A SURVEY REPORT ON VIRTUAL CARE TAKER-VOICE GUIDER

A.Sriram
Asst. Prof, IT Depatment
Anurag Group of Institutions, V: Venkatapur
M: Ghatkesar, D: RangaReddy, Telangana

B.Raviraju
Asst. Prof, IT Depatment
Anurag Group of Institutions, V: Venkatapur
M: Ghatkesar, D: RangaReddy, Telangana

Dr. A. Prashanth Rao
Professor, IT Department,
Anurag Group of Institutions, V: Venkatapur
M: Ghatkesar, D: RangaReddy, Telangana

Abstract: In this busy and competition world one cannot monitoring our elders (aged people) and patients continuously even though one have so much of love on them , whenever any person is unable speak then this system helps them to play some basic and emergency voice messages according to user needs. These voices will be played through speaker so that nurse or their care takers in home can come and help them immediately. By using advancements in present technologies this project is been developed to save time and user friendly system. Now a day's so many useful technologies are coming out to make our life style more comfort, luxurious and secure. This project is designed with combination of two latest and most demanding technologies that are Android and Embedded System. Create an application to play some basic voices through speaker which is present in our room. Whenever one operates this application, it sends commands to our controlling system through bluetooth. At controlling system side we have bluetooth module, micro controller, audio amplifier, and speaker. Whenever this bluetooth module receives command from android application then it transfers this command to micro controller. Micro controller directly by saving prerecorded voice message in micro controller's memory in the form of binary we can play that voice message. This is very comfort and can operate easily just by touching the respective keys on mobile application [1, 2, 6, 10]

Keywords: virtual care taker, voice guider, patient voices, Arduino UNO

INTRODUCTION

Now a day's so many useful technologies are coming out to make our life style more comfort, luxurious and secure. This project is designed with combination of two latest and most demanding technologies that are Android and Embedded Systems. This project has been developed to save time and provide user friendly system by using advancements in present technologies. Now a day's so many useful technologies are coming out to make our life style more comfort, luxurious and secure. This project is designed with combination of two latest and most demanding technologies that are Android and Embedded System. This application creates patient voices and these voices fed into system as a input through speaker. The system interns sends commands to controlling system using bluetooth.The controlling system comprises bluetooth module, micro controller, audio amplifier, and speaker. Whenever this bluetooth module receives commands from application then it transfers these commands to micro controller device. The micro controller maps the prerecorded voices- commands and interprets the message accordingly in the form of binary. This is very comfort and can operate easily just by touching the respective keys on mobile application.

The main objective of this paper is to monitor the patient remotely and also reduces the manpower. This is very comfort and can operate easily just by touching the respective keys on mobile application.
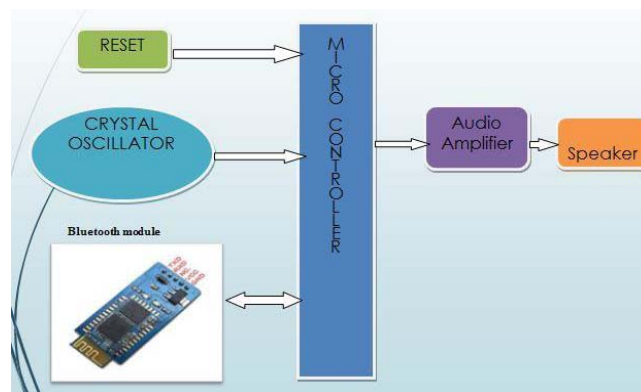

Fig 1: Block diagram for virtual care taker and voice guider device [4].

The various components of VCVCD system has shown in Fig 1 which records the voices and sends the commands to the controlling system. The effective user interface is provided to operate VCVCD application easily just by touching the respective keys on mobile application [1].

The main components of VCVCD system are given below:

a. CRYSTAL OSCILLATOR

A **crystal oscillator** is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a precise frequency. This frequency is commonly used to keep track of time, as in quartz wristwatches, to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio

transmitters and receivers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators, but other piezoelectric materials including polycrystalline ceramics are used in similar circuits.

