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Multi Character Identification for Visually Impaired Using Braille System

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ABSTRACT

India is now a home to the world's largest number of blind people. Technologies are developed day by day principally in communication mobile phones which plays a crucial role. But visually impaired people can't able to use message application in mobile phones. The proposed system is to help the blind to know the letters through voice communication. This system designed so as to make thing easy for the blind people. In this system we use 6 dots Braille system which mostly used in blind school. Normally speech recognition software, audio interface is mostly used features to use computers by the blind. Here the same features are introducing in the mobile with Braille system. In this system, we receive messages by using modem. All that messages are recognized by audio interface and sending acknowledgment for that particular message by using speech recognition with help of Braille system. So with this system blind peoples can able to use all the applications in mobile phone as a normal people.in future this system will be helpful to blind people to communicate whole the world with simple interface.

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I. INTRODUCTION

Mobile phone is a very useful invention. Today all the people are using mobile phones for their convenient the mobile phone is a very good technology for communication. Having mobile phone is a great advantage for communicating with friends and families from anywhere to all over in the world. By calling or sending messages from mobile phone we can easily able to connect with others without electricity. Now a day's SMS (short message service) is the most useful application. Today 80% of mobile phone users are using this data application. But the visually impaired people cannot able to use this application. In this project the visually impaired people can read message using mobile phone, and also this system help the blind people to send acknowledgment for the current incoming messages .This will be implemented by interfacing the Braille system with mobile phone. Louise Braille is the father of Braille system. This system is a worldwide system; with the help of this system, all the blind peoples for reading and writing like a normal people.

II. LITERATURE SURVEY

In the past two decades, several Braille System Output Devices were developed to help the blind and visually impaired individuals interact with computers. In the late 1990's, a device called Braille Lite was developed by Blazie Engineering (Windermere House, Kendal Avenue, London, England). It has the ability to represent up to 18 characters and is refreshable; characteristics that help visually impaired individuals to skim a text document more easily. However, its price made it difficult for all visually-impaired and blind individuals to acquire it.

In order to give blind persons the ability to read characters easily, Telesensory (Bukit Batok Crescent, Prestige Centre, Singapore) developed a device called Octacon. Optacon is a device that prints the regular shape of the letters, and enables the readers to feel the letter and thus read it. This was done by using vibrating metal rods that are moved over a printed page, converting the image of the letter into a tactile form. The main drawback of the Optacon is that it was not very practical, and it would take a visually-impaired person a very long time to skim a text document.

In 2001, the Palm Braille was developed by Scott Stoffel. It is a device which connects to the parallel port of the computer and has the ability to read the characters from a file in order to output them. The users of the device can sense the six pins on the device and know which letter they are reading. The problem of the Palm Braille is that it was only able to read one character at a time. To make reading easier and the time spent by users more efficient, Benetech® (California Avenue, CA, USA) translated more than 7000 books into Braille language and made them available online. This action helps the blind or visually-impaired individuals to print out a book using Braille printers and read it on papers easily, but it does not help others who wish to read books that are not available online.

Also in 2001, the Alva Refreshable Braille and the Alva 570 Satellite Pro were introduced by Optelec (Breslau, LT Barendrecht, Netherlands). The Alva Refreshable Braille 8-dots cells refresh and change ac- cording to the part of the screen that has the computer's attention; whereas, the Alva 570 Satellite Pro was the first designed desktop model that gives the user the ability to read a whole line of 80 cells each. On one hand, these two developments solved the problems that all previous Braille display systems encountered, but on the other hand, each of the mentioned developments would cost a user more than five thousand US dollars, which is considered to be very expensive.

Now here using this Braille system both reading and replying the messages possible by visually impaired people. In this project using Braille technology the blind people can access the message application in mobiles as a normal people. Using this system uneducated people also may use the message application in mobiles.

III. OBJECTIVES

The main objective of this project is blind or partially blind people can understand the messages and give acknowledgment for particular message using mobile as normal people.

