Volume 6, Issue 5, May 2016 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

Voice Based Vehicle Parameter Control

[1]C. Jeeva, [2]Anwar Naseer Khan, [3]Junaid Azad Wani, [4]Amit Kumar
[1] Assistant Professor, SRM University in the Department, Electrical and Electronics, India
[2, 3, 4] B-Tech, SRM University in Electrical and Electronics, India

Abstract- Modern industries are increasingly demanding process automation in all sectors. Automation results into better quality, increased production and reduced costs. In this project, a prototype that shows how automation techniques are been used in a vehicle, and use of micro-controller for providing same is shown. The interfacing properties of Micro-Controller device with other devices like relay, motor and sensors Etc., has made automation work so expedient and consequently successful. This type of technique, with some major and minor modifications can be successfully used at various places. Use of this technique for vehicle will reduce the human efforts. This idea is developed used ATMEGA 328 Micro-controller.

Keywords: smart voice sensor system, RF module, sensors, vehicle navigation, safety implementation

I. INTRODUCTION

In our proposed design, we wish to control the movements of the vehicle using voice commands from the user connected with a sound card and a Microphone. In front of driver seat. The goal of Voice Sensor Vehicle is to listen and act on the commands received from the user. Here, the system will require the training from the user (for the accent) after which the device will start understanding the commands issued. Further the system can also work in Manual Front Panel Control Mode where the switches/ control buttons will be provided in the GUI (Graphical User Interface) and they can be used to control the direction of movements. Additionally we use the existing concept of smart zonal sensor system in particular areas or places. As an example, near school zone, the sign board displays “School Zone Ahead, Drive Slowly”, or near a hospital, “Hospital Area-Do not Blow Horn”, but in reality rarely this is practiced. Drivers go at very high speed as usual near school zone, or operate the harsh horns loudly causing inconvenience to the patients in the hospital. Even though these are meant for the safety of the vehicles traveling and also for the general public, it is hardly practiced by the vehicle drivers. As a result, it makes the whole concept of displaying warning sign and messages on the roadside boards meaningless. So, to prevent accidents and make the driver follow rules automatically as well as add to the driver's convenience we can vary some parameters of the vehicle

II. EXISTING WORK

Earlier some implementation has been done on this technology. The previous work included the variation of the speed of the vehicle in zones like school, hospital, U-turn and highway for accident prevention. It included a smart zone based vehicle speed control Using RF and obstacle detection and accident prevention system. Whenever the vehicle is within the zone, the vehicle’s speed has been controlled by receiving the signal and reducing it to some cut-off value and kept constant until the vehicle moves out of the zone, and then the vehicle gets accelerated by itself. It detects obstacles by using IR sensors and prevents accidents by stopping the vehicle. The modules used in the system were RF transmitter and receiver modules for establishing wireless communication, DC motors for the movement controller, IR sensor for obstacle detection.

III. PROPOSED WORK

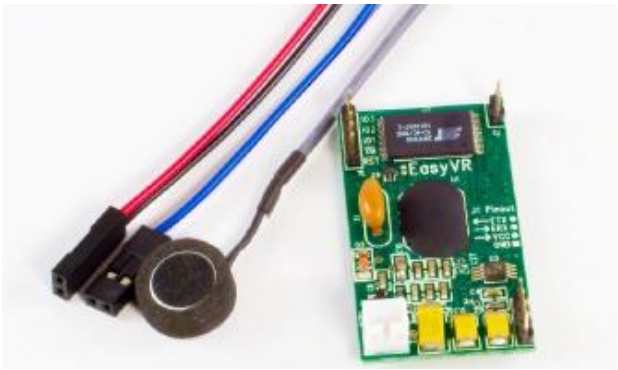
The person who is sitting in the vehicle can control the vehicle by voice sensor module is connected with sound card and microphone is used for speech recognition and signals transfer. is used to control the vehicle to take the corresponding action. Once the connection is established and Speech control system includes two parts: speech recognition module and control module. Speech recognition system is used to provide an analysis of the human’s voice in order to determine what action the Microcontroller needs to take to satisfy operator’s request.