Quartz crystals are manufactured for frequencies from a few tens of kilohertz to hundreds of megahertz. More than two billion crystals are manufactured annually. Most used for consumer devices such as wristwatches, clocks, radios, computers, and cellphones. Quartz crystals are also found inside test and measurement equipment, such as counters, signal generators, and oscilloscopes. [1]

b. MICRO CONTROLLER

ATMega328 - Microcontroller
Code: A000048

The ATMEGA328P Micro controller uses in VCVCD system which is preloaded with the Arduino UNO (16MHz) Boot loader. This will allow you to use Arduino code in your custom embedded project without having to use an actual Arduino board. [2]

c. Communication Module

HC-05 embedded Bluetooth serial communication module (can be short for module) have two work modes: order-response work mode and automatic connection work mode [8].

d. APR MODULE

This APR Module enables the APR9600 device to reproduce voice signals in their natural form. It eliminates the need for encoding and compression, which often introduce distortion.

While the input signal to an audio power amplifier, such as the signal from an electric guitar, may measure only a few hundred microwatts, its output may be a few watts for small consumer electronics devices, such as clock radios, tens or hundreds of watts for a home stereo system, several thousand watts for a nightclub's sound system or tens of thousands of watts for a large rock concert sound reinforcement system. While power amplifiers are available in standalone units, typically aimed at the hi-fi audiophile market and sound reinforcement system professionals, most consumer electronics sound products, such as clock radios, boom boxes and televisions have relatively small power amplifiers that are integrated inside the chassis of the main product [2].

KIT SETUP
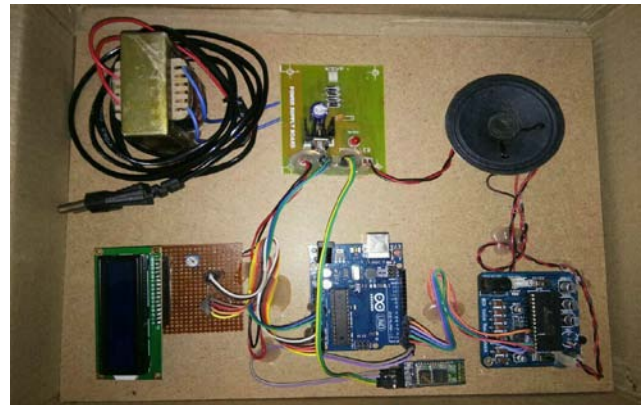
In the implementation of this device we are using some hardware components. They are as follows:

1. Step down Transformer.

2. Regulated +5v and +12v power supply.

3. ATMEGA328P Micro Controller.

4. Bluetooth module or switches or remote.

5. APR module.

6. Audio amplifier.

7. LCD display.

2.1 LCD Basic Commands

All data transferred to LCD through outputs D0-D7 will be interpreted as commands or as data, which depends on logic state on pin RS:

RS = 1 -Bits D0 -D7 are addresses of characters that should be displayed. Built in processor addresses built in map of characters‖ and displays corresponding symbols. Displaying position is determined by DDRAM address. This address is either previously defined or the address of previously transferred character is automatically incremented.

RS = 0 -Bits D0 -D7 are commands which determine display mode.

2.2 LCD Connection

Depending on how many lines are used for connection to the microcontroller, there are 8-bit and 4-bit LCD modes. The appropriate mode is determined at the beginning of the process in a phase called ―initialization‖. In the first case, the data are transferred through outputs D0-D7 as it has been already explained. In case of 4-bit LED mode, for the sake of saving valuable I/O pins of the microcontroller, there are only 4 higher bits (D4-D7) used for communication, while other may be left unconnected.

Consequently, each data is sent to LCD in two steps: four higher bits are sent first (that normally would be sent through lines D4-D7), four lower bits are sent afterwards. With the help of initialization, LCD will correctly connect and interpret each data received. Besides, with regards to the fact that data are rarely read from LCD (data mainly are transferred from microcontroller to LCD) one more I/O pin may be saved by simple connecting R/W pin to the Ground. Such saving has its price.

Even though message displaying will be normally performed, it will not be possible to read from busy flag since it is not possible to read from display.

