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Voice Recognization System to Control Car Interiors

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ABSTRACT: The objective of the project is to design a "voice recognization system to control car interiors"**.** Speech is the preferred mode of operation for humans, this project intends to make the voice oriented command words for controlling car interiors. The voice frequency is person independent. The system comprises of a user interface module and a car. The user interface module comprises of voice recognization module (v3) which accepts the voice commands through microphone. The voice recognization module accepts the voice commands and compares with the stored commands (this process repeats till the matching occurs). The function related to the matched command is executed.

The module recognizes the voice and sends control messages to the microcontroller. The programmed microcontroller then processes the received data and switches the respective interiors via connected driver circuit or IC regulator. The driver circuit and the IC regulator cater to the power requirements of the high power devices and along acts as a switch to the devices. Thus, 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 Recognization Module, ULN2803 IC, Voltage regulator, servo motors

I.INTRODUCTION

In present day scenario, due to the increase in population, traffic is increasing rapidly, and advancement in technology is bringing more comforts in to the vehicles, these two things combined are leading to the increase in number of accidents. 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.

II. RELATED WORK

Now-a-days voice recognization is gaining more importance, keeping in mind to allow un-distracted driving experience, to the driver, that improves safety and the proposed idea is also gives to improve the luxurious hands free access to interior comforts of the car. In order to have used micro controller (ATMEGA328) along with voice recognization module (v3). Actually Arduino software is used to write the code. In arduino the code is called as "sketch". The program is compiled and converted to machine code (.ino) using the same software. The ".ino" file is dumped to the processor ATMEGA 328 using the same Arduino software.

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II. PROPOSED SYSTEM

A. *Block Diagram:*

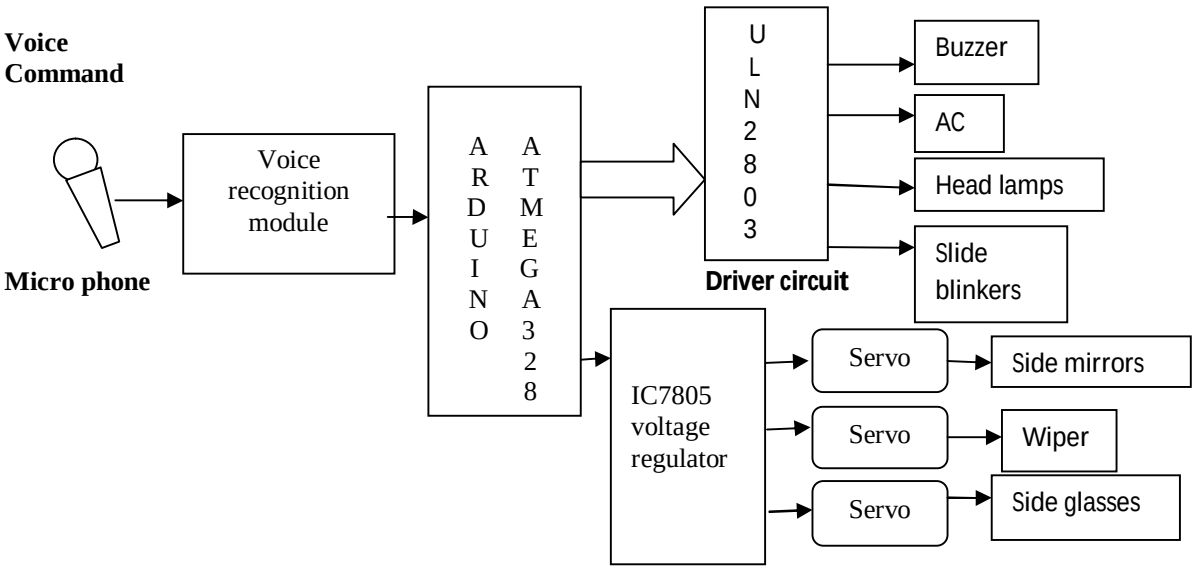

Fig. 1.Block diagram of the system

Voice is a non-electrical signal, so a transducer which converts the voice signal to electrical signal, micro phone, is used. Micro phone gives an analog signal; hence it has to be converted into digital form by using an ADC. 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.

