



SMART RENDERING NEWS ARTICLE READER

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Abstract: Image Text is the text information embedded or written in image of various form. Image text is often found in captured images, scanned documents, magazines, newspapers, posters etc. The knowledge from these image documents would give higher efficiency and simple access if it's converted into text form. The method by which Image Text converted into plain text is text Extraction. Text Extraction useful in information retrieving, searching, editing, documenting, archiving or reporting of image text. However variation of those texts because of differences in size, orientation style, and alignment, text is embedded in complex color documentation images, degraded documents image, inferiority image, likewise as low image contrast and complicated background make problem text extraction extremely difficult and challenging one. During this we proposed the algorithm, Edge based and connected components. The extracted text recognition done by OCR with better accuracy and at last audio output is going to be produced.

Index Terms - Fixed-point Model, Image processing, Contextual information, Newspaper, Segmented block, Voice assistant.

I. INTRODUCTION

Image Text is that the text information embedded or written in image of various form. Image text may be found in captured images, scanned documents, magazines, newspapers, posters etc. the data from these images documents would give higher efficiency and straightforward of access if it's converted to text form. The method by which Image Text converted into plain text that computer can recognize its character is Text Extraction.

The information from image documents should be converted into text so as to induce efficient use and access of it like archiving or reporting that are employed in different image based application like office works. Many methods are given by different researchers and professionals for text detection and extraction previously. Consistent with the methods used; they're categorized into different methods, such as; Connected Components Based Method, Edge Based Methods, Region Based Method, Texture Based Method and Mathematical Morphology Based Method. The all methods and techniques employed in image text extraction have their own advantages and limitations supported different parameters like precision rate, recall rate, accuracy etc.

The two methods used for text extraction and recognize a text from a posh image are connected components and Edge based Methods. This Edge-based algorithm is one among the favoured Methods for text extraction which specialize in the high contrast between the text of image and its background. This method identifies and merges the sides of text boundary while processing. The input image fed to processing engine which include sub processes like text region detection, text localization and text extraction. Finally, monochrome output image which is white for ground and black background.

Connected Component based methods merges small component into successively large components until all the region of image is identified. It uses geometrical analysis to merges these text components which alters out non-text components and set the boundaries of text contained regions. we've got used some test images which

are vary in properties and after processed by the above connected algorithm, different output are obtained.

The development of such systems requires use of two technologies that are central to those systems, namely optical character recognition for text information Extraction (TIE) and text- to-speech (TTS) to convert this text to speech. Text Information Extraction is the first and important function of any assistive reading system and is an integral part of OCR because this process determines the intelligibility of the output speech.

The quality of text-to-speech furthermore extending our capabilities to get expressive synthetic speech. OCR is employed to acknowledge words. It can recognize characters, words and sentences with none mistakes. OCR convert image text to plain text that computer recognize. Finally the output text are going to be enabled to be read with better accuracy and at last the audio output produced.

II. Related Work

Many researchers have done their work on extraction of image text and retrieving the information through there are many challenges. These researches are based on different image text detection and extracting techniques which have their own advantages as well as limitations. Review of these literatures is given by the following table in summarized way.

Chowdhury Md. Mizan, Tridib Chakraborty and Suparna Karmakar, proposed algorithm to acknowledge printed textual matter and converted to required format text using OCR (Optical Character Recognizing) and Image Processing techniques. The algorithm recognizes the character offline, is efficient to extract bimodal images and is applicable in retrieval of image, video, web content text etc. They suggested that future researchers must done on OCR area.

Jack Greenhalgh and Majid Mirmehdi created novel system for detection and recognition of text in traffic signs automatically using MSER (Maximally Stable Extremal Regions) and HSV (Hue-Saturation-Value). The result improved accuracy of recognition F- measure of 87%. The image on sign must be capture when it's larger size.

