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# VOICE RECOGNIZATION SYSTEM TO CONTROL CAR INTERIOR

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**Abstract-***This paper intends to make the voice oriented command words for controlling car interiors. The voice frequency is independent on person. The user interface module comprises of voice Recognition module (v3) which accepts the voice commands through microphone. The voice Recognition module accepts the voice commands and compares with the stored commands. The function related to the matched command is executed. The module recognizes the voice and sends control messages to the arduino. The programmed controller processes the received data and switches the respective interiors via connected driver circuit or IC regulator. The driver can have a hands free control on the interior electrical & electronic equipment in the car & can have an un-distracted driving experience.*

*Keywords:* *Arduino UNO R3, Voice Recognition Module, ULN2803 IC, Voltage regulator, servo motors.*

## I.    INTRODUCTION

In present day, due to the increase in population traffic is increasing rapidly, due to these increases number of accidents. The advancement in technology is bringing more comforts in to the vehicles; if those comforts in the vehicles need not have to be operated manually, then the driver need not distract himself from driving. This idea motivated us to introduce a smart system that will eliminate the driver to operate the interior facilities manually, which will improve the convenience of the driver to travel safely and comfortably in vehicle on the roads.

#### a.    Rate of Accidental Deaths during the Decade (20010-2014)

The rate of accidental deaths has shown increasing trend during the period 2004 - 2014 with an increase of 62.9% in the year2014 as compared to 2010. The population growth during the period 2010-2014 was14.6% whereas the increase in the rate of accidental deaths during the same period was42.4%. The percentage change of accidental deaths is presented in fig-1. A total of 4, 51,757 accidental deaths were reported in the country during 2014 showing an increase of 12.8% as compared to 2013.Correspondingly, 11.3% rise in the rate of 'Accidental Deaths' were reported during the year as compared to 2013. Due to this increasing strength of accident we have to design this vehicle to control car interior due to this we can minimize some amount of accident.

#### b.    The Percentage change in Population, Incidence and Rate of Accidental Deaths over the corresponding previous year during 2010 to 2014
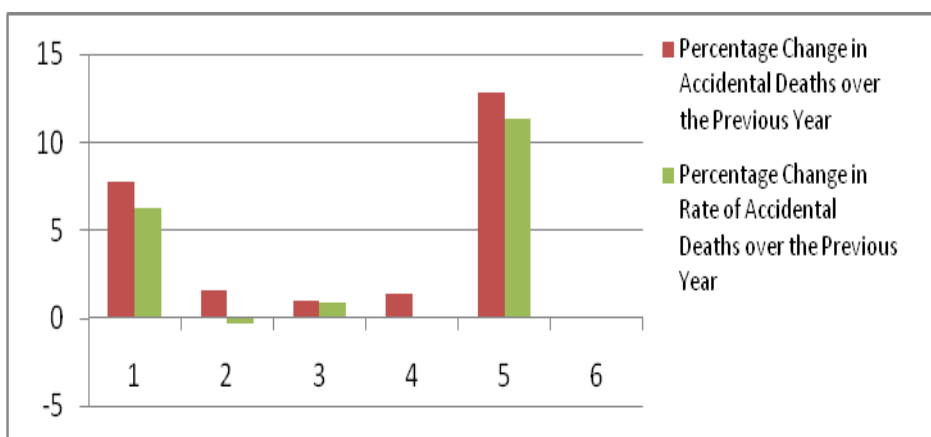


*Fig.1. Statistics of Accidental Death*

## II. LITERATURE SURVEY

K. Say Geethika1, Ch. Naga Sri, M. Rama Devi, A. Rani Naga Lakshmi, G. Pagan Kumar, K.G.Venkata.Krishna. "*Voice Recognization System to Control Car Interiors*". In this paper it controls car interior through voice and this function control using arduino uno R3 [1].

