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Sixth Sense Technology with Optical Character Recognition

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Abstract: ***Sixth Sense Technology is an innovative technology that will be further developed in the future and will be used for the benefit of human kind. It depends on the ideas of augmented reality and has all around carried out the view of it. The thing that makes it special is the way all the technologies are combined together to get a beneficial output. It partners advances like hand motion acknowledgment, picture catching, preparing, and control, and so forth OCR is to achieve change or change of a book or text-containing documents, for instance, deciphered substance, printed or sifted text pictures, into an editable electronic plan for more significant and further planning. Along these lines, our Goal is to carry part of the actual world to computerized world. Hand Gesture Recognition is in great demand today and can be executed with sixth sense technology.***
Keywords: Sixth Sense, Gesture Recognition, OCR, Neural Networks, Hand Gesture

I. INTRODUCTION

This 'Sixth Sense' is a device that we can either wear or hold in our hands to interact with the world in a unique and digital way. One can project the image on a wall and do their work as required. There exists no middle of the road connect between our computerized gadgets and our communications with the actual world. In the past, data was kept on the paper that made it very cumbersome to remember the place and folder and could be used only at a particular place. With developing technology, data can now be stored on screens but one still require a device to operate them. With Sixth sense one can access data from anywhere without any device. They just need a plain wall for their work. Optical character recognition (OCR) is a framework that changes input text into machine-encoded design. Today, OCR is helping in digitizing the manually written archaic original copies, yet in addition helps in changing over the typewritten archives into digital structure. An OCR framework depends principally, on the extraction of highlights and segregation/order of these highlights. The point of developing hand gesture is that humans can easily interact with the world without interacting with any other device in between like mouse etc. Hand motions are a part of non-verbal communication that can be passed on through the focal point of the palm, the finger position and the shape built by the hand.

II. LITERATURE SURVEY

A. Sixth Sense

The theory behind Sixth Sense Technology is that the Sixth Sense device attempts to decide what somebody is connecting with as well as how the individual in question is collaborating with it. The product scans the web for the data that is pertinent to that circumstance.

1) *Technique 1- Head Worn Version:* They began with a bigger projector that was mounted on a protective cap. However this failed as if someone comes in front of the projector than everything will be projected on his/her face. Movement is not allowed will performing the project so that the projector stays still and image is not blurred.
2) *Technique 2- Sixth Sense Glass:* They were acquainted with all the features at a particular place and were easy to carry anywhere. They were designed in such a way that the information remains secured and protected. The glass consist of signal acknowledgment infrared camera, infrared 3D laser projector and 2 lasers fitted at both the finishes of the glass and furthermore goes about as a little showcase and ordinary projector at focus. Show is comprised of optical glass and have a crystal layer and a smaller than usual projector which will straightforwardly project on optical nerve of eye causing it to appear as though your eye is projecting data. This glass additionally incorporate mouthpiece, utilized for sound account and perusing of information utilizing voice. The glass interfaces gadgets through Bluetooth, equipped for clicking pictures, recording of music, perusing information, sending messages, managing up a call, and so on this chips away at battery. By utilizing 3D infrared laser one can associate with 3D protests and can make changes in 3D workspace.

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B. OCR

OCR (Optical Character Recognition) is the mechanical change of pictures of physically composed or printed text into machine encoded text. It was essentially made as a piece of perusing machine for the visually impaired in 1947. OCR (Optical Character Recognition) increases the proficiency and viability of work. The ability to immediately look through substances is extremely helpful.

1) *Task-specific readers:* As the name suggests, this type of OCR is used for specific task only like reading a check book, printing passbook in banks etc. These machines can't be used for any other purpose. Like a passbook will be only printed if the format of the passbook is known to the machine or else it will reject the copy inserted. Such frameworks underline high throughput rates and low mistake rates. Applications such as letter mail perusing have normal throughput paces of 12 letters each second with blunder rates not exactly 2%. Can perceive both manually written and machine-printed text.
2) *General purpose page readers*: They are intended to deal with a more extensive scope of reports like business letters, specialized compositions and papers. It works by catching a picture of any document and isolating the page into text versus non-text areas, applying OCR to the content locales and putting away non-text locales independently from the yield text. They can peruse machine composed content yet a couple can peruse hand-printed alphanumeric. Very good quality page peruses have progressed acknowledgment capacities and high information throughput. Low-end page peruses generally are viable with conventional level bed scanners that are generally utilized in an office climate with PCs, which are less requesting as far as framework exactness or throughput.

C. Gesture Recognition

Gesture Recognition is a technology that with the help of mathematical algorithms makes computer understand the actions or gestures done. Like with the help of our hands we can scroll down the screen without using any input device. The essential objective in considering gesture recognition is to present a framework that can distinguish human motions and use them to pass on data or for order and control purposes. Touchless interface notwithstanding motion controls are getting broadly famous as they furnish the capacities to cooperate with gadgets without truly contacting them.

