



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.2018.3449>

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Advanced Vehicle Safety Management using Embedded Systems

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Abstract: Usage of mobile phones while driving is common. This causes the risk of distracted driving and accidents. Researchers have conducted a survey around the world, and they all agree that use of mobile phones while driving is dangerous and risky. Drivers need to use a number of skills while driving. Any lapse in concentration increases the risk of the vehicle being involved in a crash. Driving while using a hand held mobile phone can cause both physical and mental distraction which affects driving performance. Research shows that using a mobile phone while driving increases the risk of crashing. Using a mobile phone while driving can bring even greater danger to new drivers as they may experience difficulty in balancing the many demands on their driving - from perceptual, mental and physical tasks. Research has found inexperienced drivers who use a mobile phone spend less time looking at the road ahead. They are also more likely to wander over the road (across traffic lanes) and take longer to notice driving hazards. A mobile phone can be important in an emergency. If you need to use your mobile phone to call for help, stop and park safely where you will not endanger other road users. To remove these hazards a new efficient type of mobile jammer while driving is proposed using pic microcontroller. In this new design we are going to disable the Keypad, by using microcontroller. We are going to do it using a 433MHz frequency which has a public license. So there is no need of licensing

Keywords: photo detector sensor, gassensor, pic microcontroller.

I. INTRODUCTION

Nowadays, vehicle usage is very much higher. The use of mobile phones while driving, distracts the driver and affect the driving in many ways. Therefore vehicles require proper monitoring also avoiding the accidents using mobile phone. The project aims to modify an existing safety model employed in domestic field. Advanced jammer technical is used to control the mobile. In this method mobile keypad is locked its so not possible to send SMS, play games and listing song while driving. but possible to receiving the urgent information. Special vehicle is along-term workplace to particular person. The release Of gases including NOX, SOX, HCl, volatile organic compounds (VOCs) and fluorocarbon, from industry, automobiles various chemical pollutants can be dangerous for humans thus we have included gas sensor to detect them. When the level so harmful gases are excessive, a buzzer indication is given. Despite all the statistics some people still refuse to buckle up, these are the reasons for the fatal accidents. So we have included seat belt reminder in our project.

II. EXISTING METHOD

A. Existing Method Working methodology

Existing jammer is used only to control mobile phone calls while driving so driver may possibly play games and listen songs. This causes accidents. And there is no indicating system to detect harmful gases inside the car and for seat belt buckling detection.

B. Disadvantages

- 1) The person can make a call, send sms, play games and listen song while driving.
- 2) The person cannot be contacted for some urgent information when we use normal jammer.
- 3) Nearly the mobile phone will be in Switch Off state.
- 4) There will not be any notification that the user mobile has been jammed.

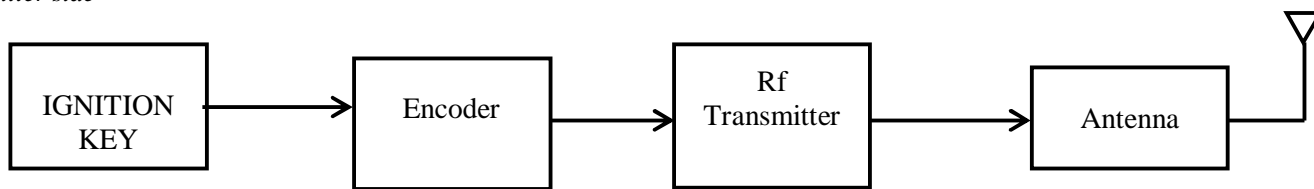
C. Challenging in project

Advanced jammer technical is used to control the mobile. In this method mobile keypad is locked so not possible to send sms, play

games and listen song while driving. but possible to receiving the urgent information.

