A COMMUNICATIVE DEVICES USING BRAILLE- A LITERATURE REVIEW

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ABSTRACT- In this fast-developing world that is tending a lot of towards the utilization of data communication the visually, audibly and vocally impaired persons realize it extremely troublesome to cope up with the pace of it. Therefore, they're at a risk of being socially excluded because of poor access to data. Braille is significant to any or all visually impaired people and it's the sole system through that visually impaired persons will learn to browse and write. The very fact says that eightieth of all visually impaired persons browse and write Braille fluently. Braille code consists of cells of raised dots pattern. Blind persons will sense the presence and absence of dots victimization their fingertips, giving them the code for image. Thus, Braille accomplishment is the key to employment and full participation in society. This analysis paper principally deals with the implementation of Braille system through totally different strategies to reinforce their communications.

*Key Words***: Blind, Braille, dots pattern.

1. INTRODUCTION

According to World Health Organization, concerning 285 million individuals are visually impaired worldwide, 466 million individuals have disabling hearing disorder, and a million individuals are dumb. Concerning 9 thousand million individuals within the world are deaf and dumb. They need their own manual-visual language popularly called language. The blind individuals are capable of reading one hundred fifty words per minute. Deaf, blind, and mute individuals usually referred to as deaf blind use tactile language to speak with individuals. 0.2% is Deaf-blind within the world. The worldwide utterly blind population is calculable to be 40 to forty-five million and nearly one hundred thirty-five million are calculable to have low vision. The cause for visual impairment for youth is mainly due to birth defects within the brain or the attention, and uncorrected refractive errors. Whereas visual defect and visual impairment due to infections

have considerably reduced with the fast progress of health care services, there's a notable increase in a blind , and visually impaired individuals over sixty-five years older thanks to long life expectancy. Sadly, the blind population is predicted to double by 2020. Sight is the main human sense that possesses the main influence on perception of all sensations, unitedly with other senses like hearing. Therefore, the shortage of sight is the greatest challenge the blind face in performing arts their daily tasks such as navigation, info access, social interactions and safety. Hence, the blind are discharged and deprived of the privilege of education underneath traditional circumstances. Approximately seventy-fifth of the blind are discharged   , whereas, only 10% of the blind kids receive special Braille education. In the context of the trendy society a visually handicapped person and his/her family faces several socioeconomic issues. Consequently, the need for helpful technologies that modify the blind to measure freelance, productive and higher lives emerged as investing on nursing homes, blind welfare, health care and blind care specialists were gave the impression to be pricey and unsustainable solutions.

1.1 BRAILLE SYSTEM

Braille may be a system developed by Louis Braille in the19th century to allow the blind to browse and write. Louis Braille was impressed by this method and in turn then visited produce a changed code to form easier to use. Louis took many a lot of years to make a system that was appropriate to include all the letters of the French language. Eventually the Braille system has become widespread with the support of a bunch United Nations agency was to become the Royal National Institute for the Blind. Braille code may be a piece of writing using a series of raised dots to be browse with the fingers by individuals blind or whose seeing is not spare for reading written material. The standards describe regarding the characteristics of the Braille code and conjointly the most options square measure in short summarizes.
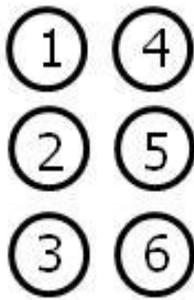
The Braille Cell