Control module is used to make the Microcontroller understand voice commands and act in the desired mode the process of speech commands controlling is complicated. When the operator (either a disabled person in car or a person from base station) speaks, their voice will be captured by the microphone and passed into soundcard where actual analogy to digital conversion takes place. The digital signals from previous step are fed as input to the ‘Speech Command Recognition Module’ where oral commands will be processed into a structure of features. These features may include signal characteristics such as energy or frequency response. The features would be analysed and compared with the data in database. The database is obtained through signal analysis, that stage can be called “training” of the speech data. The recognized commands will be passed into control module, which is separate from the speech recognition module. The control module will process the commands it receives from the speech recognition module and instruct to take

corresponding actions. These actions are sent to the microcontroller which is connected to an encoder transmitter and an antenna. Micro controller sends the corresponding instructions to encoder which encodes address/data bits and transmits the radio signals with the help of the antenna. Additionally we also programmed a Microcontroller to decrease the speed of the vehicle when it enters school zone, which is done by using a resistance connected to the DC motor of the vehicle, and disable horn when it enters the hospital zone [6]. Also with the help of microcontroller we are able to display the different messages on the LCD at the entry and exit of each zone. In the circuit of the receiver, a crystal oscillator is used for the clock. The relay is used because we need to control a large amount of current and/or voltage with a small electrical signal. The Darlington Transistor is used to drive the relay. Transistors are used as switches. The LCD display is used along with a contrast switch for the display of messages. The 10u capacitor and 10K resistor are connected to the RST pin of microcontroller for resetting it.

3.1 VR MODULE

Easy VR is a multi-purpose speech recognition module designed to easily add versatile, robust and cost Effective speech recognition capabilities to virtually any application. The Easy VR module can be used with any host with an UART interface powered at 3.3V – 5V, such as PIC and Adriano boards. Some application examples include home automation, such as voice controlled light switches, locks or beds, or adding "hearing" to the most popular robots on the market.



VR FEATURES

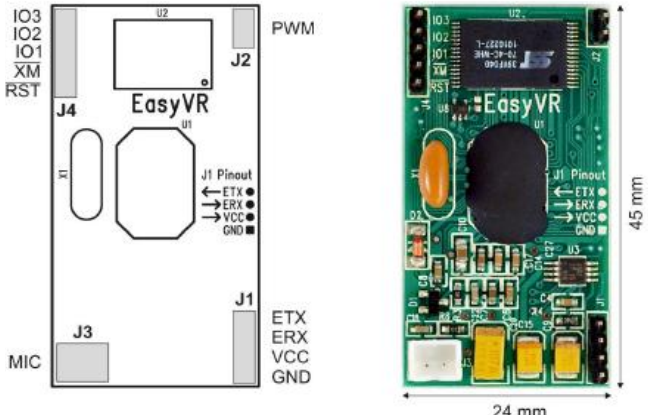
A host of built-in Speaker Independent (SI) commands for ready to run basic controls, in the Followings languages:

- English (US)
- Italian
- German
- French
- Spanish
- Japanese

- Supports up to 32 user-defined Speaker Dependent (SD) triggers or commands as well as Voice
- Passwords. SD custom commands can be spoken in ANY language.
- Easy-to-use and simple Graphical User Interface to program Voice Commands and audio.
- Module can be used with any host with an UART interface (powered at 3.3V - 5V)
- Simple and robust documented serial protocol to access and program through the host board
- 3 GPIO lines (IO1, IO2, IO3) that can be controlled by new protocol commands.
- PWM audio output that supports 8Ω speakers.
- Sound playback of up to 9 minutes of recorded sounds or speech.

