BRAILLE LANGUAGE SOFTWARE FOR BLIND AND DEAF PEOPLE

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Abstract: The telecommunication technology has become the integrated a part of our day to day life. It's completely revolutionaries the way we communicate. In an exceedingly country like India where population is beyond 1 billion, it's surprising that around 25% of visually impaired population of world is in India. Various estimates say that around 4 to 14 million people in India are visually impaired. The results of blindness aren't limited only to physical disability, but it also affects the economic, social and also the psychological lifetime of a personal. Blind people often lose self-respect and become isolated from remainder of the society. What they have isn't sympathy but empathy, a wise approach to every individual. They have education and training to be ready to read a book or learn from a book. Hence, we plan to design a "BRAILLE LANGUAGE SOFTWARE". This has an SW & Microcontroller unit. We created an SW via VB.NET programming. Within which we are able to enter a text it'll convert into a Braille code, using speech filter. Speech filter converts in three cycles, which are text to ASCII then ASCII to BINARY and at last it converted Binary to Braille code and it's sensing to human palm by palm-pad (Vibrator pad) and for listen the text speaker also available. Within the palm-pad we six used vibrator buttons to sense the Braille code. The vibrator pad is controlled by microcontroller unit. Ergo, Blind people can ready to sense the Braille code**.**

Index Terms **– Braille Language, Vibrator Buttons, Braille Software, Speaker, VB.net, Microcontroller**

I. INTRODUCTION

Braille may be a writing which enables blind and partially sighted people to read and write through touch. It had been invented by Braille (1809-1852), a French teacher of the blind. It consists of patterns of raised dots arranged in cells of up to 6 dots in a very 3 x 2 configuration. Each cell represents a letter, numeral or mark. Some frequently used words and letter combinations even have their own single cell patterns. There are different versions of Braille as follows: Grade 1, which consists of the 26 standard letters of the alphabet and punctuation. It's only utilized by those who are setting out to read Braille. Grade 2, which comprise the 26 standard letters of the alphabet, punctuation and contractions. The contractions are employed to avoid wasting space because a Braille page cannot fit the maximum amount text as a typical printed page. Books, signs publically places, menus, and most other Braille materials are written in Grade 2 Braille. Grade 3, which is employed only in personal letters, diaries, and notes. It's a sort of shorthand, with entire words shortened to some letters. Here we are visiting make a gadget which is able to convert the text messages into the Braille code. In order that blind people can read the text messages and enjoys the reading, and learning the Braille code which proves to be of an awfully great help for near-blind people. The project could be a portable tool that reads Braille code. It's ideal for those that are new Braille reading. This project uses Braille sensor (a combination of six Vibrator Buttons) to sense Braille characters. The sensed Braille character is identified and told to the user using speaker. When a full word is fed character by character, it'll pronounce the word. The vibrator button (vibrator pad or palm pad) design makes the project simple and affordable to blind. Since this project is targeted to blind people that didn't master the Braille reading, learning it assumed they're new the blind walking stick additionally. Here microcontroller is employed to manage the Vibrator pad. Microcontroller is programmed using Embedded C-code.

II. LITERATURE SURVEY

Dash point is a hardware and software system designed to make e-learning possible for the hearing and visually impaired. The system will also increase the communication capabilities for these specific types of disabled people. Controller Virbo6 is a support tool by which information is transmitted, the main core of "Dash point" is software that implements the education features, communication features and ability to expand the functionality. Dash point consists of a core, which translates the symbols of the usual alphabet to the Braille alphabet and transfer of the symbols via vibrations applied to the controller[1]. Describe an email client application that sends and receives emails, and converts them to speech and also transcripts them into Braille script with special emphasis on special symbols so that visually impaired people will also be able to read emails. This application filters unwanted message like advertisement, spam and more text from mail and converts this message text into speech or Braille script. Then this Braille script is sent to the parallel port so that it can be embossed on paper by Braille Embosser or can be read by electronic Braille reader attached to the parallel port. This application increases the availability of information and use of technology for handicapped that is for visually impaired individuals.[2].