IV. PROPOSED SYSTEM

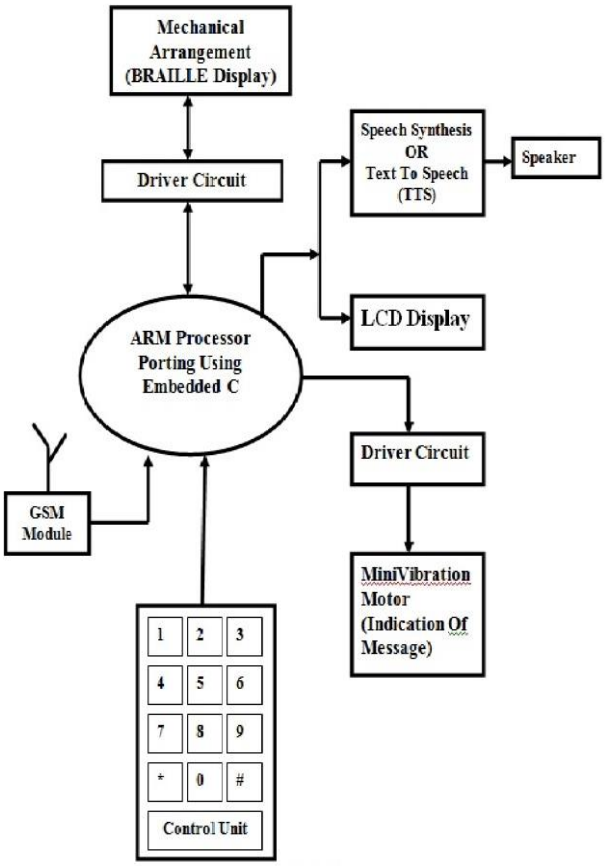


Fig. 1. Block Diagram

V. SYSTEM DESIGN

In this system the message received from the GSM modem. Every single incoming message is indicated by external vibration motor using vibration. The every single message collecting in the arm board, will be display in these formats (LCD display, Braille board and voice output) by pressing key number"1" in the control unit.

Here LCD is used for all except blind people, but output message from the audio is used for blind and dumb people only. Both Braille output and audio output can be used by the blind people. The incoming message which is not important for the user can be deleted by using control unit (key no: 3).

The user can reply the current message by using Braille Keypad. Before sending that reply text message is check the spell by using Braille board when pressing the key "6" in control unit. Finally the message is sent through the GSM modem by press the key "9".

VI. CONTROL UNIT

A This system is mainly developed for mobile application. By using this system the blind people could read and write message by Braille module. So only we are implemented all these system functions in to one control unit are called keypad.

Control unit have 12 keys (0 to 9, # and *) for controlling the entire system. Each key have specific function in that unit. Blind people, every time when pressing a key, the indication of key which pressed that will be indicated in loud speaker.

Functions of control unit:

1. Ready to read
2. Reread
3. Delete current message
4. Reply for current message
5. Check text
6. Recheck
7. Send message
8. Future Reference
9. Future Reference
*. Temperature indication
0. Time indication
#. Date indication

Vibration: It is first function of this project, If any new message is comes into the mobile, the indication of new message to start vibrating using mini vibration motor.

Ready to read: After vibrating, we can read that message by using press the key "1". These command to create a task into the controller for reading new message to convert "text message in to voice" and delivered in to loud speaker. This process is called Speech synthesis. The message also indicated in LCD display and Braille board.

Reread: The blind may cannot read the message clearly the first time, press the key "2" then the that current message again indicated in three format.

Delete the current message: If that current reading message is not important message, want to delete that message then press the key "3". The current message is deleted from the inbox.

Reply for current message: Want to reply for that current reading message, press the key "4". This is indicating to the controller for ready to record the voice for acknowledgment.

Check text: The stored text message is checking by using Braille board when pressing the key "5". Here the each character of the message display in the Braille board also delivered in the loud speaker and LCD display.

Recheck: If the checking the text is not compatible for the blind people, then recheck the text by pressing the key "6".

Send message: The text message is correct after checking spell then press the key "7". The message sent to the particular recipient.

Temperature indication: The blind people can see the weather and temperature of the environment. When pressing the key "*" the temperature of the current day to delivered in loud speaker.

Time indication: When press the key "0", current time will be delivered in the loud speaker also display in LCD.

Date indication: When press the key "#", date of the current day will be delivered in the loud speaker also display in LCD.