Rashedul Islam, Md. Rafiqul Islam, Kamrul Hasan Talukder, proposed hybrid techniques (Edge-Based and Connected Components Based) that allows to extend accuracy of text area detection and extraction techniques by combining, during this algorithm accuracy of the extraction system is improved. They test using only 08 images to judge, but not considered degraded images and tiny size text, not checked by OCR to acknowledge characters. Future work is to form database for sake of coaching.

Harpreet Singh, Deepinder Singh used mathematical morphology for extraction of image text using resulting improved performance and low noise. But not detecting small text from complex background. The paper states the longer term work to be Extracting small text, and converting into editable form.

Paratha Sarathi Giri compared two basic approaches for extracting text region in images edge-based and connected-component based employing a set of images that adjust along the scale of lighting, scale and orientation.

Proposed work is to design the verifying extraction text region by HMM and SVM, and then to design recognizer system for extraction text regions.

Various methods and tools will be used in order to meet the general and specific objectives of this research work, these are listed as follows:

Literature Review

1) T. Rubesh Kumar et al [1] propose dreading is clearly essential in today's society. Printed text is everywhere within the sort of reports, receipts, bank statements. There are already some systems that have some promise for portable use, but they can't handle product labeling. But a giant limitation is that it's very hard for blind users to search out the position of the Universal Product Code and to properly point the Universal Product Code reader at the Universal Product Code [1]. T.Rubesh Kumar, C.Purnima have proposed a camera-based assistive text reading framework to assist blind persons read text labels and products packaging from hand-held objects in their

daily lives. Main contributions embodied during this prototype system are: 1) a completely unique motion-based algorithm to resolve the aiming problem for blind users by their simply shaking the thing of interest for a short period Top of Form.

2) A singular algorithm of automatic text localization to extract text regions from complex background and multiple text patterns; and 3) a conveyable camera-based assistive framework to assist blind persons reading text from hand-held objects. Pooja Sharma et al. [2] proposed Blindness can be a state of lacking the perception because of physiological or neurological factors. during this proposed work by Pooja Sharma, Mrs. Shimi S. L. and Dr. S. Chatterji, a simple, cheap, friendly user, virtual eye are visiting be designed and implemented to spice up the mobility of both blind and visually impaired people in an exceedingly specific area [2]. The proposed work includes a wearable equipment consists of head hat, mini hand stick and foot shoes to help the visually human to navigate alone safely and to avoid any obstacles which is ready to be encountered, whether fixed or mobile, to forestall any possible accident. the foremost component of this system is that the ultrasonic sensor which is used to scan a predetermined area around blind by emitting- reflecting waves. The reflected signals received from the barrier objects are used as inputs to Arduino microcontroller. The microcontroller perform the issued commands then communicate the status of a given appliance or device back to the earphones using Raspberry pi speech synthesizer. The proposed system is affordable, fast, and easy to use and an innovative affordable solution to blind and visually impaired people in assemblage countries.

III. Methodology

Proposed System

The whole work of this dissertation is categorized into three major parts or stages as discussed below:

- a) Pre-processing Stage
- b) Processing Stage
- c) Post Processing Stage

a) Pre-Processing Stage:

Pre-processing of images involves removing low-frequency background component, normalizing the intensity of the individual particles present in the input images, removing reflections, and masking portions of images. Image pre-processing is the method of enhancing data images proceeding to computational processing.

This block consists of 4 sub divisions namely,

- Original Image
- Conversion to grey Scale.
- Image Enhancement.
- Conversion to Binary Image

b) Processing Stage:

processing stage have different steps during which the image is checked whether it contains text or not, identify to locate the text area on image, and differentiating foreground and background of that image text is finished. the subsequent steps are most common: a) Text Information Extraction Text Information Extraction will be divided into sub-stages: text detection, text localization, text extraction and enhancement, and recognition. Each sub-stage are going to be reviewed during this.

Text Detection: takes enhanced image as input and decides it contains text or not and identifies the text regions in a image.

