types of detection systems that do this conversion: systems that use the eddy currents that are generated in metallic sensing objects by electromagnetic induction, systems that detect changes in electrical capacity when approaching the sensing object, and systems that use magnets and reed switches.

6 .ALCOHOL SENSOR

The analog gas sensor- MQ3 is suitable for alcohol detecting, this sensor can be used in a breath analyzer. It has a high sensitivity to alcohol and small sensitivity to benzene. The sensitivity can be adjusted by the potentiometer sensitive material of MQ3 gas sensor is SnO2, which with lower conductivity in clean air. When the target alcohol gas exist, the sensors conductivity is higher along with the gas concentration rising, use of simple electro circuit, convert change of conductivity to correspond output signal of gas concentration. The MQ-3 sensor is made of Tin Dioxide (SnO2) delicate layer.

IV . APPLICATIONS

1).It can be installed at Offices, homes, authorized areas etc.

2) .Can be installed at any four wheel automobiles at low cost.

V . FUTURE SCOPE

This project can further be improved by giving the sensor signals to mechanical control which makes its more developed version of protection such that, When the obstacle was detected in front it sensor sences and access the brakes so that to stop vehicle. And when the alchohol consumption was detected by sensor it send a message to fanily members and track the location every time. RFID identification can further be made small such that it can be placed inside our skin so that owner himself can be the key to vehicle.

VI . CONCLUSION :

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VII. REFERENCES

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