In this paper "*Controlling an Electric Car Starter System through Voice*" A.B. Muhammad Firdausi, R. Mohamed Yusuf, A. Sahara, M.H. Nuraida, this paper is to make a car controlled by human voice and it is analyzing the voltage of the microphone and develops a prototype of the voice controlling device in the car system. The system can turn ON and OFF using difference level of voltage that came from microphone. However, this system has a limitation and only record 3 seconds of the data sound. Further studies must be carried out concentrating on voice recognition to enhancing the interface system. The setup for keeping up these ecological conditions will be a onetime venture for any genuine application [2].

ShafkatKibria "*Speech Recognition for car Control*" Speech recognition is the process of converting an acoustic signal, captured by micro-phone or a telephone, to a set of words. In this paper, we describe our efforts towards a hybrid speech recognition system to control secondary functions in the car. We also provide extended comfort functionality to the driver. The hybrid speech recognition system contains a fast, grammar-based, embedded recognizer. We will analyze different aspects of such a design and the integration of it into a car. The main focus of the paper will be on maximizing the reliability of the embedded recognizer and designing an algorithm for switching dynamically between the embedded recognizer and the server-based ASR system [3].

## III. HARDWARE

**A. Voice Recognization Module:** Voice Recognization Module is a compact and easy-control voice recognition board. This module supports up to 80 voice commands in all. Max 7 voice commands could work at the same time. Any sound could be trained as command. Users need to train the module first before let it recognizing any voice command. This board has 2 controlling ways: Serial Port, General Input Pins. General Output Pins on the board could generate several kinds of waves while corresponding voice command was recognized.
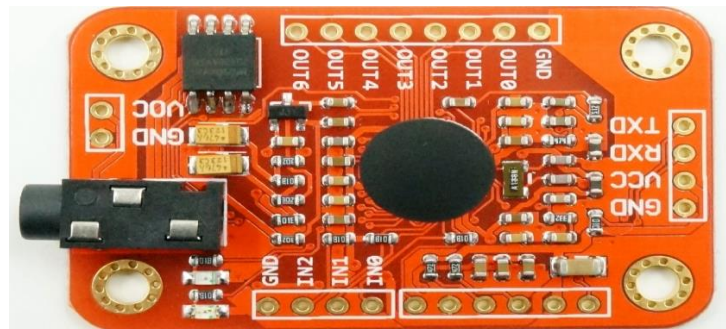
**B.**



*Fig.2. Structure of Voice Recognization Module V3*

**C. Arduino UNO R3:** Arduino is a microcontroller board as shown in Fig.3. It has onboard power supply and an USB port to communicate with PC and it contains an inbuilt microcontroller ATMEGA 328. Its operating voltage is 5v and it has 28pins of which 6 are used as analog Input pins and 14 are used as digital I/O pins of which 6 provide PWM output. It has 32 KB of flash memory of which 0.5 KB is used by boot loader and it contains 2KB of SRAM and 1KB of EEPROM. The data from PC is sent to the microcontroller in the arduino board. The digital pins 6 & 7 are connected to the electrical devices through power amplification section.



*Fig.3. Arduino Board*

**D. Driving Circuit (Darlington Transistor):** In electronics, the Darlington transistor is a compound structure of a particular design made by two bipolar transistors connected in such a way that the current amplified by the first transistor

is amplified further by the second one. This configuration gives a much higher current gain than each transistor taken separately

The signal coming from the microcontroller is very weak and is not sufficient enough to drive larger circuits. So, ULN2803 Darlington transistor is used for amplification purpose. ULN2803 consists of two NPN transistors as shown in Fig.4 in which the collector of one transistor is connected to the base of another transistor. This result in high gain and one end of the transistor is connected to the relays which are used for switching electrical devices.
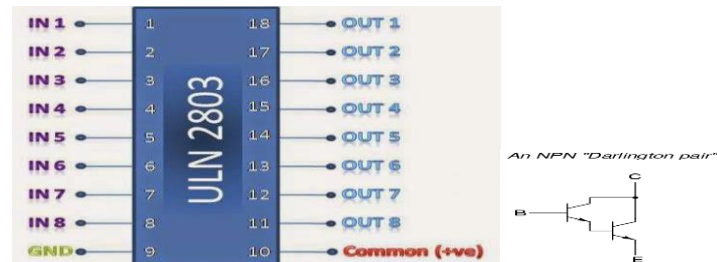