Text Localization: Text localization involves to separate the text components and non-text components by mark the boundaries of the text regions.

Text Extraction: Text detection and extraction of useful information present within the images are utilized in many applications. During this a multi scale edge-based text extraction algorithm is proposed. This deals with printed document images and also news paper images. It considers color, style, font size of every character and also alignment of the text.

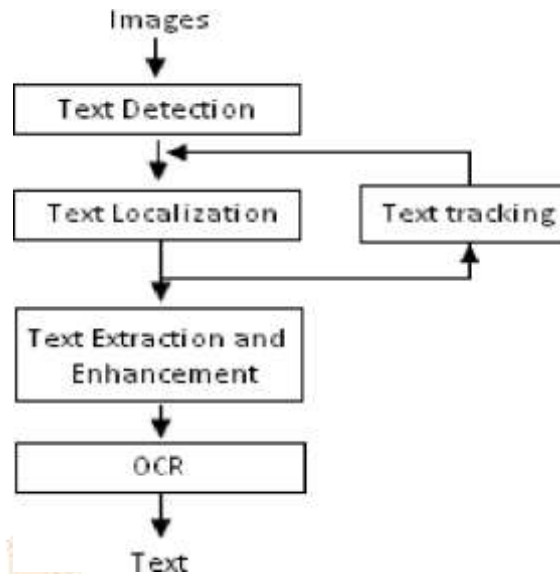


Fig. 1: Flow of Events of the Method

c) Post-Processing Stage:

This stage contains the further processes that may be done on extracted text like segmentation, character recognition and text to speech

- Segmentation: is anxious with dividing a picture into meaningful regions. Image segmentation may be broadly classified into two types. For character segmentation, first the image must be segmented row-wise then each row must be segmented column-wise.
- Character recognition: The last stage is that the character recognition. This module converts the binary text object into the ASCII text using OCR tool.
- Text to speech: This process gives audio or speech output of character or word recognized by OCR.

IV. Implementation

Edge based algorithm:

Edge-based algorithm is one of the popular Methods for text extraction which specialise in the high contrast between the text of image and its background. This method identifies and merges the sides of the text boundary while processing. The figure below can represent architecture of Edge Based text extraction algorithm. The input image fed to processing engine which has sub processes like text region detection, text localization and text extraction. Finally, monochrome output image which is white for ground and black background.



Fig.2: Results of Edge Based Algorithm: (a) and (c) Are original input images, (b) and (d) output

Connected Components algorithm:

Connected Component based method merges small components into successively large components until all the region of image is identified. It uses geometrical analysis to merge these text components which alters out non-text components and set the boundaries of text contained regions.



Fig.3: Extraction process of Connected Component Algorithm-
(a) And (c) are original images, (b) and (d) respective output

Optical Character Recognition:

OCR is optical character recognition module is the mechanical or electronic conversion of images of typed, handwritten or printed text into machine-encoded text. It is a common method of digitizing printed text so that it can be used in machine process such as text-to-speech. OCR is optical character recognition module is the mechanical or electronic conversion of images of typed, handwritten or printed text into machine-encoded text. The input is given as text, using a finger device mounted camera which captures text and sends the input text to the OCR process where the extraction of text to speech is been done. From the captured input text is segmented as word by word detection thereby to read it as separate word. Boundary detection is completed by detecting words which are fit inside the boundary, if not it eliminates the text which is unfit to read. The method of text extraction is administered by matching with templates one by one so forming a full word. The mentioned line or a word is read from the captured input text with an acceptable coding. After matching with the templates and displays it as a text and reads it aurally. In this method a USB camera which captures the input given in text format and it's sent to OCR process which processes it as text and converts it into a speech form.