Fig 1: The Braille cell

1.2 BRAILLE CODE

The Braille translator is a program package that is used to intercept a text into Braille and sent to Braille embosser, which produces a print of the first text copy. Primarily solely the script is remodeled, not the language. Braille translation package or embedded hardware converts ink print into Braille or Braille into ink print. Typically, somebody has ink printed throughout a datum processes system file or at a associate degrees uniform resource locator and needs Braille. The Braille may be sent to a Braille embosser to provide physical Braille or to associate degree electronic note taker. Other circumstances is that someone has Braille in associate degree electronic Braille note taker that they need to make in ink print to be shared with somebody United Nations agency does not scan Braille. Braille translation package is usually classified as helpful Technology, since the action of the package provides Braille for a visually mortal. A Braille translator is also pass individuals with or while not sight. A Braille translator will run on a Smartphone, notebook computer, network server, or (historically) larger mini-computers or mainframes of larger establishments. Some languages use deconstructed Braille, wherever every letter uses a specific Braille character. Constructed Braille needs manipulation of capitalization, emphasis, numbers, and punctuation. Some languages use contractile Braille, wherever the principles for numerous Braille abbreviations are quite advanced. As associate degree example, in contractile English Braille, the word supposes (5 letters) is rendered as three characters: ⠞⠓ (th) (in) k. The use or non-use of these contractions are claimed to pronunciation. As associate degree example, the "th"sign is utilized in "think," however not "pothole". Unless properly programmed, a laptop may build a slip that not a soul would build, like victimization the contraction for "mother "inside the word, "chemotherapy." The foremost troublesome area of manufacturing Braille is creating the selection of once and once not to use contractions. Once individuals build these choices its Braille transcription; once computers build these choices its Braille translation.

1.3 ASCII BRAILLE

Braille code operates the sixty four code characters within the middle of thirty two and ninety five inclusive. All capital letters in code communicate to their equivalent values in unconstructed English Braille. Ne'er the less not

like customary print, there's only1. Braille image for every letter of the alphabet.

Therefore, in Braille, all letters ar lower-case by default, unless preference by a capitalization sign (⠠dot6).The numbers one through nine and zero correspond to the letters a through j, except that they're down or shifted lower within the Braille cell. As like, ⠉ dots 1-4 represents c, and ⠒ dots 2-5 is three. The opposite symbols will or cannot correspond to their Braille values. Such as, ⠌ dots 3-4 represents / in Braille code, and this is often the Braille slash, however however dots 1-2-3-4-5-6 represents =, and this is often not the sign in Braille. code additional closely corresponds to the Nemeth Braille Code for arithmetic than it will to a people Literary Braille Code, because the Nemeth Braille code .If Braille code is viewed in a very application program, it'll seem like a addled up mixture of letters, numbers, and punctuation. However, there ar many fonts out there, which allow the user to look at and print Braille code as simulated Braille, i.e. a graphical illustration of Braille characters. Braille code in the beginning designed to be a way for storing and transmittal 6-dot Braille in a very digital arrangement and this continues to be its primary usage nowadays.

As a result of it uses customary characters out there on pc keyboards; it is simply written and altered with a customary application program. Several Braille embossers receive their input in Braille code, and nearly all Braille translation software package will import and export this format. Many establishments that turn out Braille materials distribute BRF files. BRF files ar files that primarily contain Braille code, however conjointly embrace management charac ters that have an effect on however the Braille is written or displayed. These files will then be raised with a Braille embosser or written, scan on a Refreshable Braille show, or back-translated into customary text, which might then be scan by a Screen reader or alternative similar program. Several notice BRF files to be a additional convenient thanks to receive brailed content, and it's increasing use as a distribution format. Unicode includes away for coding eight dots Braille; but, Braille code continues to be the popular format for coding six-dot Braille.

1.4 BRAILLE GRADE

There square measure variety of various versions of Braille:

- Uncontracted or Grade one, that consists of the twenty six normal letters of the alphabet and punctuated it's solely employed by those who squares measures 1st commencing to scan Braille.
- Contracted or Grade two that consists of the twenty six normal letters of the alphabet, punctuation and contractions. The contraction square measures used to avoid wasting house as a result of a Braille page cannot work the maximum amount text as a regular written page. Books, signs publically places, menus, and most alternative. Braille materials square measures written in shrunken Braille.
- Grade 3 that are employed in the main in personal letters, diaries, and notes, and conjointly in literature to a restricted extent. It's a form of shorthand, with entire

words shortened to a couple of letters. there's no official normal for this version of Braille

Fig 2: Braille scripts

2. METHODS

2.1 Rule based algorithm

Rule based mostly formula could be a term in technology meant to cover any machine learning technique that identifies, learns, or evolves 'rules' to store, manipulate or apply. Techniques that implement in text to Braille translator ar rule-based technique. Rule-based technique is one amongst computing technique. Rule-based ways, rule discovery or rule extraction from knowledge, ar data processing techniques geared toward understanding organization providing clear data hidden in knowledge, providing logical justification for drawing conclusion.