3.2 Technical Specification

3.2.1 Physical Dimension And Pin Assignment



Connector	Number	Name	Type	Description
J1	1	GND	-	Ground
	2	VCC	I	Voltage DC input
	3	ERX	I	Serial Data Receive (TTL level)
	4	ETX	O	Serial Data Transmit (TTL level)
J2	1-2	PWM	O	Differential audio output (can directly drive 8Ω speaker)
J3	1	MIC_RET	-	Microphone reference ground
	2	MIC_IN	I	Microphone input signal
J4	1	/RST	I	Active low asynchronous reset (internal 100K pull-up)
	2	/XM	I	Boot select (internal 1K pull-down)
	3	IO1	I/O	General purpose I/O (3.0 VDC TTL level)
	4	IO2	I/O	General purpose I/O (3.0 VDC TTL level)
	5	IO3	I/O	General purpose I/O (3.0 VDC TTL level)

Note: the GPIO (J4.3, J4.4, and J4.5) are at nominal 3.0VDC level. Do not connect 5VDC Directly to these pins.

3.2.2 Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	Unit
VCC	Voltage DC Input	3.3	5.0	5.5	V
Ta	Ambient Operating Temperature Range	0	25	70	°C
ERX	Serial Port Receive Data	0	-	VCC	V
ETX	Serial Port Transmit Data	0	-	VCC	V

3.2.3 Electrical Characteristics

These are applicable to J4 pins only, including IO1-3, /XM and /RST.

Symbol	Parameter		Min	Typ	Max	Unit
V_{IH}	Input High Voltage		2.4	3.0	3.3	V
V_{IL}	Input Low Voltage		-0.1	0.0	0.75	V
I_{IL}	Input Leakage Current (0 < V_{IO} < 3V, Hi-Z Input)			<1	10	µA
R_{PU}	Pull-up Resistance	Strong		10		kΩ
		Weak		200		kΩ
V_{OH}	Output High Voltage (I_{OH} = -5 mA)		2.4			V
V_{OL}	Output Low Voltage (I_{OL} = 8 mA)				0.6	V

3.2.4 Power Supply Requirements

Symbol	Parameter		Min	Typ	Max	Unit
I_{Sleep}	Sleep current		< 1			mA
I_{Oper}	Operating current		12			mA
$I_{Speaker}$	Audio playback current (with 8Ω speaker)		180			$mA_{(RMS)}$

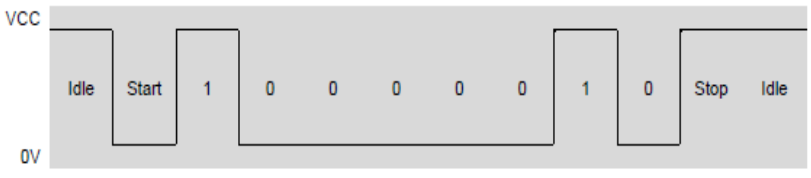
3.2.5 Serial Interface

The Easy VR is a "slave" module communicating via an asynchronous serial interface (commonly known as UART interface), with the following features:

- Baud Rate: **9600** (default), 19200, 38700, 57600, 115200
- Frame: **8** Data bits, **N**o parity, **1** Stop bit