The Proposed Algorithm:

The proposed algorithm is combination of the 2 algorithms, Edged Based Algorithm and Connected Components Algorithm discussed above so as to urge higher performance text extraction. Using the mix of the 2 algorithms has a plus not for text extraction also for recognition process it'll give most enhanced input for OCR (Optical Character Recognition) which convert image text to plain text that computer can recognize. Finally, the output text is going to be enabled to be read.



Fig.4: Result of proposed algorithm.

V. Experimental Results

Here in this project we implement a Smart news paper reader using optical character reorganization and Google voice assistant.

STEP 1: Executing the code with an image named example_01 for text extraction.

STEP 2: Text extracted from the given image

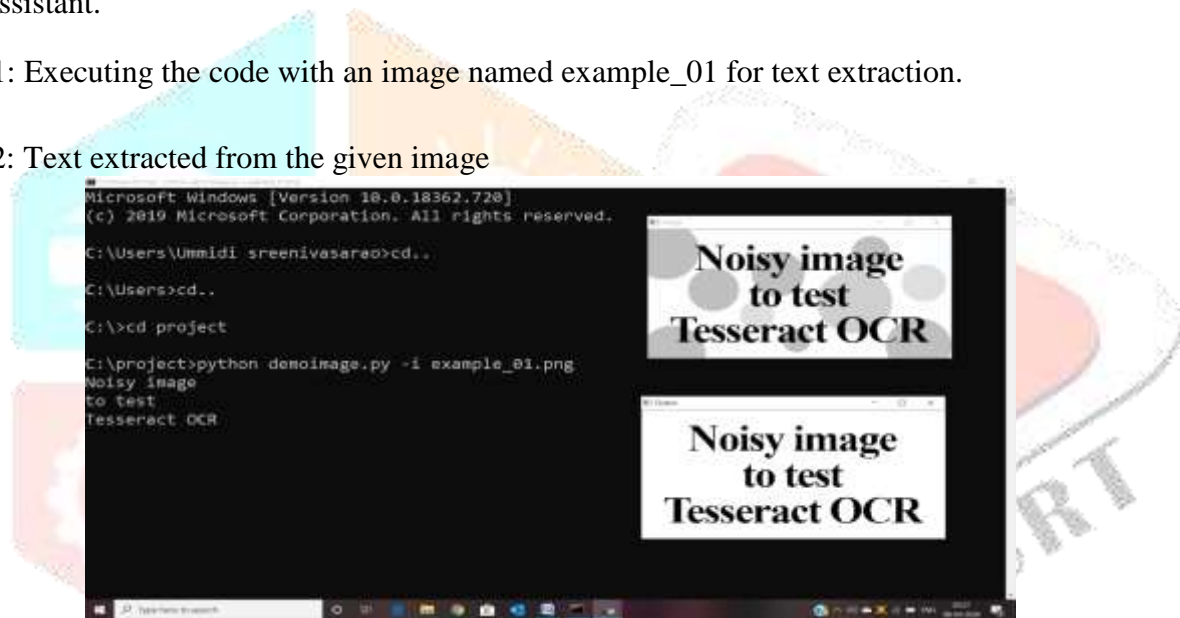


Fig.5: Noise Removed from the given input image

STEP 3: Python 3.7.4 shell will be open

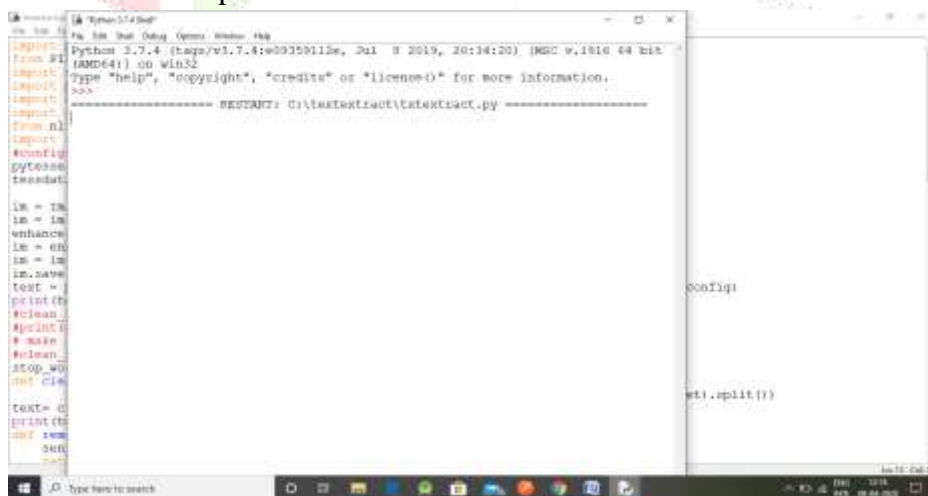


Fig.6: Interface of Python 3.7.4 for result

STEP 4: After running the code it displays as in the image and it will ask for the language.

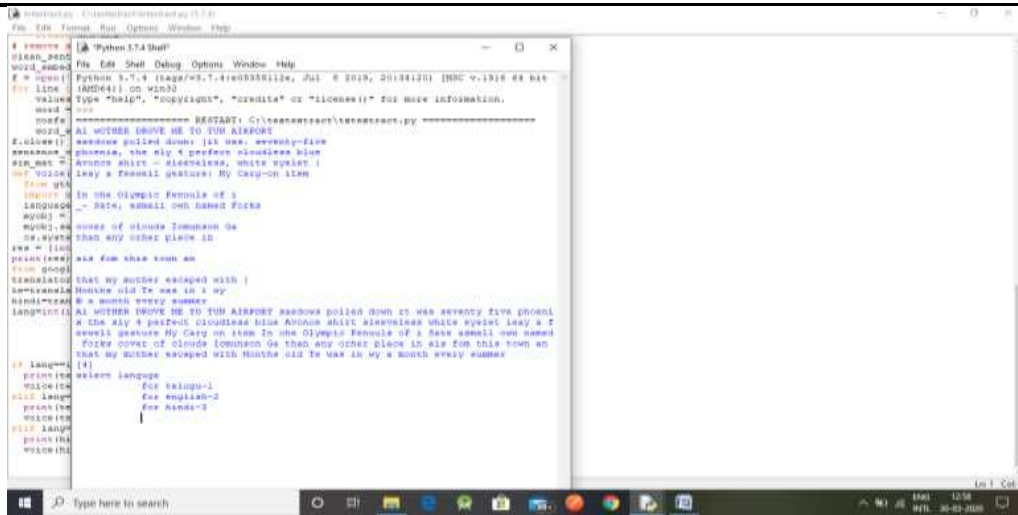


Fig.7: Text extraction from image

STEP 5: If we given as 1 it display the text in Telugu.

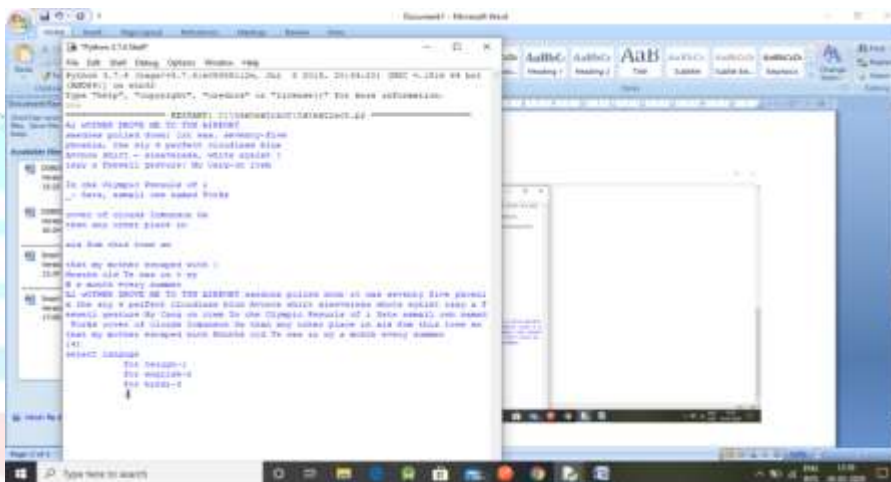


Fig.8: Language selection from menu



Fig.9: Extracted text in Telugu Language

STEP 6: If we give as 2 the text will be displayed in English.