Finger Braille is one of tactual communication media of deaf blind people. In finger Braille, index finger, middle finger and ring finger of both hands are likened to keys of a Braille typewriter. A sender dots Braille code on the fingers of a receiver like whether he/she does the type of the Braille typewriter. Then the receiver recognizes the Braille code. Deaf blind people who are skilled in finger Braille can catch up with speech conversation and express various emotions. Because there are small non-disabled people who are skilled in finger Braille, deaf blind people communicate only with interpreters. In this paper, we developed a finger Braille teaching system and designed a teaching interface which taught clauses explicitly. The teaching system recognized non-disabled people's speech and converted to Braille code. By parsing the Braille code, the teaching system retrieved clause information and segmented the Braille code into clauses. Then the dot pattern of the Braille code was displayed. By observing the dot pattern, non-disabled people dotted Finger Braille to

deafblind people. An evaluation experiment between a blind person who was skilled in Finger Braille and two nondisabled people who were non-skilled in Finger Braille was carried out. The results showed that the fundamental functions (speech recognition, conversion to Braille code and clause segmentation) were practicable; the nondisabled senders could dot finger Braille accurately and communicate with the blind receiver directly. Therefore it was considered that the teaching system was effective.[3]. The main aim of this article is to bridge the communication gap and put forth the technologies to help people who suffer from blindness, deafness or dumb or any combination of these. Here they have proposed a new concept called as SHAROJAN BRIDGE which provides the solution to above mentioned sufferings. SHAROJAN BRIDGE is the concept of wearable technology where the device is very similar to a wrist watch and hence it is easily portable. Here DATA ENTRY GLOVE is used to provide input rather than traditional desktops, PC's. It can provide 96 ASCII characters by 80 different finger positions.

This device takes the input from glove worn by the differently abled person, converts the input into a message which is later transferred to a short or long distance. On the receiver side the message is again converted to the required output format. For example, the blind user can provide the text message using sensor glove positions and the output can be of audio. At first the input and output mode of this SHAROJAN BRIDGE is set to the desired mode. The input text message is converted into the required language. This glove also possess a microphone to provide the audio input. Once the message is sent, it is transmitted through wireless GSM network to the receiver. In order to provide the long distance communication the receiving person must have mobile phone.

The deaf and dumb person can send the message using this sensor glove with gesture movements and it can be described by American Sign Language. The dumb person can make use of either sign language or Braille character mode to send the message. Hence this method provides all the possible solution on consideration of different disabilities. The limitations are due to the presence of arduino boards and other circuits, which makes the band a little bulky. he disabled person must be aware of American Sign Language.[4].

The Braille keyboard which is developed based on the Braille Lippi i.e. Braille writings, scripts etc. a Braille keyboard is being developed which can be interfaced with the pc or laptops. The keyboard is made up of six push buttons which are used for typing the required alphabets, numbers and punctuations. The keyboard connected with a microcontroller helps in typing the characters. The board works on 5v in two different modes: one is the alphabet mode, the other one is the numerical mode. An arduino board is used to convert the output to audio using the audio jack. Ardiuno uses embedded c programming language. COOL TERM is the software uses for collection of data required for the process of converting the input to desired format such as text, document, power point and spreadsheets etc. Along with this an SD Card module is used for storing the audio file in .WAV format, also because of the SPI it can be interfaced for communications between the controllers and also for processing purposes. This keyboard acts a Braille trainer kit enabling the deaf, blind and dumb person to communicate efficiently by enhancing their employability skills[5]. Braille body system which is wearable band that consist of 6 individual vibrating motors through which text, numbers and special symbols are sensed. Braille writer is used for giving inputs out of which 6 is used for Braille code and 2 is used for the auxiliary functions. The Braille input is entered in using numeric keyboard with the combinations of 7,4,1,8,5,2. For the Braille dots 1,2,3,4,5,6 the numeric value 7,4,1,8,5,2 is assigned. Once the whole text message is framed it is send through SMS. For example the word hello is coded as 745, 75, and 741,741,751.[6]

III. METHODOLOGY

In this paper, we present Software for visually Blind moreover as Deaf People, which reads a braille code and sense for the blind people through vibrator buttons, further as speaker also. For speaker we use the Speech synthesis header file to talk out the word through speaker.