III. PROPOSED BLOCK DIAGRAM

A. Transmitter side



B. Receiver side

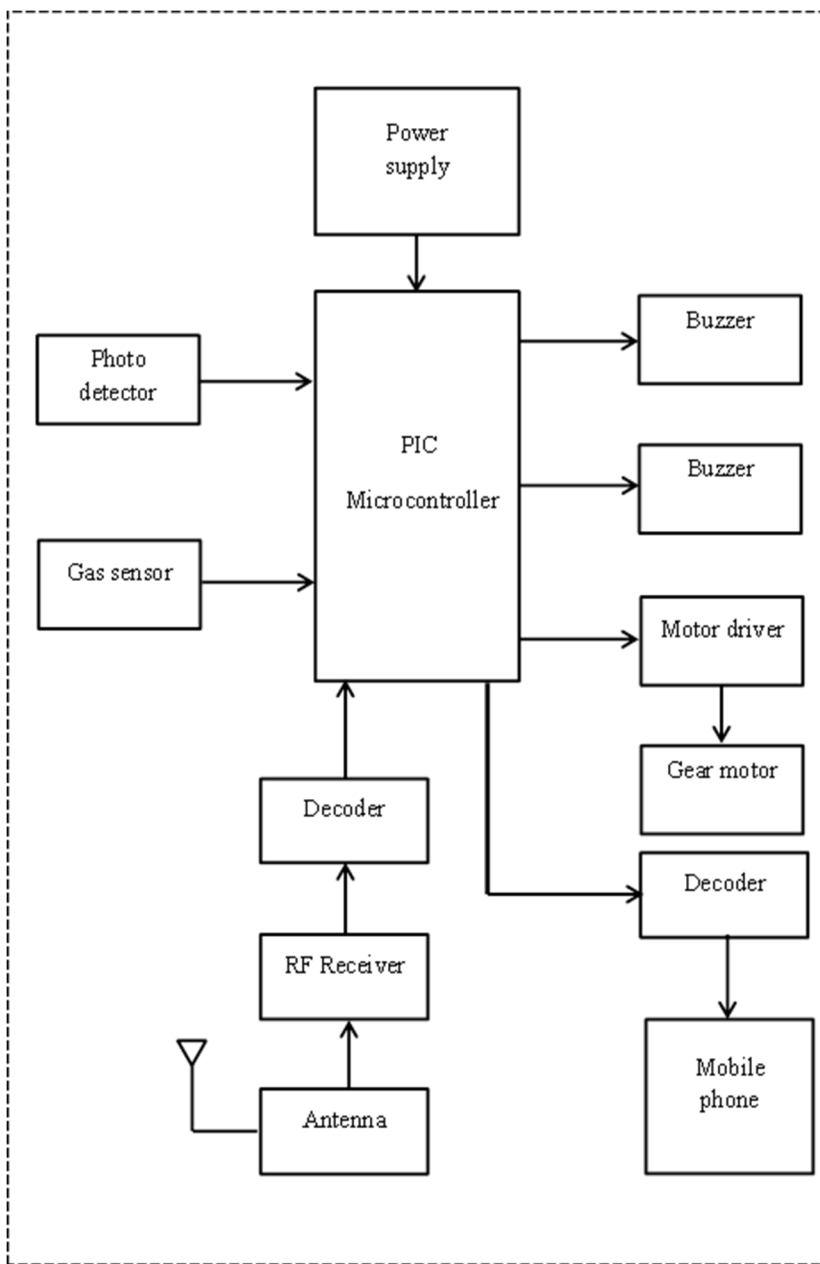


Fig 1: Proposed Block diagram

IV. MATERIALS&METHODS

A. RF transmitter

- 1) TWS-434 module is used as an RF transmitter.
- 2) This module works at 433 MHZ frequency for data transmission.
- 3) It accepts the input digitally and operates at 1.2v to 12v in DC .
- 4) This accepts the data serially and transmits it through antenna.
- 5) The transmission rate comes under 1Kbps - 10Kbps.



Fig.2.RF transmitter

B. RF Receiver

- 1) The RWS-434: model is used as linear RF receiver module.
- 2) this module works at 433.92MHZ frequency.
- 3) This module operates at 4.5 dc volts to 5.5 volts.
- 4) It sends a digital output.



Fig .3.RF receiver

C. Generating Data

- 1) The transmitter module does not allow the usage of sending encoding and decoding.
- 2) It is necessary to use switches and button for data transmission
- 3) Then we have to use the encoder and decoder module.
- 4) This will help to use error checking.

