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## Real-Time Text to Braille and Audio Convertor

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### ABSTRACT:

Blindness represents one of the major disabling societal causes, impacting the life of visually impaired people and their families. People with visual disabilities find many day-to-day tasks, which include basic and essential communications to be difficult. As a result, they are ought to go through a high chance of exclusion in the society. This prevents them from accessing a lot of information available in the world. They use Braille as a linguistic medium to exchange information. In today's world, many visually defective people try to learning braille. Braille system consist six raised dots in each cell and each cell represent one letter in English alphabet. The main disadvantage of the existing system was the preview is not shown to the user before converting into braille when uploading .pdf and images. The another disadvantage was the images in .pdf are converted into ASCII images which may cause waste of time when reading large document. To overcome this problems, we are developing an application which will convert natural language into English braille language from the uploaded pdf input by using Natural Language Processing(NLP) and by using Object detection the images are converted into text which describes the scenario of the image which will save the time of the visually impaired person by feeling unwanted images in the .pdf. Then the converted text is shown as preview for the user which will allow the user to edit the content if any content needs to be changed from the uploaded .pdf input. Finally, the text is converted into braille language then user can download the output in .pdf format. Additionally, we also converting text into audio so that the visually impaired person who doesn't know the braille language can hear the content in the pdf. Thus this application is more helpful for the visually impaired people to gain knowledge from varies documents.

**Keywords:** Text Recognition, Feature Extraction, Refreshable Braille.

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### INTRODUCTION:

Braille is a material framework to speak to content. A book in braille comprises of a few Braille cells where every cell speaks to a letter set or image. Six individual pins/dots together represent a single cell. Blend of raising high and raising low of these pins form a letter set. There is a standard Braille code for every letter set of the vast majority of the dialects. By and large, outwardly debilitated people move finger over the braille messages that are embellished on paper to peruse the content. We propose a novel text-based method for searching through noisy text. The Braille system in English is mainly of 2 types: 6-dot Braille 8-dot Braille 8-dot Braille has the 2 extra pins/holes to represent capital letters. Our project is based only on the 6-dot || Braille system. Digits and numbers are preceded by, the braille equivalent of the # symbol. The braille part of our project focuses on representing: i. The 26 English alphabets ii. The 10 digits and any number resulting by combination of multiple digits iii. 16 punctuation marks This adds upto 52 combinations, which is the number of possible characters each Braille Unit/Cell of our device can represent. India is home to 33% of the world's visually impaired populace. As per a report distributed by the National Program for Control of Blindness (NPCB), the country has about 12 million individuals with visual impairment as opposed to the global total of 39 million. A study by ET Health world says that India will have 2 million blind children by 2020. Another study states that, people who are the deaf and blind (i.e., those suffering from Deto live in destitution and be jobless, with lower instructive results than others with no incapacities. According to an overview led by the National Council of Educational Research and Training (NCERT) only 29.16 percent of the blind in India are part of the education system. Only 6.86 percent of the schools have access to braille books and audio content, as pointed out by the same survey. Youngsters with hard of hearing visual impairment are up to multiple times more averse to be in school than kids without incapacities. We aim to include 4 Braille Units/Cells. Our device performs 2 functions - text to speech conversion to obtain the audio files for the text and creation of refreshable braille texts, in real-time.

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### EXISTING SYSTEM

The existing system has an e – mail and web based service capable of automatically transforming documents into a variety of alternate formats for the variety of alternate formats for the visually and reducing impaired. In the existing system data are given in the form of text, URL, and document upload. This document is converted into braille language and outputted as .pdf files, mp3 files and so on. This existing system has many services to help visually impaired. In braille service the transcription of documents to contacted and uncontacted Braille in accordance with the Braille codes for Bulgarian, Czech, Danish, Unified English (UEB), British English, American English, French, German, Greek, Hungarian, Icelandic, Italian, Novwegian, Portuguese, Romanian, Slovak, Slovenian and Spanish.

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## PROPOSED SYSTEM

In the proposed system we are developing an application which will convert the natural language into braille language to achieve it first we are going to convert natural language into English language using Natural language processing then the English language is converted into braille language. The user can give the input in the form of text or .pdf text then the .pdf text is converted into braille text. The user can download the output which contains the braille content in the .pdf document as well as audio document.

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## II. LITERATURE SURVEY

[1] This paper has a proficient, inventive and ongoing cost helpful method. Rather than perusing from content pictures, this gadget permits clients to hear the substance of content picture. It blends the idea of Text to Speech Synthesizer (TTS) and Optical Character Recognition (OCR). This framework assists with connecting with PCs viably through vocal interface. The provoking errand to separate content from shading pictures.

[2] This paper designs a system which produces Braille characters on Braille display by taking input from Braille keyboard, this system also displays English characters corresponding to the Braille character on the LCD, it also displays on laptop if it is connected. Reading documents as text is also it's another capability. The challenging task here is to convert the Braille characters to English characters if the pins of Braille keyboard do not rise up and down properly.

