IOSR Journal of Engineering (IOSRJEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
Volume 3, PP 22-26

Text Extraction and Translation Using Image Processing and Augmented Reality

Tejas Parkar, Devanand Haldar, Prof. Snigdha Bangal
BE-IT, Atharva College of Engineering/Mumbai University, India
BE-IT, Atharva College of Engineering/Mumbai University, India
ME-IT, Atharva College of Engineering/Mumbai University, India

Abstract : *The language barrier among tourists is one of the major difficulties when travelling. Therefore we want to develop a Android based text translation application that is able to recognize the text in real time by a mobile phone camera, translate the text, and display the translation result back onto the screen of the mobile phone using Augmented Reality. All this is done in Real-time. The solution for this problem is to develop a translate technology which can give the results in real time and provides an Interactive User Interface. This can be implemented using Image recognizing and processing.*
Keywords *- Augmented Reality, Image Recognizing, Image Processing, Text Translation, Optical Character Recognition*

I. Introduction

The language barrier among tourists is one of the major difficulties when travelling. Therefore we want to develop a IOS/Android based text translation application that is able to recognize the text in real time by a mobile phone camera, translate the text, and display the translation result back onto the screen of the mobile phone using Augmented Reality. All this is done in Real-time. The Language barrier among tourist is major difficulties faced these days. Tourist have to carry a dictionary or need to have access to Google Translator for reading sign boards at the tourist place .This problem is occurred worldwide in any countries. Example: It occurs in India when you travel to south Indian states or north Indian states. The solution for this problem is to develop a translate technology which can give the results in real time. This can be implemented using Image recognizing and processing. The application will be smart phone application to track the image text that needs to be processed. This text will be detected from the image. This will be given to OCR for image to text conversion . After the text extraction the detected text will be identified and translated in English language . Later on this output will be displayed to the user using Augmented Reality.

II. Literature Survey

This section shows various analysis and research made in the field of Augmented Reality and Image Processing Technology. It also shows different methodologies being used by existing system and the conclusion of this literature.

Scene Text Extraction using Stroke Width Transform: In this author has used Stroke Width Transform methodology for detecting the text in the image and extracting the text from the image. Stroke Width Transform (SWT) is a computer vision algorithm an image operator) which can be used in the task of detecting text in images. This is a non-trivial task, especially for camera pictures, but SWT performs pretty well in this field.

Fig:2.1 Stroke Width Transform

Scene Text Detection: In this author has used Connected Component Clustering and Non-text Filtering methodology for detecting the text in the image. In graph theory, a connected component (or just component) of an undirected graph is a sub graph in which any two vertices are connected to each other by paths, and which is connected to no additional vertices in the super graph. For example, the graph shown in the illustration has three connected components. A vertex with no incident edges is itself a connected component. A graph that is itself connected has exactly one connected component, consisting of the whole graph.

Fig:2.2 Scene Text Detection

Natural Scene Text Detection: In this author has used Multi-channel Connected Component Segmentation methodology for detecting the text in the image. In graph theory, a connected component segmentation (or just component) of an directed graph is a sub graph in which any two vertices are connected to each other by paths, and which is connected to no additional vertices in the super graph. For example, the graph shown in the illustration has three connected components. A vertex with no incident edges is itself connected component. A graph that is itself connected has exactly one connected component, consisting of the whole graph.

Fig:2.3 Natural Scene Text Detection

III. Methodology

We will be using the following modules in our project to enhance the precision of the existing system.

1.1 OCR

It is the mechanical or electronic conversion of images of typed, handwritten or printed text into machine-encoded text, whether from a scanned document, a photo of a document, a scene-photo (for example the text on signs and billboards in a landscape photo) or from subtitle text superimposed on an image (for example from a television broadcast). It is widely used as a form of information entry from printed paper data records, whether passport documents, invoices, bank statements, computerized receipts, business cards, mail, printouts of static-data, or any suitable documentation. It is a common method of digitizing printed texts so that they can be electronically edited, searched, stored more compactly, displayed on-line, and used in machine processes such as cognitive computing, machine translation, (extracted) text-to-speech, key data and text mining.