*Fig.4.ULN2803 (Darlington Transistor PAIR) IC*

**E. IC Voltage Regulator (IC 7805):** A voltage regulator is a device which converts varying input voltage into a constant regulated output voltage. A regulated power supply is very much essential for several electronic devices due to the semiconductor material employed in them have a fixed rate of current as well as voltage. The device may get damaged if there is any deviation from the fixed rate. The AC power supply gets converted into constant DC by this circuit. By the help of a voltage regulator DC, unregulated output will be fixed to a constant voltage. The circuit is made up of linear voltage regulator 7805 along with capacitors and resistors with bridge rectifier made up from diodes. From giving an unchanging voltage supply to building confident that output reaches uninterrupted to the appliance, the diodes along with capacitors handle elevated efficient signal.

As we have made the whole circuit till now to be operated on the 5V DC supply, so we have to use an IC regulator for 5V DC. And the most generally used IC regulators get into the market for 5V DC regulation use is 7805. So we are connecting the similar IC in the circuit as U1. IC 7805 is a DC regulated IC of 5V. This IC is very flexible and is widely employed in all types of circuit like a voltage regulator. It is a three terminal device and mainly called input, output and ground. Pin diagram of the IC 7805 is shown in the diagram below.
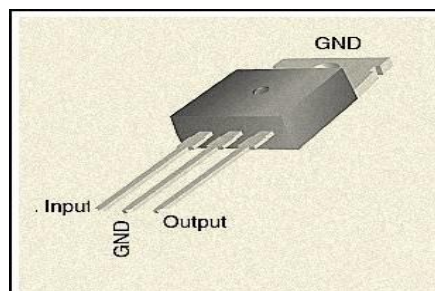


*Fig.5.Ic Voltage Regulator*

**F. Servo Motor:** A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate an object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor. We can get a very high torque servo motor in a small and light weight packages. Does to these features they are being used in many applications like toy car, RC helicopters and planes, Robotics, Machine etc. we are using these servos to rotate the wiper, slide glasses & side mirrors.