2.3 LCD Initialization

Once the power supply is turned on, LCD is automatically cleared. This process lasts for approximately 15mS. After that, display is ready to operate. The mode of operating is set by default. This means that:

1. Display is cleared
2. Mode

DL = 1 Communication through 8-bit interface

N = 0 Messages are displayed in one line

F = 0 Character font 5 x 8 dots

3. Display/Cursor on/off

D = 0 Display off

U = 0 Cursor off

B = 0 Cursor blink off

4. Character entry

ID = 1 Addresses on display are automatically incremented by 1

S = 0 Display shift off

Automatic reset is mainly performed without any problems. If for any reason power supply voltage does not reach full value in the course of 10mS, display will start perform completely unpredictably. If voltage supply unit cannot meet this condition or if it is needed to provide completely safe operating, the process of initialization by which a new reset enabling display to operate normally must be applied.

Algorithm according to the initialization is being performed depends on whether connection to the microcontroller is through 4-or 8-bit interface. All left over to be done after that is to give basic commands and of course-to display messages.
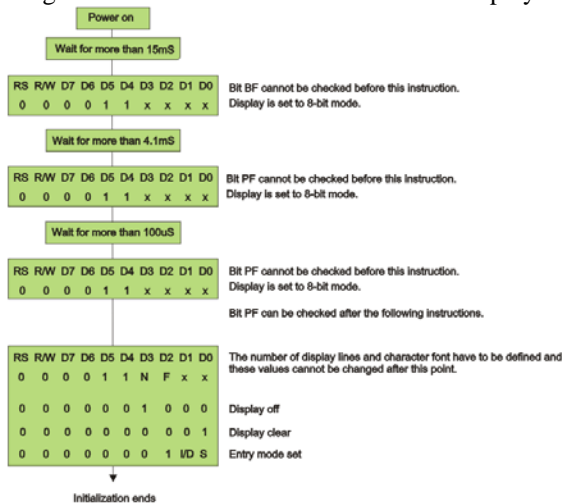

Procedure on 8 bit initialization.

2.4 Contrast control:

To have a clear view of the characters on the LCD, contrast should be adjusted. To adjust the contrast, the voltage should be varied.

FLOW OF EVENTS

3.1 Basic Flow

This part starts when actor setup the kit by making connections.

a. The system has two modes one for recording and another for playing the voice purpose.

b. The actor chooses the mode according to his purpose.

3.2 Special Requirements

All connections must be checked properly.

3.3 Pre-Conditions

User has to make sure all the connections were made properly.

3.4 Post-Conditions

If the part of the project is successful, the kit has been setup properly [9].

COMMUNICATION

HC-05 embedded Bluetooth serial communication module (can be short for module) has two work modes: order-response work mode and automatic connection work mode. And there are three work roles (Master, Slave and Loopback) at the automatic connection work mode. When the module is at the automatic connection work mode, it will follow the default way set lastly to transmit the data automatically. When the module is at the order-response work mode, user can send the AT command to the module to set the control parameters and sent control order. The work mode of module can be switched by controlling the module PIN (PIO11) input level [3].

4.1 Serial module PINs:

1. PIO8 connects with LED. When the module is power on, LED will flicker. And the flicker style will indicate which work mode is in using since different mode has different flicker time interval.

2. PIO9 connects with LED. It indicates whether the connection is built or not. When the Bluetooth serial is paired, the LED will be turned on. It means the connection is built successfully.

3. PIO11 is the work mode switch. When this PIN port is input high level, the work mode will become order-response work mode. While this PIN port is input low level or suspended in air, the work mode will become automatic connection work mode.

4. The module can be reset if it is re-powered since there is a reset circuit at the module.

1. How to get to the AT mode.

Way 1:

Step 1: Input low level to PIN34.

Step 2: Supply power to the module.

Step 3: Input high level to the PIN34. Then the module will enter to AT mode. The baud rate is as same as the communication time, such as 9600 etc.

Way 2:

Step 1: Connect PIN34 to the power supply PIN.

Step 2: Supply power to module (the PIN34 is also supplied with high level since the PIN34 is connected with power supply PIN). Then the module will enter to AT module. But at this time, the baud rate is 38400. In this way, user should change the baud rate at the AT mode, if they forget the communication baud rate. How to get to the communication mode:

Step 1: Input low level to PIN34.

Step 2: Supply power to the module. Then the module will enter to communication mode. It can be used for pairing.