Rule Induction victimization consecutive covering formula

Sequential Covering formula is often accustomed extract IF-THEN rules kind the coaching knowledge. We tend to don't need generating a call tree 1st. during this formula every rule for a given category covers several of the tuples of that category. A number of the consecutive covering algorithm ar AQ, CN2 and RIPPER. As per the overall strategy the principles ar learned one at the time. For every time rules ar learned a tuples coated by the rule is removed and also the method continues for the remainder of the tuples. this is often as a result of the trail to every leaf during a call tree corresponds to a rule

Algorithm: Sequential Covering
Input:
D, a data set class-labeled tuples,
Att_vals, the set of all attributes and their possible

Values.
Output: A Set of IF-THEN rules.
Method:
Rule_set= { }; // initial set of rules learned is empty
for each class c do
repeat
Rule = Learn_One_Rule(D, Att_valls, c);
remove tuples covered by Rule form D;
until termination condition;
Rule_set=Rule_set+Rule; // add a new rule to rule-set
end for
return Rule_Set;

2.2 Verilog method

VERILOG is a hardware description language mainly used to design electronic systems. It is mainly used to design and verify digital circuits. Verilog simulator is the software tool it is simulation and synthesis tool. A verilog code is written in the behavioral method. ASCII values are fed into the input side and do the process according logic which is written in the programming and produces the outputs to corresponding inputs.The truth table contains alphabetic and equivalent of ASCII values and corresponding Braille codes. For example, A is character and the A's equivalent ASCII value is 65. The feeding 8 bit input so the 65 binary equivalents is 01000001. Braille cell contains 6 Braille pins output side so we get output as 6 bit.When ASCII values are applied at the input side the corresponding binary code is available at the output side and the table acts as the decoder truth table. This code is providing better interfaces with hardware devices.
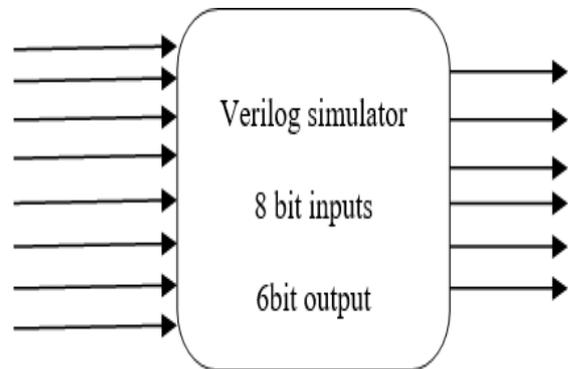

Fig 3: Block diagram of verilog simulator

2.3 Mat lab method

MATLAB could be a proprietary multi-paradign programming language and numerical computing surrounding developed by maths works. MATLAB permits matrix manipulation, plotting of function and information, implementation of algorithm, creation of user interfaces, and interfacing with programs written in different languages. Thought MATLAB is meant primarily for numerical computing. A nonobligatory tool uses the MuPAD symbolic engine permitting access to symbolic computing computer skills. Here, they're mistreatment the digital camera connected to the computer; PC can have the MATLAB Programming running that has program to find the hand gestures. When police investigation the gestures program can send corresponding gestures ID to interface and therefore