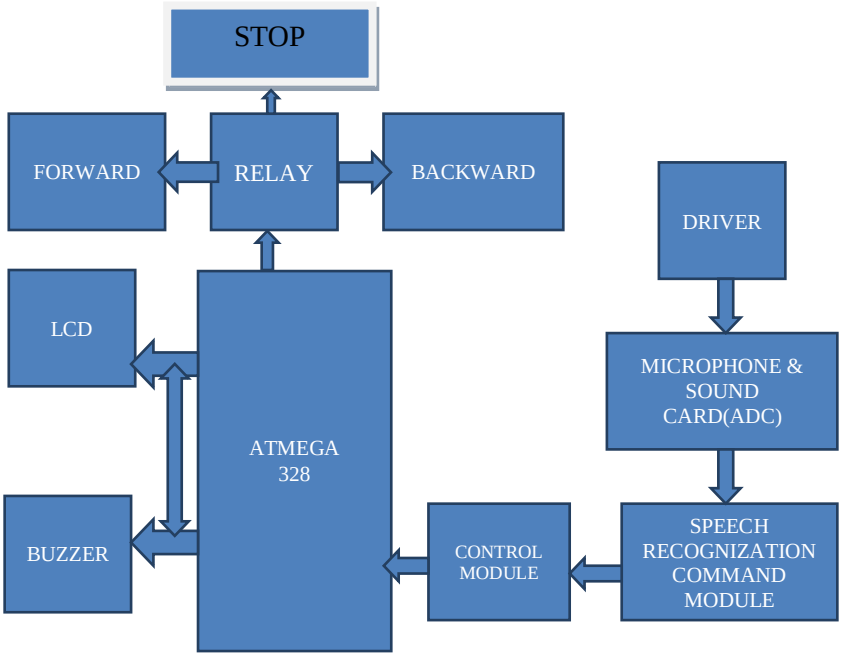
The receiver input data line is ERX, while the transmitter output data line is ETX. No handshake lines are Used.

Example of a serial data frame representing character "A" (decimal 65 or hexadecimal 41):-



IV. FIGURES

4.1 Block Diagram

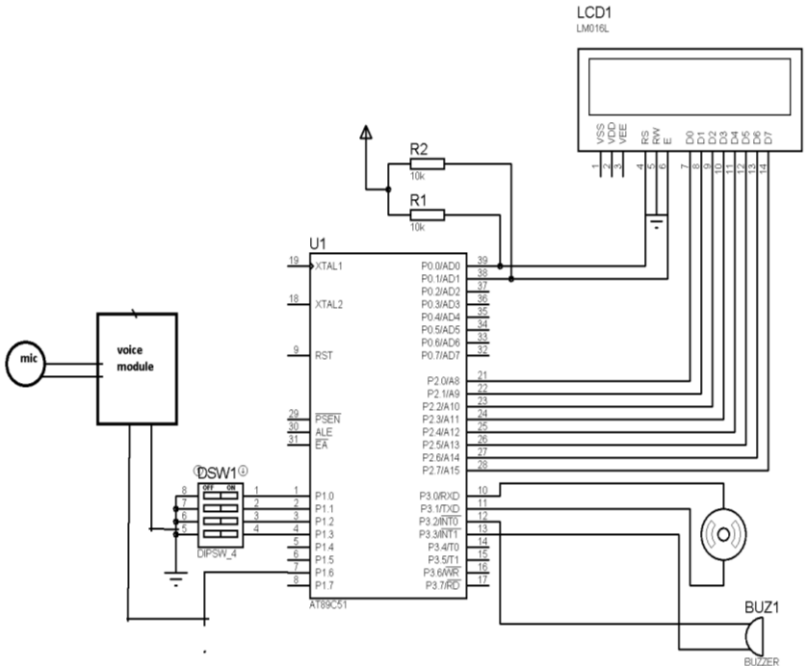


A. Components

- Microcontroller
- Voltage regulators
- Voice module sensor
- Encoders
- Decoder
- RF Module
- Resistors
- Capacitor
- Relay
- Crystal Oscillator
- LCD Display
- Transistor