2. How to set this module be the master role.

Step 1: Input high level to PIO11.

Step 2: Supply power to the module. And the module will enter to the order-response work mode.

Step 3: Set the parameters of the super terminal or the other serial tools (baud rate: 38400, data bit:8, stop bit:1, no parity bit, no Flow Control)

Step 4: Sent the characters ―AT+ROLE=1\r\n‖ through serial, then receive the characters ―OK\r\n‖. Here, ― \r\n‖ is the CRLF.

Step 5: Input low level to PIO, and supply power to the module again. Then this module will become master role and search the other module (slave role) automatically to build the connection.

3. Notes.

(1) HC-03 and HC-05's command should end up with ―\r\n‖. It means when you finish programming, you should add terminator (―ENTER‖ or ― 0x0d 34   0x0a‖) to the program. It's different from HC-04 and HC-06 (They don't need terminator).

(2) The most common commands for HC-03 and HC-05 are: AT+ROLE (set master –slave), AT+CMODE(set address pairing) , AT+PSWD (set password). If you want the master module has the function of remembering slave module, the most

simply way is: First, set AT+CMODE=1. Make the master module pair with the slave module. Second, set AT+CMODE=0. Then the master module just can make pair with that specified slave module.

(3) When PIN34 keeps high level, all commands can be used. Otherwise, only some of them can be used.

Detailed description of Command

(AT command is case-sensitive, should end up with terminator (―enter‖ or ― \r\n‖).

MODULE SELECTION

This part of the project begins when actor connects the two devices he'll be having 3 modes for communication.
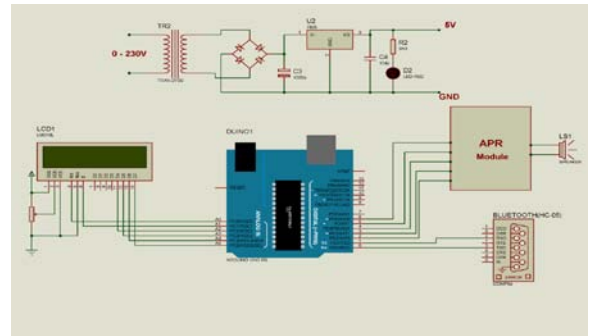
a. Byte stream mode

b. Keyboard mode

c. CMD line mode.

5.1 Flow of Events

When the user opens the applications and connects to the bluetooth he will be having mode of communication according to the mode of communication the communication is done [5].

5.2 Circuit diagram

Hardware Design [7, 10].

CONCLUSION

Now a day's so many useful technologies are coming out to make our life style more comfort, luxurious and secure. This project is designed with combination of two latest and most demanding technologies that are Android and Embedded Systems**.** In this busy and competition world we cannot monitoring our elders (aged people) and patients continuously even though we have so much of love on them, whenever any person is unable speak then this system helps them to play some basic and emergency voice messages according to user needs. These voices will be played through speaker so that nurse or their care takers in home can come and help them immediately. By using advancements in present technologies we are developing this project to save time and user friendly system [1, 6].

REFERENCES

[1]   http://nexttlabs.blogspot.in/2013/01/virtual-care-taker-voice-guider-for.html

[2] Jochen Schiller, "Mobile Communications", Addison-Wesley., second edition, 2004.

[3] ASOKE K TALUKDER "Mobile Computing", McGraw Education, second Edition

[4]   http://nexttlabs.blogspot.in/2013/01/virtual-care-taker-voice-guider-for.html

[3] IEEE Trans Inf Technol Biomed. 2012 Nov;16(6):1024-31.doi:10.1109/TITB.2012.2203313. Epub 2012 Jun 6.

[5] GUIDE Consortium: User Interaction & Application Requirements, Deliverable D2.1, 2011.

[6] Harper, R.: Being Human – Human-Computer Interaction in the year 2020, Microsoft Research Ltd, England, 2008.

[7]   https://www.futureelectronics.com › Semiconductors

[8] Krämer, N.C.: Soziale Wirkungen virtueller Helfer – Gestaltung und Evaluation von Mensch-Computer-Interaktion, Kohlhammer, Stuttgart, 2008.

[9]   https://www.wearvr.com/apps/the-caretaker

[10]   https://www.bluetooth.com.