[3] This paper operates the cell pins in a way that when the users rest their fingers over the cell it can make feel like moving fingers on cell. This paper also shows the development and design Braille book system that is low cost and portable and has one Braille cell. The disadvantage of this is paper is that when the cell moves over the fingers it's difficult to recognize the characters.

[4] This paper helps to display Braille characters by using permutations of slots that are pre-protruded. There are two eleven slots pre-protruded sliders. The display used in this paper does not need individual slot instead carry out linear sliding of the sliders and requires low power. It is not like those conventional piezo-electric displays that generate characters actuating slots dynamically and consumes large amount of power.

[5] This proposed paper is based on searching through noisy text. This system constitute words as vectors, candidates and queries into a common space acquired from the OCR, and using metric ranks the candidates to nearest-neighbor search.

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## III. PROPOSED METHODOLOGY

### A. METHODOLOGY

The proposed text-to-braille conversion system overcomes certain limitations of the existing text-to-braille conversion system. It is based on detecting the texts from any book, document or magazine through the images captured using a camera.

The text detection is achieved using Tesseract, an OCR tool from one of python's rich sets of libraries for Natural Language Processing. The OCR algorithm plays a very crucial part in our project. Python also helps in the conversion of detected texts into audio files by providing the GTTS (Google Text-to-Speech) library. The Arduino microcontroller can be programmed either using Embedded C or Micro Python. The Arduino Mega 2560 Rev3 microcontroller supports 8 bit parallel camera.

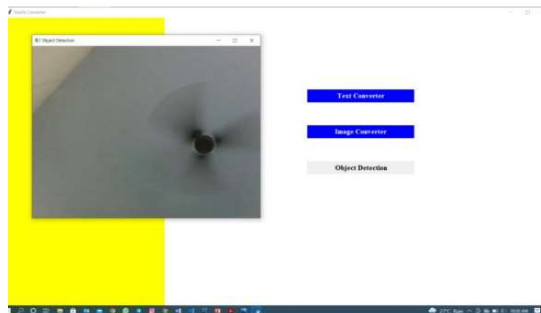
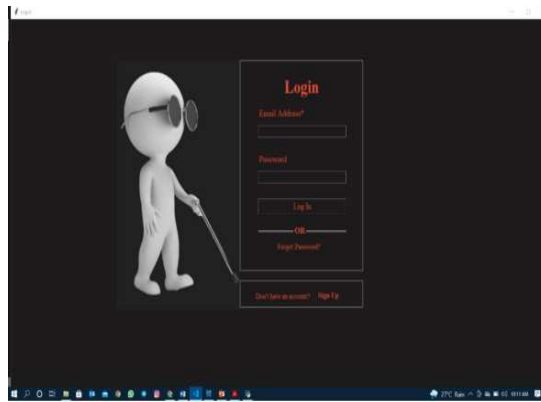
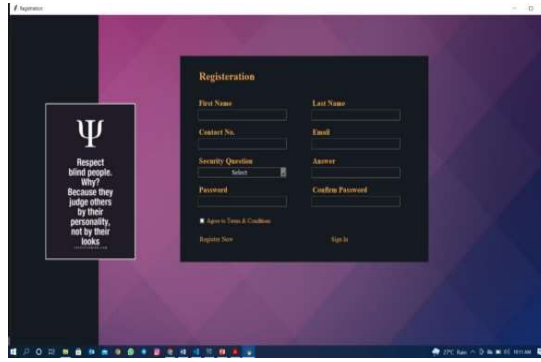
Interface and more than 50 individually programmable gpio pins. We use 24 of the available gpio pins to activate the 24 braille pins electromechanically. The Camera which is the Miniature TTL Serial JPEG Camera, is used in our project due to its ability to transmit data with ease over a TTL serial link to the Arduino. The 4 Braille Units each consisting of 6 pins are raised electromechanically, i.e., like how a solenoid is raised or lowered due to the electromagnetic effect caused due to current flow.

### B. ARCHITECTURE

The device captures images of books, then sends this image to the controller which detects the text in them and performs text to speech conversion to obtain the audio files for the book. Also, it creates writings in Braille in real time. Recognition (OCR). The OCR algorithm plays a very crucial part in

our project since it helps in detecting the text from images captured by our camera. This is the 1st step in the process of conversion of text to braille and audio. • Python also helps in the conversion of detected texts into audio files by providing the GTTS (Google Text-to-Speech) library. • To program the Arduino Mega 2560 Rev3 microcontroller, we use C++. • Arduino IDE, The Arduino Integrated Development Environment (IDE) is a crossstage application (for Windows, mac OS, Linux) that is written in capacities from C and C++.

## SCREENSHOTS



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## CONCLUSION

We have succeeded in our aim to develop a system that can be used to convert the natural language into braille language. We have succeeded in getting pdf input and converting it into braille text preview option for user. The system we developed is user friendly. The natural language is converted into braille language as we expected.

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