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 averaged sample matches with the already stored sample then the corresponding signal is given to the controller. The car interiors control program is stored in the controller memory. Driving circuit and voltage regulator are present in this kit. Depending on the output of microcontroller program it chooses the path of either driver circuit or voltage regulator. In voltage regulator, we use DC servo motor. The angular range of the servo motor is 180 degree.

B. *Voice Recognization Module (V3):*

ELECHOUSE Voice Recognition Module is a compact and easy-control speaking recognition board. This product is a speaker-dependent voice recognition module. It 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 (full function), General Input Pins (part of function). General Output Pins on the board could generate several kinds of waves while corresponding voice command was recognized.

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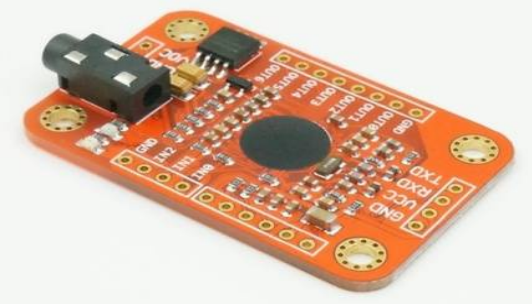

Fig. 2. Voice Recognization Module (V3)

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.

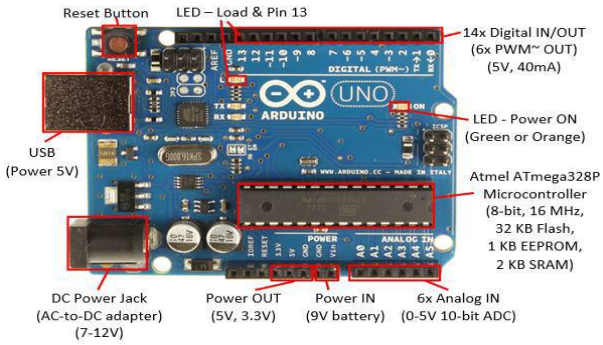

Fig. 3. Arduino UNO R3

D. *Darlington Transistor:*

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.

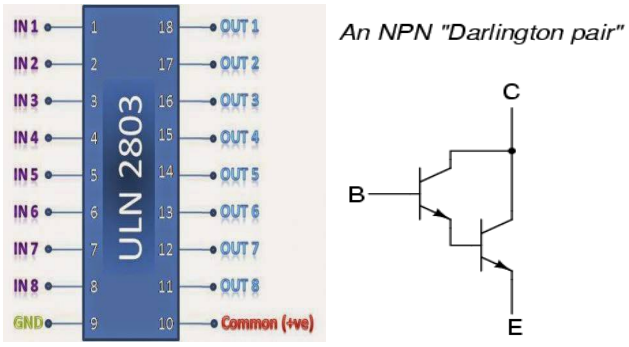

Fig. 4.ULN2803(Darlington transistor PAIR) IC

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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.

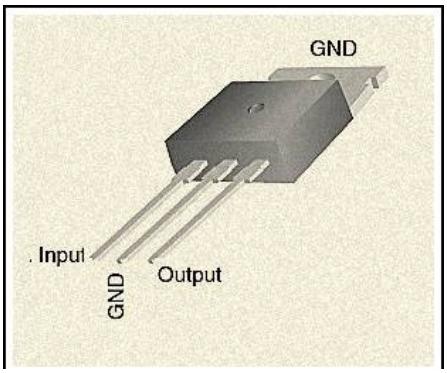

Fig. 5.IC Voltage Regulator

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 and 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.

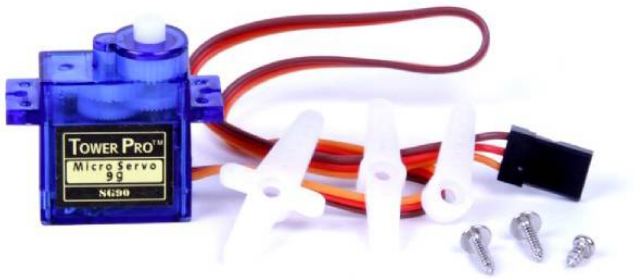

Fig. 6. servo motor

IV.HARDWARE IMPLEMENTATION

Fig 7 shows, hardware implementation of the system. Here, Arduino UNO R3 is connected to the PC, whenever, the user gives the command as input to micro phone. It is a type of transducer. It converts acoustical energy into electrical energy. These signals are sends to Voice Recognization 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

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system. The hard drive has already stored the speech signal & load into the memory. 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. The digital I/O pins of Arduino are connected to ULN2803. Since the signal coming from the microcontroller is very weak, ULN2803 is used for amplification purpose. The output pins of ULN2803 IC are connected to side lamps & side blinkers. And servo motor operating with 5V. Hence IC Voltage Regulator (7805) used to regulate the output voltage of Arduino board. Mainly servomotors are used to rotating the objects like wiper & side glasses.