IV. HARDWARE DISCRIPTION

1. Microcontroller – AT89C52

The AT89C52 may be a low-power, high-performance CMOS 8-bit microcomputer with 8K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry-standard 80C51 and 80C52 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a traditional non-volatile memory programmer. By combining a flexible 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C52 may be a powerful microcomputer which provides a highly-flexible and cost-effective solution to several embedded control applications.

2. IC transformer

7805 IC, there are 3 pins in IC 7805, pin 1 takes the input voltage and pin 3 produces the output voltage. The GND of both input and out are given to pin 2. Transformer IC's are the IC's that are wont to regulate voltage. IC 7805 could be a 5V transformer that restricts the voltage output to 5V and draws 5V regulated power supply. It comes with provision to feature sink. The utmost value for input to the transformer is 35V. If the voltage is regarding 7.5V then it doesn't produce any heat and hence no need for warmth sink. If the voltage input is more, the surplus electricity is liberated as heat from 7805.

3. Vibrator Buttons

A vibration buttons. This itty-bitty, shaft less vibratory buttons is ideal for non-audible indicators. Use in any number of applications. All moving parts are protected within the housing. With a 2-3.6V operating range, these units shake crazily - 3V.

Once anchored to a PCB the unit vibrates softly but noticeably. It comes with a 3m adhesive backing and reinforced connection wires.

4. LED

A light releasing diode is an electrical component that emits light when the electrical current flows through it. It's a light-weight source supported semiconductors. When current passes through the LED, the electrons recombine with holes emitting light within the process. It's a selected kind of diode having similar characteristics because the tangency diode. This suggests that an LED allows the flow of current in its forward direction while it blocks the flow within the reverse direction. Light-emitting diodes are built employing a weak layer of heavily doped semiconductor material. Supported the semiconductor material used and also the amount of doping, an LED will emit a coloured light at a specific spectral wavelength when forward biased.

5. Power Supply

This circuit is most typically employed in 5Volt DC Regulator, Here IC7805 is employed as a regulator because of its regulating characteristics this circuit provides constant 5 Volt DC output. Bridge rectifier consists of 4 1N4001 diode and so 100uF capacitor filters large size ac ripples. Unregulated DC voltage range from 8 volt to 12 volt is applied to the IC7805 regulator. During this IC pin 1 is taken into account as input and pin 2 falls on ground then pin 3 gives regulated output. At the output pin 0.1 uF capacitor is connected for to get rid of small sized ac ripples from regulated DC output. Finally at the output you'll get regulated 5 Volt DC.

6. Speaker

Speakers are one among the foremost common output devices used with computer systems. Some speakers are designed to figure specifically with computers, while others may be attached to any sort of system, no matter their design, the aim of speakers is to provide audio output which will be heard by the listener.

Speakers are transducers that convert electromagnetic waves into sound waves. The speakers receive audio input from a tool like a computer or an audio receiver. This input could also be either in analog or digital form. Analog speakers simply amplify the analog electromagnetic waves into sound waves. Since sound waves are produced in analog form, digital speakers must first convert the digital input to an analog signal, and then generate the sound waves.