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Python 3.7.4 Shell
File Edit Shell Debug Options Window Help
AL WOTNER DROVE ME TO TUN AIRPORT
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phoenix, the sly 4 perfect cloudless blue
Avonce shirt - sleeveless, white eyelet |
leay a feewell gesture: My Carg-on item

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AL WOTNER DROVE ME TO TUN AIRPORT saedown polled down it was seventy five phoenix the sly 4 perfect cloudless blue Avonce
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s in wy a month every summer
[4]
select language
  for telugu-1
  for english-2
  for hindi-3
  2
AL WOTNER DROVE ME TO TUN AIRPORT saedown polled down it was seventy five phoenix the sly 4 perfect cloudless blue Avonce
shirt sleeveless white eyelet leay a feewell gesture My Carg on item in che Olympic Penulls of i Sate asmall own named Fo
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s in wy a month every summer
[>>>

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Fig.10: Extracted text in English Language

STEP 7: If we give as 3 the text will be displayed as Hindi.

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Python 3.7.4 Shell
File Edit Shell Debug Options Window Help
AL WOTNER DROVE ME TO TUN AIRPORT
saedown polled down: (rt was. seventy-five
phoenix, the sly 4 perfect cloudless blue
Avonce shirt - sleeveless, white eyelet |
leay a feewell gesture: My Carg-on item