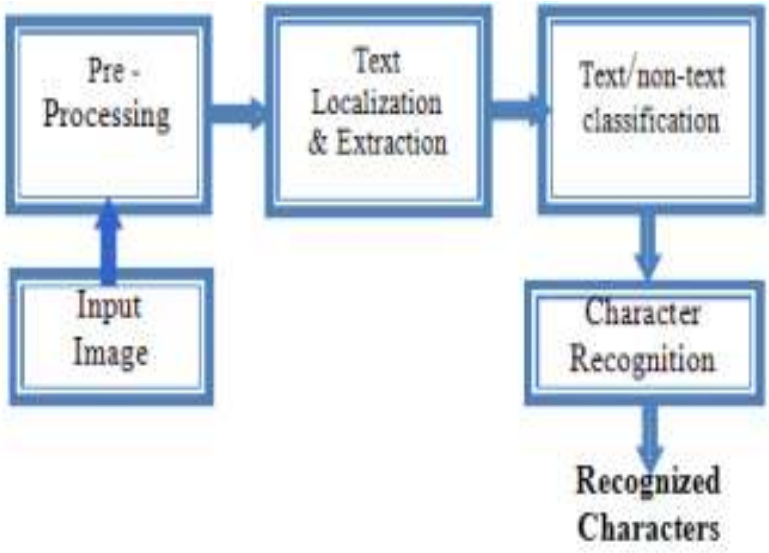

Fig:3.1 OCR Block Diagram

1.2 AR(Augmented Reality)

Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are "augmented" by computer-generated perceptual information, ideally across multiple sensory modalities, including visual, auditory, haptic, somatosensory, and olfactory. The overlaid sensory information can be constructive (i.e. additive to the natural environment) or destructive (i.e. masking of the natural environment) and is spatial registered with the physical world such that it is perceived as an immersive aspect of the real environment. In this way, Augmented reality alters one's current perception of a real world environment, whereas virtual reality replaces the real world environment with a simulated one. Augmented Reality is related to two largely synonymous terms: mixed reality and computer-mediated reality. Augmented reality is used to enhance the natural environments or situations and offer perceptually enriched experiences. With the help of advanced AR technologies (e.g. adding computer vision and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulable. Information about the environment and its objects is overlaid on the real world.

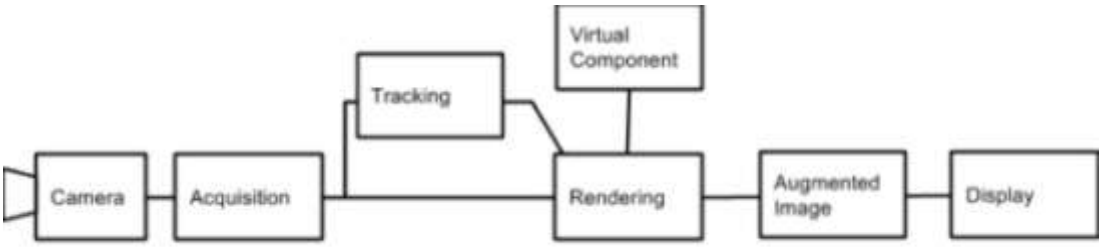

Fig:3.2 AR Block Diagram

IV. Flowchart

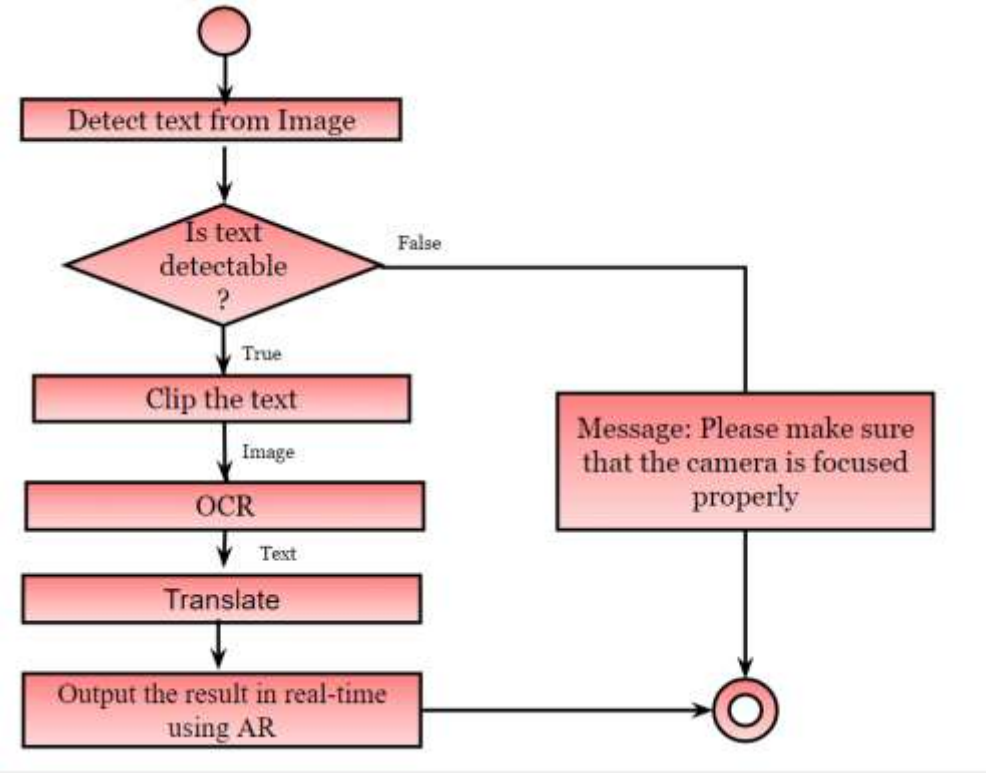

Fig 4.1 Flowchart

V. Conclusion

From the above research in different methodologies used by the different existing systems we find we can effectively translate the text through image extraction and translate .It will enhance in the interface through Augmented Reality Technology. The performance of system will be tested on various factors depending upon that effect the correctness of the results. Thus we conclude that the Translate AR android application will be able to effectively translate the text through image extraction and translation. The efficiency of the Translate AR will be better than the existing system and enhancement in the interface through Augmented Technology. The proposed system will also give translated output in real time. The performance of system will be tested based on extraction rate. With proposed application almost all the text in horizontal orientation will be extracted correctly, whereas performance of real time images will vary with lighting condition and camera resolution. Proposed android application can be further extended to deal with any target and source language as English. It can be further modified to deal with text having vertical or arbitrary orientation.

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