1) *Virtual keyboard:* Hand gesture acknowledgment framework can be utilized for interfacing among PC and human though hand signal. This work was used to present a strategy for a human PC interface through hand signal acknowledgment that can perceive 25 static signals from the American Sign Language hand letter set. The goal of this proposal was to foster a calculation for acknowledgment of hand signals with sensible precision. The division of dark scale picture of a hand motion is performed utilizing thresholding calculation. Calculation treats any division issue as classification problem.
2) *IOT implementation*: The IOT-based Smart lab is essentially formed on the coordination of two innovations: Sixth sense technology and IOT. The gadgets present in lab, for example, fans and lights are controlled through gestures performed. Image handling and attachment programming strategies have been utilized to make lab safer through electromechanical technique and movement discovery.

III.METHODOLOGY

There are several algorithms used in this technology like Logistic Regression, Deep learning, CNN, Connected component labelling etc.

A. Hand Gesture Recognition



Fig. 1 Flowchart for Hand Gesture

1) Deep Learning is essential for a larger group of AI strategies. It depends on the utilization of layers that cycle the information, separating highlights from them and creating a numerical model. In this particular venture, we'll plan to group various pictures of hand signals, which implies that the PC should "learn" the highlights of each motion and order them accurately. For instance, in the event that it's anything but a picture of a hand completing a thumbs up signal, the yield of the model should be "the hand is completing a thumbs up motion".

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2) A Convolutional Neural Network (CNN) is a Deep Learning algorithm which can take in an info picture, allot importance (learnable loads and inclinations) to different angles/objects in the picture and have the option to separate one from the other. The pre-preparing needed in a CNN is a lot lower when contrasted with other order algorithms. While in crude strategies channels are hand-designed, with enough preparing, CNNs can become familiar with these channels/attributes.

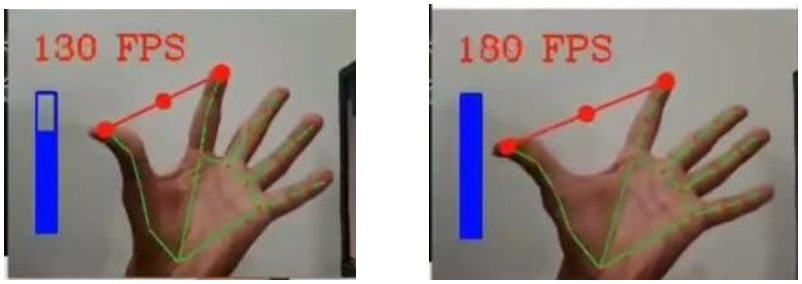


Fig. 2 Controlling Volume with hand gesture

B. Optical Character Recognition

1) Connected-component labelling is used in computer vision to spot connected regions in binary computerized images. A graph, containing vertices and interfacing edges, is built from significant information. Algorithm traverses the graph, tagging the vertices based on the connectivity and relative values of their neighbours. Connectivity is determined by the medium; picture diagrams, for instance, can be 4-associated or 8-associated.

2) Logistic Regression is an approach with the help of which we can train our model. It is a binary classifier that classifies the dataset and reduces the cost function of the equation used in text extraction and tracking. In case of adding many features in a project this approach can fit the training dataset. The concept of outliners can be removed for getting a proper dataset.

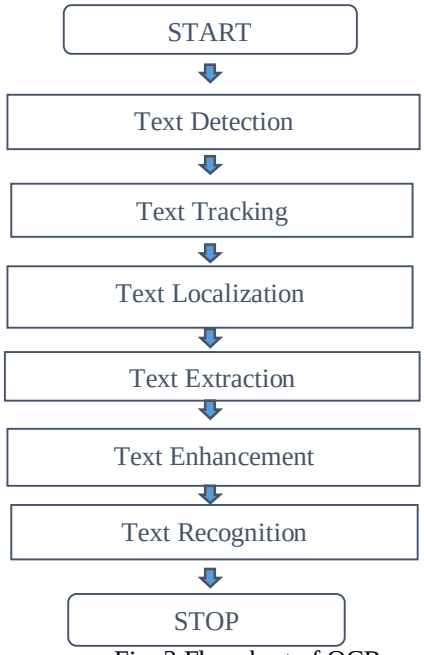


Fig. 3 Flowchart of OCR

IV. FUTURE SCOPE

OCR has improved and is used by every major industry at present time. It has still some areas to be enhanced. A good example of OCR in present situation is google lens. Some problems which include document based limitations (colored background, blurred or glared text, skewed documents), Text based limitations (variety of letters, font's size and its types), Handwriting recognition, etc. Advanced technology in Computer vision, Deep learning will improve some OCR limitations and improve the accuracy. Along with this, in gesture recognition it can be implemented on a large scale and an application like google assistant can be executed.