VII. BRAILLE SYSTEM

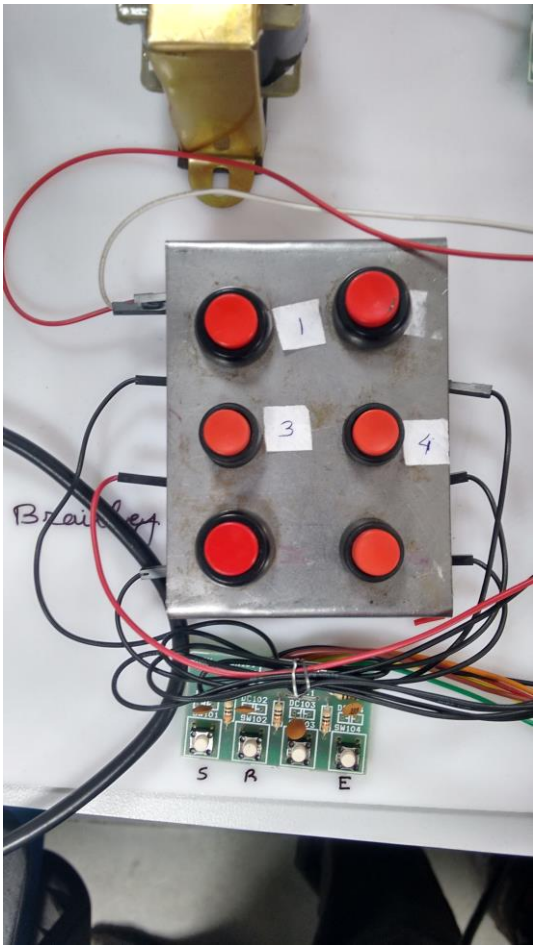
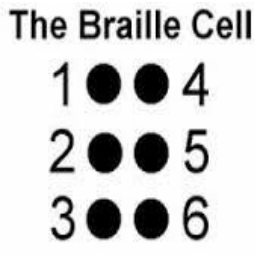
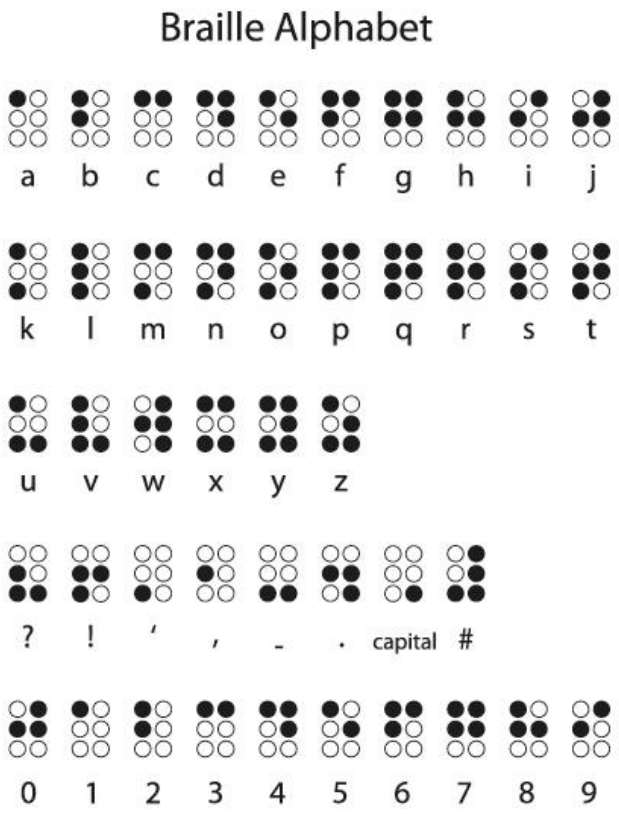


Fig. 2. Braille System

A cell is made up of six dots that arranged in two columns of three dots each. Each cell represents a letter, a word, a combination of letters, a numeral or a punctuation mark.



The first ten letters of the alphabet are formed using the top four dots (1, 2, 4, 5). Adding a dot 3 makes the next ten letters, and adding a dot 6 to that makes the last six letters (except "w" because it was not used very much in the French language at the time that Louis Braille devised this system).



VIII. SPEECH SYNTHESIS

Speech synthesis is the process of developing a human speech in an artificial manner. This system is called speech synthesizer. It can be implemented in hardware or software. Here, text to speech (TTS) system used to convert the normal text message into speech. The relevant speech for each text already created and stored in the data base. Each system has different size of data base unit; the speech unit that stored in phones or diphones, but it may lack clarity of output.

Diphone synthesis is recording a transition between the phones. Number of diphones depends on the language content. These diphones are used to store the words and improve the quality of the output of speech. Synthesizer is an alternatively used to identify the model vocal tract and also creative the completely synthetic of other human voice output.