D. Encoder

- 1) HT12E series is used as encoder.
- 2) This operates under 2.4 -5 dc voltage.
- 3) It consists of N address bits and 12N data bits.these addresses and data are transmitted under RF medium.
- 4) RC oscillator is also used in encoder.
- 5) encoders works on a 4-word transmission cycle.this cycle will repeat untill the data transmiision occurs.



Fig.4. encoder IC

E. Decoder

- 1) We use a HT12D series decoder, which is a Holtek, made Decoder.
- 2) The 2 12 decoders are a series of CMOS technology remote control system applications.
- 3) This decoder will be combined with 212 series of encoders. The same number of addresses and data format should be chosen to operate properly The decoders receive serial addresses and data are transmitted by a carrier using an RF or an IR transmission medium.
- 4) These data are continuously compared with address.
- 5) If no error or unmatched codes are found, the input data codes are decoded and then transferred to the output pins. The VT pin is used to indicate a valid transmission.



Fig.5.decoder IC

F. Pic Microcontroller

- 1) Pic microcontroller works at a frequency of 20MHZ.
- 2) it consists of 15interrupts and 5 I/O ports.
- 3) only 35 instruction set are required.
- 4) it uses USART protocol for serial communications. Thus we can use full duplex communications.
- 5) It has eight A/D input channels.

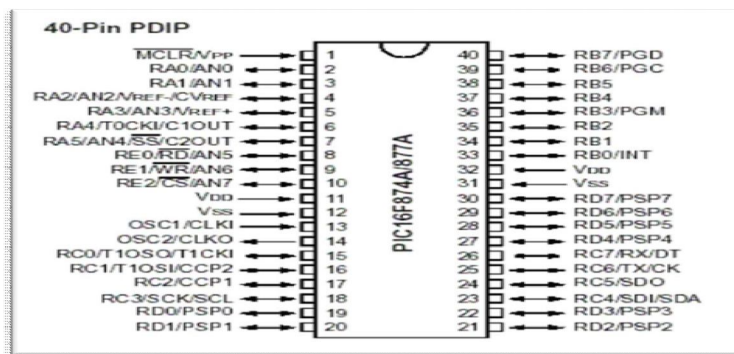


Fig 6. PIC Controller

G. Gas Sensor

- 1) When the vehicle with the closed doors is entangled in a traffic signal, the CO from the exhaust of other nearby vehicles will be easily pulled in to the vehicle cabin which can create the major disaster to the persons inside the cabin.
- 2) To prevent the CO poisoning a MQ2 sensor is used.
- 3) The high temperature is produced by the sensor after detecting gases.
- 4) Thus hazardous gas can be detected. This MQ2 sensor is connected to a buzzer thus indicating the poisonous gas.
- 5) The concentration of the gases lies between 300-10000ppm.



Fig.7. MQ2 gas Sensor

H. Photo detector Sensor

- 1) The IR rays are emitted at a frequency of 940nm.
- 2) The distance covered by sensor is up to 5meters.
- 3) This Photodiode can be used to detect the usage of seatbelt.
- 4) The circuit is kept standby through a IR beam focused on to the Photodiode.
- 5) If the IR rays are not received then the sensor then and alarm tone will be generated.
- 6) When the Laser/IR beam breaks, current through the Photodiode ceases. The output pulses which drives the speaker will be turned off.



Fig.8. Photo detector Sensor

V. HARDWARE OPERATION & RESULTS

The Rf transmitter is used as a ignition key. The encoder in the transmitter encodes and transmits the data through antenna. The operating frequency of the RF spectrum is about 10khz to 300Mhz. The RF receiver decodes the data then sends it to the pic micro controller. In other side a mobile phone is connected through relay. If no data is received which implies that the engine is working, then mobile phone does not work. Only when the time the RF receiver does not receives any data which again implies engine of vehicle in static mode, thus driver will be able to use mobile phones. A gas sensor is connected to the micro controller which detects gas and sends a buzzer signal. A tin dioxide element is placed inside a sensor which when detects a toxic gas changes a internal resistance and produce a current to the pic microcontroller which sends a signal to buzzer which will be activated. A photo detector sensor connected to micro controller, transmit IR rays to the free space if the transmitted IR rays strikes the target, then it will be reflected back to the sensor if it receive a IR rays then it sends a buzzer signal is deactivated. If it does not receives a signal then buzzer will be activated.