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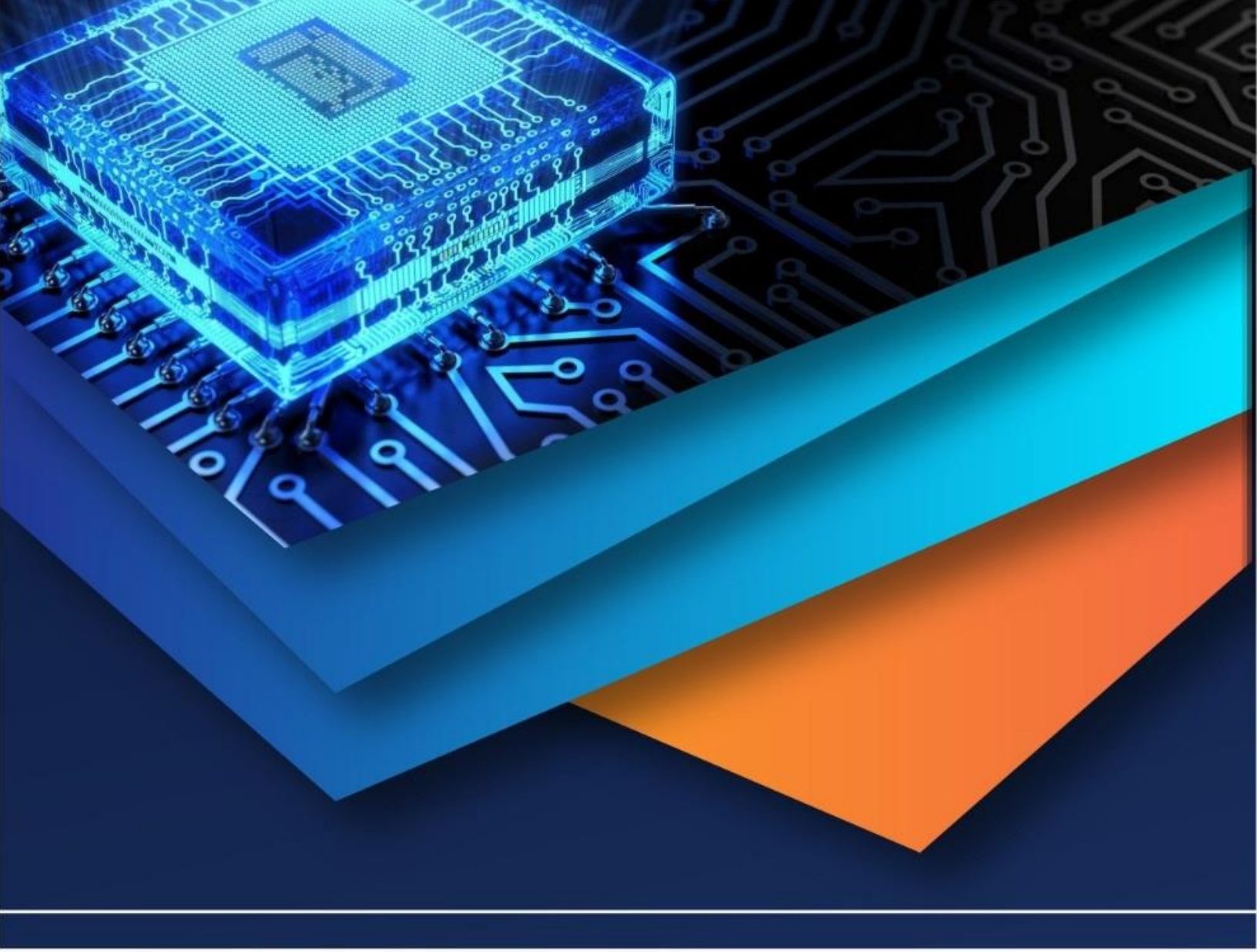
V. CONCLUSIONS

The key here is that Sixth Sense perceives the items around you, showing data consequently and allowing you to get to it in any capacity you need, in the easiest way that could be available. Clearly, this has the capability of turning into a definitive "straightforward" UI for getting data about everything around us. In any case, as it is currently, it might change the manner in which we cooperate with this present reality and genuinely give everybody complete consciousness of the environment around us. Gesture Recognition when done in a proper way can simplify the life of human being that are working on the desktop or anywhere else in the world. This can provide help in all the sector of business. Use of keyboard and mouse can be minimized and touch screen user interface will transform into touchless user interface. Along with this google lens is the biggest example of OCR that can provide solution by just scanning a particular image.

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