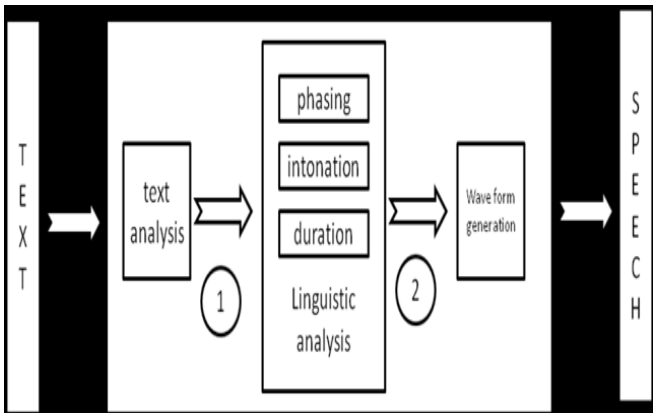


Fig. 3. TTS Block Diagram

The quality of this system increased when the similarity of human voice into the database and ability to understood the voice. This system mostly used by the visually impaired people to reading the message and computer documents. The figure 3 shows the block diagram of speech synthesis. Fig.4 Speech synthesis A text-to-speech system is composed of two parts:

1) A front-end
2) A back-end

First, it converts the text message (numbers, abbreviations) into equivalent of written out words. This process is called pre processing. The front end assigns phonetic transcriptions and that converts into the corresponding speech, also match to the system database; the process of converting phonetic transcriptions into words is called grapheme-to-phoneme conversion. Finally in the front end phonetic transcriptions converts output as symbolic representation. The back end is the output end; this is used symbolic linguistic representation into sound. in this system the corresponding output speech is delivered in the speaker and we make headphones to the blind people to listen data with out noise.

IX. ALGORITHM

1. Initialize biasing for all module.

2. Scan serial buffer1 for input from GSM module.

3. If serial buffer flag is 1 then output logic high on digital IO connected to vibration motor.

4. Copy serial buffer data in temporary variable.

5. Compare temporary variable data bit by bit with data base of alphabet stored in processor.

6. Check for key 1 to be pressed or not if yes go to next or if no go to step 5.

7. Compared output is used to select one of TTS register.

8. According to step 5 respective digital of braille system output is set to high.

9. Transmit temporary variable to LCD data output pins.

10. Scan for key 3 is to be pressed.

11. If pressed go to step 12 else go to step 13.

12. Delete temporary variable data value.

13. Scan for key 4 is to be pressed

14. If pressed go to step 15 else go step 13

15. Continuously check for key is to be pressed for 10 cycles.

16. Compare no. Of digital IO that are read high with data base to obtain alphabet that has been pressed.

17. Continuously do step15 to step17 for 10 cycles.

18. Copy this data value in data buffer.

19. Serially transmit to GSM module.

20. STOP

X. FINAL HARDWARE

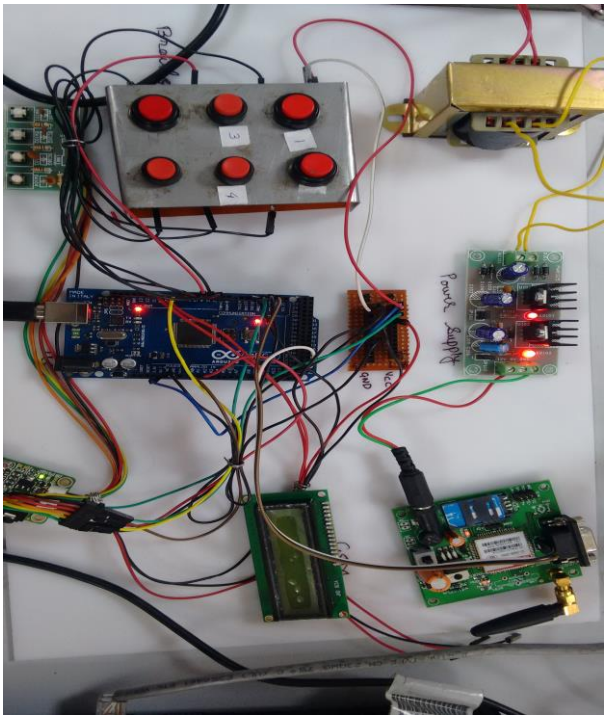


Fig. 4. Final Hardware

XI. CONCLUSION

Still now Braille technology is used by the blinds only for the reading purpose. But here, using this Braille system both reading and replying the messages possible by visually impaired people. In this project using Braille technology the blind people can access the message application in mobiles as a normal people. Using this system uneducated people also may use the message application in mobiles.in future+ we add gps module to go blind people where ever they want to go and gave voice instructions to follow the path.

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