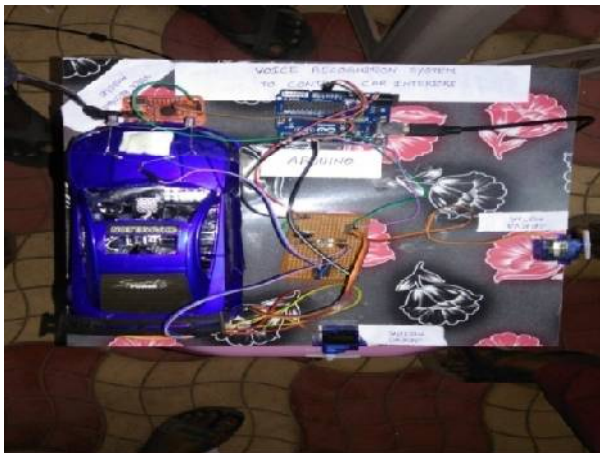

Fig. 7. Overall Prototype

V.RESULTS

After applying input commands, the corresponding results are shown in the figures below;

1. ON (Head Lights on)
2. OFF(Head Lights Off)

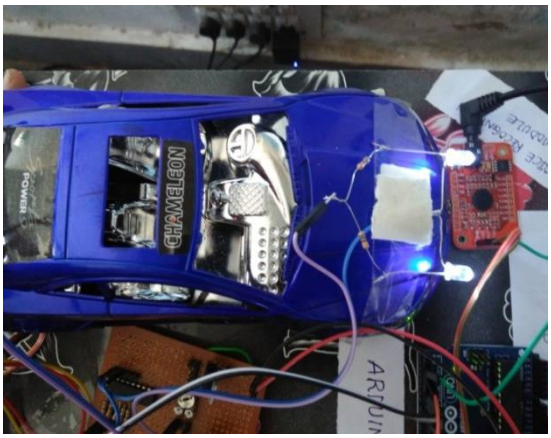

Fig. 8. Head Lights On

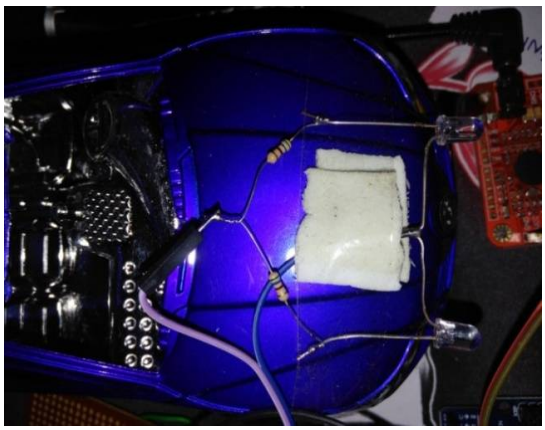

Fig. 9. Head Lights Off

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The above figures 8 and 9 shows, how head lights are operating according to the voice commands