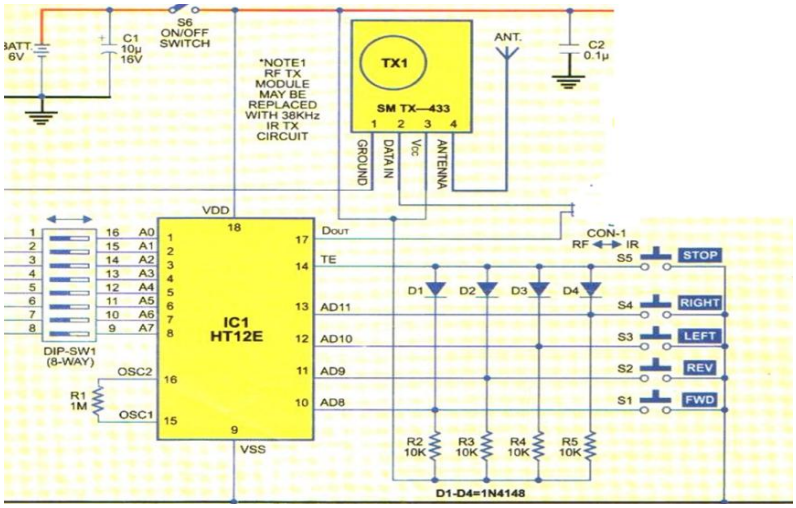
B. Individual Modules

The Voice module shown in below fig is fitted on the vehicle. It consists of a voltage regulator, a decoder, microcontroller, relay, Darlington transistor, Resistors, Buzzer and an LCD display