the small controller can browse the command and can active the speech unit referred to as APR- 9600 that has gestures command. Currently the visually handicapped person person will hear and can get to understand what the person is telling. The visually handicapped person will speak and therefore the MATLAB can browse the command {and will and will} send ID to constant to the microcontroller which can show the commands spoken and therefore the dumb person can see constant and acquire to understand what the visually handicapped person has spoken. Communication like hullo, hi, however area unit you etc.
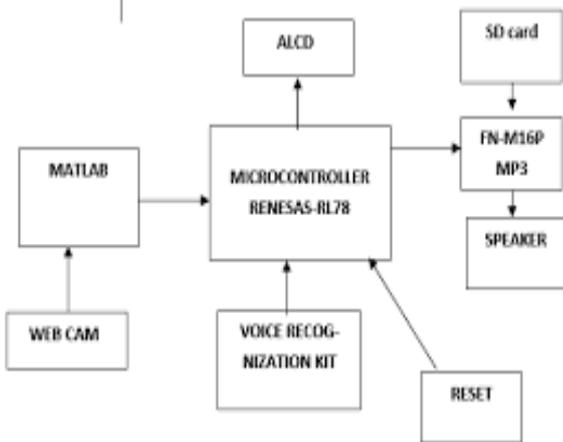

Fig 4. Matlab block diagram

2.4 Haptic technology

Haptic technology conjointly referred to as proprioception communication or 3d bit, refers to associate in nursing technology that may produce an expertise of bits by applying forces, vibrations or motion of users. These technologies are often wont to produce virtual objects in a very model, to regulate virtual objects, and to boost device of machines and device. Tactual devices might incorporate tactile sensors that live forces exerted by the user on the interface. The hypothesis of the projected resolution is to use the sense of bit of the arm to transfer info to a visually handicapped person employing a wearable band having six vibration nodes cherish the standardized Braille dot code. Moreover, wearable helpful solutions ar most popular than the moveable helpful solutions like Braille displays and mobile phones (text to speech) as they supply hands-free convenient interaction.

The 'Braille Band' tactual wearable blind support device connected to sensible phone applications helps the blind community to steer Associate in nursing freelance quality life. This helpful technology permits info transmission, navigation and sensible device accessibility through the sense of bit. With the event of the Braille Band the enforced a replacement mode of communication to the blind mistreatment tactual technology. The merchandise practicability tests conducted showed promising results with respect to reading speed and reading accuracy that improved with follow. Supported experimental results a median CTR of zero.4375 characters per second were achieved.
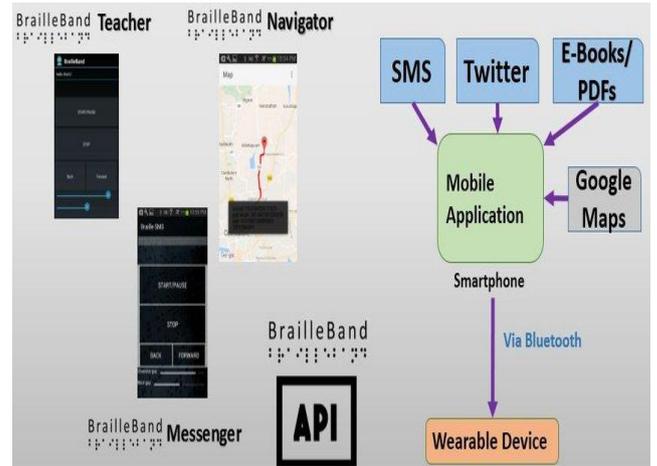

Fig 5: Braille band mobile application and integration of existing application

2.5 Raspberry pi Based Assistive Communication System

Raspberry pi may be a credit-card sized pc that connects to a pc monitor or TV and uses input devices like keyboard and mouse .it capable of performing arts numerous functionalities like closed circuits television, military application, aquatics web, and taking part in high definition videos, like games and to create information bases. Here, Raspberry Pi is interfaced with the pc monitor by victimization the 5V line. Through this line, there operate the kit with the subsequent code as Tesseract OCR, Espeak, WinSCP,AMRvoiceapp.
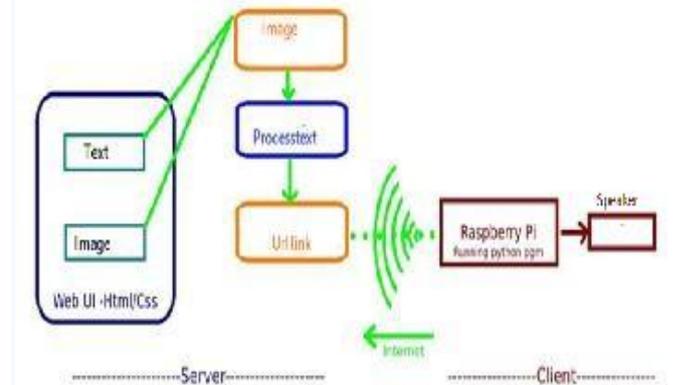