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AL WOTNER DROVE ME TO TUN AIRPORT saedown polled down it was seventy five phoenix the sly 4 perfect cloudless blue Avonce
shirt sleeveless white eyelet leay a feewell gesture My Carg on item in che Olympic Penulls of i Sate asmall own named Fo
rks cover of clouds Icmnson Ga than any other place in ais fom this town an that my mother escaped with Months old Te wa
s in wy a month every summer
[4]
select language
  for telugu-1
  for english-2
  for hindi-3
  3
अल WOTNER ड्रवाई मरें ड्रवा टुन एअरपोर्ट साइडन पोल्लेड डाउन इट वास सेवन्टी-फाइव फीनिक्स, द सली 4 पार्फेक्ट क्लाउडलेस ब्लू अवोन्स शर्ट-सल्वीसलेस, व्हाइट आइलेट |
लेय अ फीवेल गेस्टुर: माय कार्ग-ऑन इटेम इन चे ओलिंपिक पेनुल्ल्स ऑफ़ आई सैटे अस्मॉल ओन नांमड फोर्कस
कवर् ऑफ़ क्लाउड्स इकमन्सन गा थन अनि अदर प्लेस इन
आइस फॉम डिस् टाउन अन्
थैट माय मॉदर एस्केपेड विथ |
मॉन्थ्स ऑल टै वास इन चै वी
स अ मॉन्थ एवरी समर
अल WOTNER ड्रवाई मरें ड्रवा टुन एअरपोर्ट साइडन पोल्लेड डाउन इट वास सेवन्टी फाइव फीनिक्स द सली 4 पार्फेक्ट क्लाउडलेस ब्लू अवोन्स
शर्ट-सल्वीसलेस व्हाइट आइलेट लेय अ फीवेल गेस्टुर माय कार्ग ऑन इटेम इन चे ओलिंपिक पेनुल्ल्स ऑफ़ आई सैटे अस्मॉल ओन नांमड फो
रकस कवर् ऑफ़ क्लाउड्स इकमन्सन गा थन अनि अदर प्लेस इन आइस फॉम डिस् टाउन अन् थैट माय मॉदर एस्केपेड विथ मॉन्थ्स ऑल टै वा
स इन वी अ मॉन्थ एवरी समर
[>>>

```

Fig.11: Extracted text in Hindi Language

STEP 8: The extracted text will hear in MP3 player

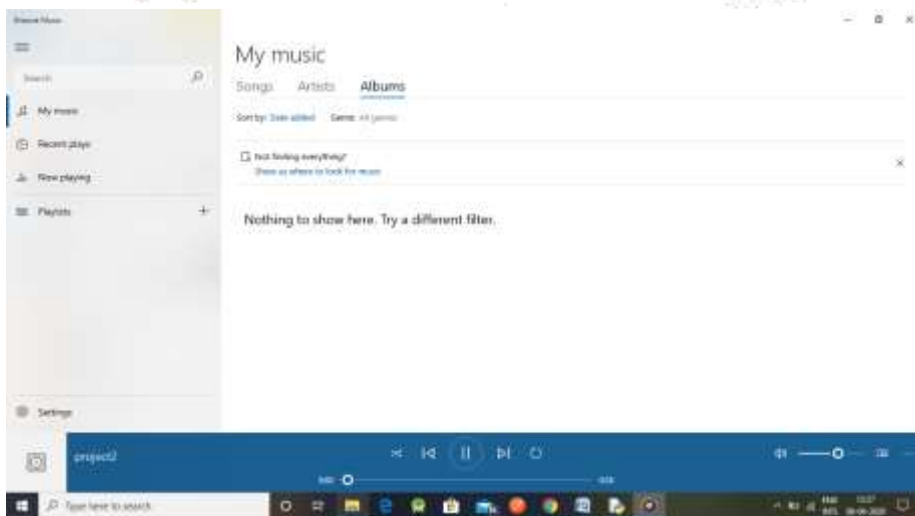


Fig.12: Extracted text to MP3 player

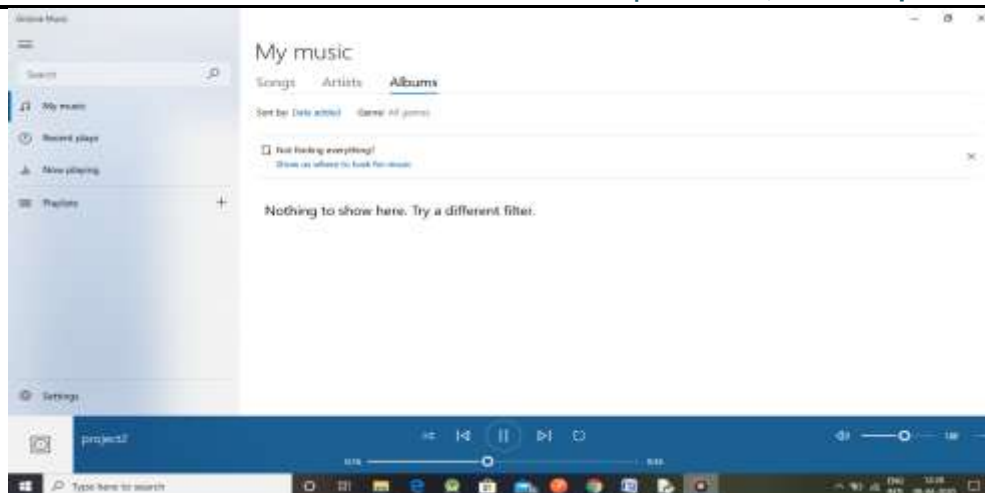


Fig.13: Text read by voice command

IV Conclusion

Extraction of text from image documents is very important in different areas nowadays. In this we proposed the algorithm which gives good performance in text extraction by combining two algorithms, Edge Based and Connected Components. The extracted text recognition done by OCR better accuracy and finally audio output produced. The paper does not include handwritten and complex font text which can be future work.

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