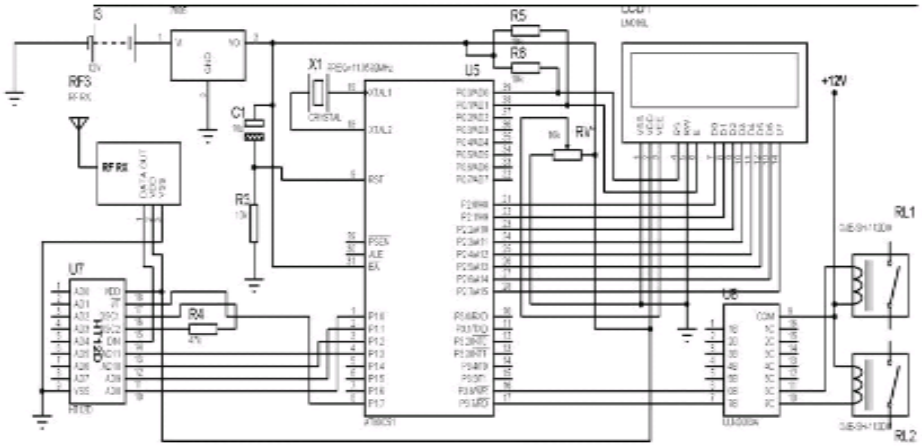


4.2 Circuit Diagram

4.2.1 Circuit diagram of transmitter



4.2.2 Circuit diagram of Receiver



V. PROGRAMMING

```
# wake up or interrupt recognition or do nothing
# (uses a timeout or max repetition count)
DO
SEND 'b'
LOOP UNTIL RECEIVE = 'o'
# ask firmware id
SEND 'x'
IF NOT RECEIVE = 'x' THEN ERROR
# send ack and read status (expecting id=0)
SEND ' '
id = RECEIVE
IF id = 'A' THEN
# it's a VRbot
ELSE IF id = 'B' THEN
# it's an EasyVR
ELSE
# next generation?
END IF
# set language for SI recognition (Japanese)
SEND 'l'
SEND 'C'
IF RECEIVE = 'o' THEN OK ELSE ERROR
# set timeout (5 seconds)
SEND 'o'
SEND 'F'
IF RECEIVE = 'o' THEN OK ELSE ERROR
```



```
# start recognition in wordset 1
SEND 'i'
SEND 'B'
# wait for reply:
# (if 5s timeout has been set, wait for max 6s then abort
# otherwise trigger recognition could never end)
result = RECEIVE
IF result = 's' THEN
# successful recognition, ack and read result
SEND ' '
command = RECEIVE – 'A'
# perform actions according to command
ELSE IF result = 't' THEN
# timed out, no word spoken
ELSE IF result = 'e' THEN
# error code, ack and read which one
SEND ' '
error = (RECEIVE – 'A') * 16
SEND ' '
error = error + (RECEIVE – 'A')
# perform actions according to error
ELSE
# invalid request or reply
ERROR
END IF
 # insert command 0 in group 3
 SEND 'g'
 SEND 'D'
 SEND 'A'
 IF RECEIVE = 'o' THEN OK ELSE ERROR
 # set command label to “ARDUINO_2009”
 SEND 'g'
 SEND 'D'
 SEND 'A'
 SEND 'Q' # name length (16 characters, digits count twice)
 SEND 'A'
 SEND 'R'
 SEND 'D'
 SEND 'U'
 SEND 'I'
 SEND 'N'
 SEND 'O'
 SEND '_'
 # encode each digit with a ^ prefix
 # followed by the digit mapped to upper case letters
 SEND '^'
 SEND 'C'
 SEND '^'
 SEND 'A'
 SEND '^'
 SEND 'A'
 SEND '^'
 SEND 'J'
IF RECEIVE = 'o' THEN OK ELSE ERROR
 # dump sound table
 SEND 'h'
 IF NOT RECEIVE = 'h' THEN ERROR
 # read count of entries and name length
 SEND ' '
 count = (RECEIVE – 'A') * 32
 SEND ' '
 count = count + (RECEIVE – 'A')
 SEND ' '
```



```
length = RECEIVE – 'A'
# read name text
FOR i = 0 TO length - 1
SEND ' '
label[i] = RECEIVE
NEXT
```

VI. RESULT

In our proposed design, we wish to control the movements of the vehicle using voice commands from the user connected with a sound card and a Microphone. In front of driver seat. The goal of Voice Sensor Vehicle is to listen and act on the commands received from the user. Here, the system will require the training from the user (for the accent) after which the device will start understanding the commands issued. And additionally we can see that the vehicle moves to the exit point which is having a receiver, decoder and microcontroller, which indicates when vehicle enters school (any institutional) zone or hospitals zone will reduce the speed of the vehicle with RF Module with respective place or We can reduce it with the Voice Based Module anywhere u can reduce the speed of the vehicle.

VII, CONCLUSION AND FUTURE SCOPE

We have proposed the integration of voice recognition and navigation system into the vehicle which helps for disabled people. This speech-control system, though quite simple, shows the ability to apply speech recognition techniques to the control application. Our sensor can understand control Commands spoken in a natural way, and carry out action. The method is proved for real-time operation. This device (integrated with modern technology) has been initiated to prevent accidents; safety and convenience to the people by making them follow traffic rules automatically. This system is also cheap and easy to install as compared to GPS system. It can be used in any type of vehicle

In the future we intend to add RFID Tags to our vehicle for its tracking. We can also use GPS instead of RF Module in our vehicle. If this system is installed in all the vehicles it can be used for traffic regulation. In case of traffic jams it can even be helpful as we are able to monitor number of vehicles in a particular zone and can deliver information regarding heavy traffic in a particular area.

REFRENCES

[1] D.B. Chav an, A.R. Makandar, F.H. Khan, S.A. Inamdar. Automatic Vehicle Speed Reduction System Using Rf Technology, International Journal of Engineering Research and Applications, Vol. 4, Issue 4, pp 776-777, April 2014.

[2] S. V. Rao, P. S. Kumar, N. A. Kumar, M.S. Yusuf, B. Krishna. Smart Zone Based Vehicle Speed Control Using RF and Obstacle Detection and Accident Prevention, International Journal of Emerging Technology and Advanced Engineering, Volume 4, Issue 3, pp 13-16, March 2014.

[3] www.teal.gmu.edu/courses/ECE447_OLD/component_specs/transceiver_Manual_433MH

[4] www.keil.com

[5] www.holtek.com

[6] www.alldatasheet.com/datasheet