IV. SYSTEM ARCHITECTURE

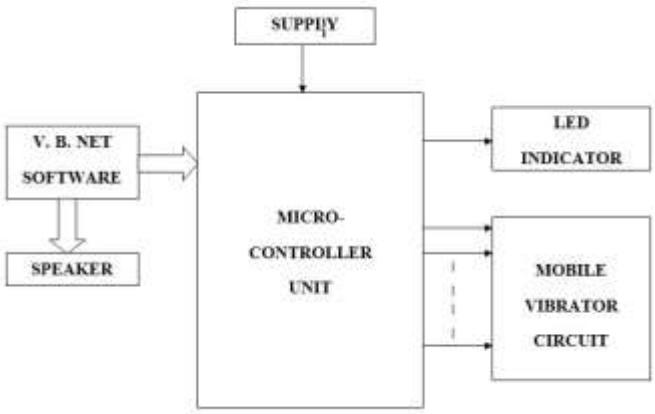

Fig 1 Architecture Block Diagram

In the Braille Language SW, VB.net SW is use for Blindfold people also Deaf people. When we open the SW it ask us to enter the text which we want to convert into Braille language or code. The text we entered is in ASCII code, SW converts the ASCII code into Speech using speech filters feature of the VB.net SW, then announced through the speaker. Now, coming to the vibrator part, SW converts the ASCII code into Binary code, then Binary codes are send to Microcontroller via USB to Serial converter. The text which we entered is saved in Microcontroller memory. Microcontroller process the data or text to the Braille language pattern. When text is received in Microcontroller, Microcontroller turn on/off the Relay Circuit by 3 sec time delay for each char. It is work like a Interpreter line by line char convert to Braille via 3 sec time delay. When Relay circuit is turned On the 6 vibrator buttons will sense the Braille code and vibrates according to Braille code of that char. When the char is sense to the person then LED indicator turn on for the understanding the tutor for Blindfold person understood the char. The circuit diagram consists of a Microcontroller AT89C52, it acts as a CPU. It has a 4 port microcontroller, it is a software controlled system also it is a high performance, it is a low-power, high-performance CMOS 8-bit microcomputer with 8K bytes of Flash programmable and erasable read only memory (PEROM). Software used here is EMBEDDED C. Braille –Text Messenger provides the facility for disable people. Vibration buttons will act as a Braille reading system. With the help of Microcontroller present in circuit.

V. ADVANTAGES

1. Efficient way voice dictionary.
2. Less time delays.
3. Quick response time.

4. Fully automate system.
5. Robust system, low power requirement.
6. It is a portable device.
7. It is affordable.

VI. CONCLUSION

The problem of Braille literacy is creating a major barrier in enabling the visually disabled people in achieving a rightful place in the society. The use of Braille system is unavoidable for such people. Our project emphasizes on the use of Braille system in an independent, user friendly, portable and cost effective manner. It can affect the learning ability of visually challenged people in a comfortable and interactive way. The software processing that is performed in project is developed independently and does not depend on internet connectivity. This device can be used effectively to simplify the learning of Braille Language. It can prove to be a small but effective step in enhancing the literacy rate for visually as well as Deaf challenged people.

VII. FUTURE SCOPE

1. In this Software the Blind People will learn as well as they senses the word.
2. In future we use this Software for learning purpose for Blind and Deaf people.
3. Blind people also hear the word through speaker which is the computer speaker.
4. This Software is reducing the cost of printing books.

VIII. REFERENCE

1. D. Gorodnitsky, V. Kalashnikoff, E. Pavliy, E. Pinchuk, A. Tumanoff, O. Tumanova, N. Ustyan, “Hardware-software complex *"Dash point"* for learning and communication of deaf blind people”.ICETA 2011 • 9th IEEE International Conference on Emerging eLearning Technologies and Applications • October 27-28, 2011, Stará Lesná, The High Tatras, Slovakia
2. Deepak Kumar, Himank Singh Muktawat, Saiful Islam Aligarh Muslim University,ZHCET. “E-mail Client having Articulation and Braille Transcription of E-mails for the Blinds”. Special Issue of IJCCT Vol. 2 Issue 2, 3, 4; 2010 for International Conference [ICCT-2010], 3rd-5th December 2010.
3. Matsuda Yetal. (2007) Finger Braille Teaching System for People who Communicate with Deaf blind People, Proc. of the 2007 IEEE International Conference on Mechatronics and Automation, Harbin, China, 2007, pp.3202–3207
4. S. S. D. Kameswari, D. Harika, and D. K. Sahu, “Braille keyboard for blind people,” Int. J. Recent Technol. Eng., vol. 8, no. 1, pp. 156–159, 2019.
5. S. Ohtsuka, N. Sasaki, S. Hasegawa, and T. Harakawa, “Helen Keller Phone - A communication system for deaf-blind people using Body-Braille and Skype,”2012 IEEE Consum. Commun. Netw. Conf. CCNC’2012, pp. 30–31, 2012, doi: 10.1109/CCNC.2012.6181019.
6. S. Das Ruman Sarkar and D. Rudrapal, “A low cost microelectromechanical Braille for blind people to communicate with blind or deaf blind people through SMS subsystem,” Proc. 2013 3rd IEEE Int. Adv. Comput. Conf. IACC 2013, pp. 1529–1532, 2013, doi: 10.1109/IAdCC.2013.6514454.
7. en.wikipedia.org/wiki/Braille