3. MOVE (Wiper Starts Rotating)

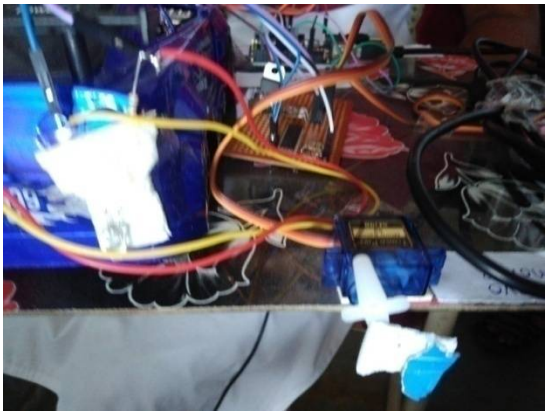

Fig.10. Wiper Starts Rotating

4. STOP(Wiper Stop Rotating)

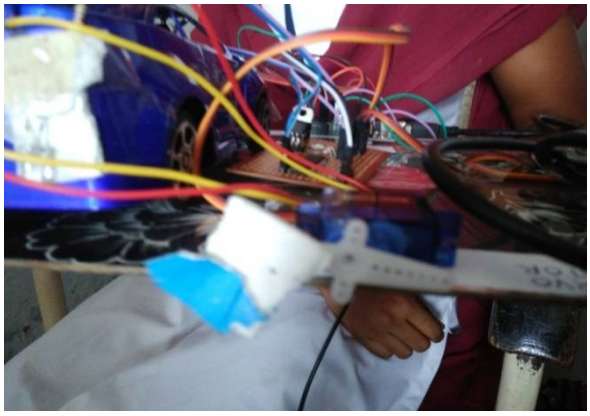

Fig.11. Wiper Stop Rotating

The above figures 10 and 11 shows, how wiper is operating according to the voice commands.

5. GO (Side Blinkers On)

Fig. 12. Side Blinkers On

6. FINISH (Side Blinkers Off)

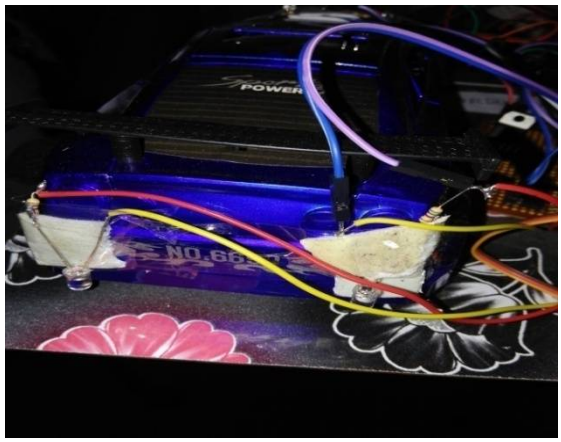

fig. 13. Side Blinkers Off

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The above figures 12 and 13 shows, how side blinkers are operating according to the voice commands.

7. OPEN (Side Glasses Up)

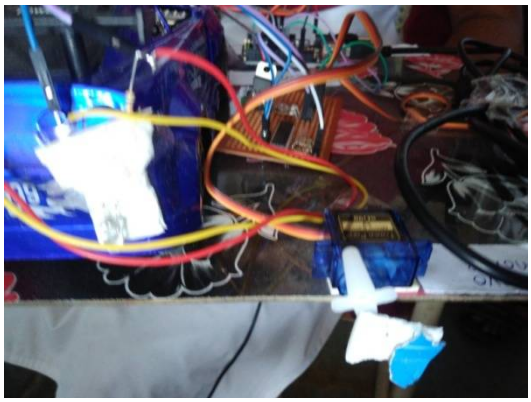

Fig. 14. Side glasses up

8. CLOSE (Side Glasses Down)

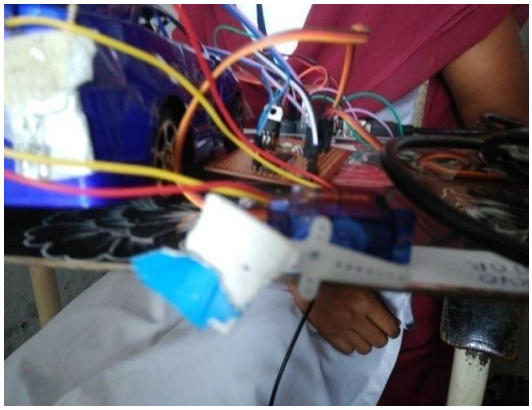

Fig. 15. Side glasses down

The above figures 14 and 15 shows, how side glasses are operating according to the voice commands.

VI. CONCLUSION

The system has been successfully designed and tested. Now this system can be implemented in full fledge 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.

VII. FUTURE SCOPE

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

Further, in future, this system can be implemented by controlling car interior electrical system by thought waves or brain waves. We can also enhance the system to an Automatic system that operates on its own by sensing the surrounding environment.

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