The hardware of the proposed system is shown in Fig.9

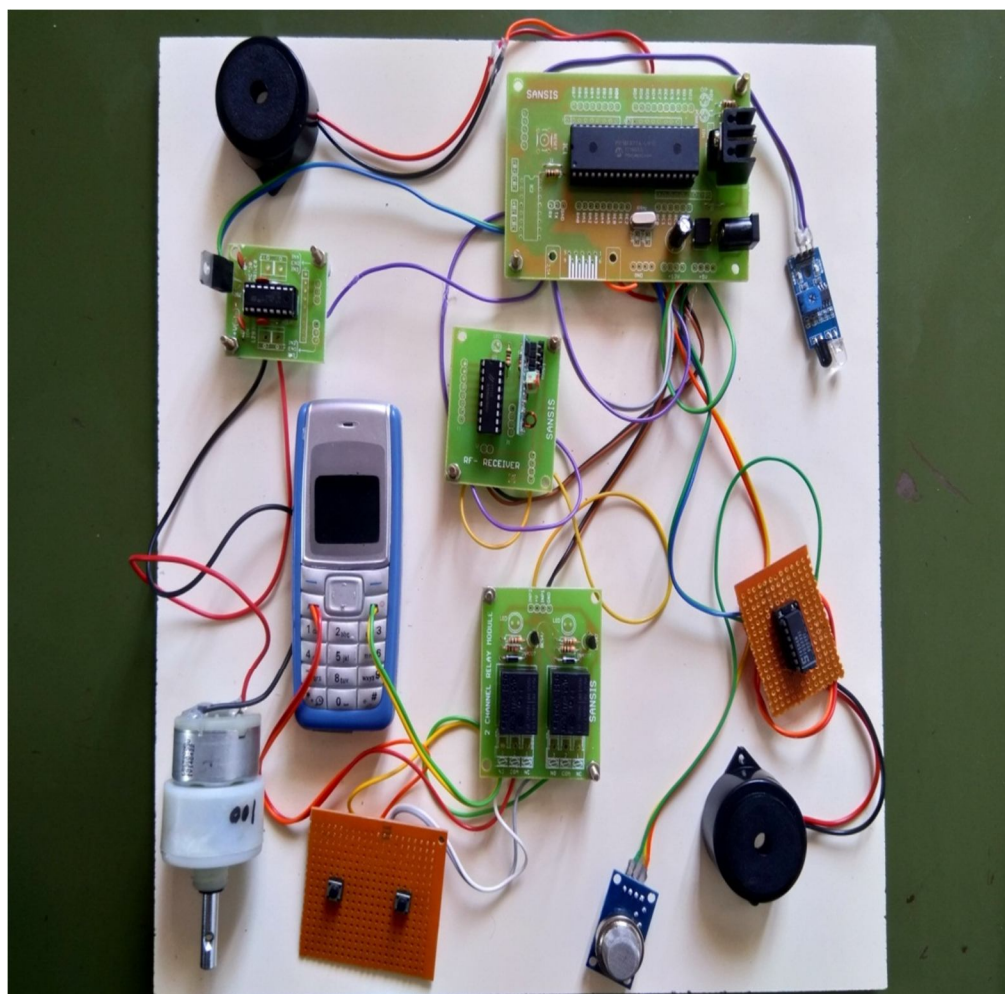


Fig.9. Hardware of the Proposed System

VI. CONCLUSION

Atmost importance should be given to reduce the vehicle accidents. Increasing the safety measures for vehicles is foremost thing in modern age. Restricting driver from using mobile phones can forbid accidents. We have successfully installed a device which prevents loss of concentration from driver due to using mobile phone. Cell phone jammer effectively jams the operation of cell phone thus avoiding all the distractions from both outside and inside the vehicle. Eventhough every car has a seat belt people tend to avoid that for various reasons, thus assurance of seat belt during driving and detection of hazardous gas inside a vehicle can prevent people inside the vehicle. Thus providing health and safety for both driver and passengers.



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