*Fig.6. Servo Motor*
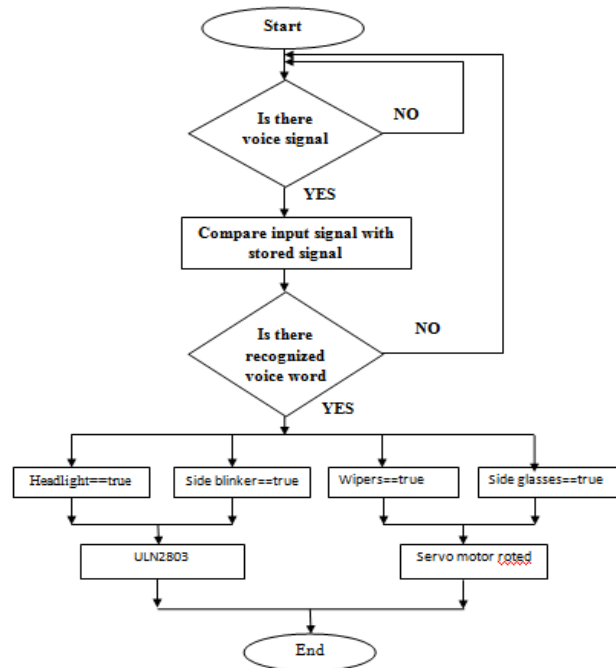
## IV. WORKING

**G. Flow chart:**



*Fig.7. flow char*

Voice is a non-electrical signal, so microphone use as a transducer which converts the voice signal into electrical signal, micro phone, is used. Micro phone gives an analog signal; hence it has to be converted acoustical energy into electrical energy these signals are sends to Voice Recognition Module (V3). VRM receives those signals & translates commands. Because, in built ADC is used which converts varying analog voice signals into digital signal. It digitized the sound & then filters to remove noise, and it also adjusts speed of the stored sound in main memory of the system. This digital signal is compared with the stored commands; if it matches that particular command will be executed. Matching of the voice commands is the main task. Since every individual person will have their own voice frequency every new user voice must be trained first in the program as an input before that user's voice can be recognized by the program.
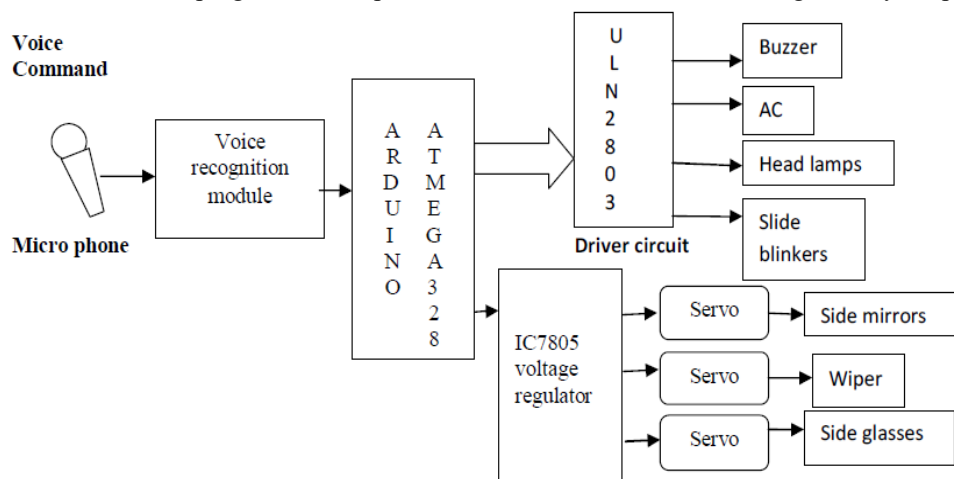


*Fig.8.Block Diagram*

With the trained voice a statistical average of the multiple samples of the same word is analyzed by the program and stores the averaged sample as a template in a program data structure. When the average sample matches with the already stored sample then the corresponding signal is given to the arduino. Actually Arduino software is used to write the code. In Arduino the code is called as "sketch" and it is dumped to the processor ATMEGA 328 using the same Arduino software. Depending on the output of microcontroller program it chooses the path of either driver circuit or voltage regulator.

## V. ADVANTAGES

- Advancement of technology in car because it controls interior like wipers, side glasses etc. so it brings more comfortable to the driver.
- Due to this technology driver do not distract himself from driving.
- It overcomes number of accidents due to increasing technology in car.
- This idea motivated us to introduce a smart system that will eliminate the driver to operate the interior manually, which will improve the convenience of the driver to travel safely and comfortably in vehicle.

## VI. LIMITATIONS

- In this system there is possibility to add some noise like engine noise, road friction, vehicle friction, etc.
- The limitation is that some time we give a command but due different frequencies system does not give satisfied output.
- The acoustic model is in simple term an internal representation of how people using a specific language from a specific country or region speak.
- This model takes lots and lots of training data to create and for many users they work just fine.

## VII. CONCLUSION

In this concept we study on voice recognization application and driving performance using voice recognization, evaluated an in-vehicle voice recognization device and provided qualitative guidelines for designing an in-vehicle voice recognization interface.

Now this system can be implemented for controlling the car systems like slide glasses, slide blinkers, wipers, air conditioner etc. The designed is very portable so as to make it easy to install, configure, run and maintain and also increase the comfort in vehicle.

## VIII. FUTURE SCOPE

At present electrical systems of cars are controlled by hands. We have taken initial step in making this a hands free environment through this idea by implementing voice command controlled system.

Further, in future, this system can be implemented by controlling car interior like door opening and closing. We can also enhance the system to an Automatic system that operates on its own by sensing the surrounding environment.

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