Fig 6: Raspberry Pi web processing Block Diagram

There is developing associate economical text to speech conversion technique by victimization the Raspberry Pi three processor. Once the text image was capture by the camera, and stores it to the cloud, the synthesizer accustomed separate the text from the image and so the optical character Recognition algorithmic rule was enforced to acknowledge the character within the text and so the Raspberry Pi three was the accountable to convert that text into speech by victimization the open cv libraries and for handicapped person the voice signals ar born-again into text format by victimizing AMR voice app and HC-05 devices.

Year	Authors	Method	Category of people	Process
2010	M.Rajasenathipathi,M Arthanari,M Sivakumar	Text to Braille by Vibration motors	Blind	Blind people can convey reply to visible person produce the vibration hand glove for two way communication.
2015	Tahir Khan	Hand gesture based on image processing using MATLAB	Deaf	The software run in a mobile handset having a frontal camera while a disabled person makes the signs
2016	B Shirude, A Mohite, K Agav,Pranjali G	Hand gesture using Sharojan Bridge	Blind, Deaf and Dumb	Using Sharojan bridge the disabled people communicate among themselves
2017	Arsh A Ghate,Vishal G	Detection of obstacles using ultrasonic sensor	Blind	Ultrasonic sensors will be used as Sensor to detect at the front and it will send signal to arduino UNO then it will process data and send signal to servo motor which will guide through vibrating feedback.
2017	Akshatha K V,Mohammad Hasan D,H Latha, Manjunath M T,Chetan B V	Hand gesture using MATLAB	Blind, Deaf and Dumb	Human gesture is received through webcam and converted into text in LCD and also with voice output
2017	Saraswathi Y.S, Shivangi G, S kulkarmi, Swetha, Kiran B	Braille system communication device	Blind-deaf	Transmit through keyboard and receive through vibrators and display in LCD
2018	MR.R.Jagadish, R.gayathri, R.Mohanapriya, R.Kalaivani, S.Keerthana	Hand Gesture Recognition System for Deaf and Dumb Persons	Dumb and deaf	Device which can convert the hand gestures of a deaf-mute person into speech
2018	J Stella, K S Valsan	Text to braille by ASCII	Blind	The text to Braille convertion method uses Rule Based Algorithm for blind people.
2018	M Shah,T Shah,R Tiwari,R Thakar	Braille to ASCII conversion and vice-versa	Blind and Deaf	Transmit and receive text from PC to glove.
2019	Savindu H P,Iroshan K A,Panangala C D, Pereira W L, De Silva A C	Braille band based on Haptic technology	Blind	Braille band helps visually impaired person by haptic technology using braille sensation related to the information and instruction given by Bluetooth.
2019	Suvarna Nandyal, Shireen kansar	Detection of image and text to voice using raspberry pi-method	Blind, Deaf and Dumb	With help of AMR voice app which makes them to understand what the person says can be displayed as the text message
2020	K Basavaraja,A Pujari, N Karthika,R Holla.	Braille code conversation using verilog	Blind	ASCII code is converted to braille code.It is mapped to the normal microcontroller which converts the actual motion.

Table 1. Survey of various methods and process

Here it offers with three stairs:

- Image to Voice (For BLIND)
- Text to voice (For DUMB)
- Voice to text(For DEAF)

3 CONCLUSION

In this research paper, we have given brief summary about the implementation of Braille system for communication by different authors. Here the visually impaired people read and write the information using different methods. But there are some limitations present in each method. Our future work is to overcome these existing limitations and to develop smart Communication device for visually impaired people to read and write messages using mobile application and voice recognition.

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