NIET Journal of Engineering & Technology (NIETJET)
Volume 12, Issue 2, 2021 ISSN: 2229-5828 (Print)

HALO: Holographic Assistance and Live Operations

Prakhar Varshney[1],Shilpi singh[1], Rashi Srivastava[1] ,Vaibhav Madan[1],Mr. Mayank Deep Khare[1]

[1]Department of computer science &Engineering, Noida Institute of Engineering and Technology, Greater, Noida 201306, India.

Abstract: ***Personal assistants are less participatory these days; you have to wake it up or press a button, such as calling "ALEXA", every time you wish to complete a task. HALO essentially fills up the interaction gap between the user and the helper. Until recently, holographic assistants were science fiction, but with the inclusion of some interactive components, they are now a reality. Finger gestures and motion sensors are used to create an interactive holographic display. A motion sensor in this system recognizes finger actions (swiping and pinching) and transforms them into holographic picture rotation and enlargement/reduction, respectively. A user may accomplish a variety of tasks with gestures, such as changing the music by swiping. The recent growth in the field of personal assistants has prompted the development of a more user-friendly interface. HALO is a method for bridging the gap between the user and the helper. In the field of Personal Assistants, IOT (Internet of Things) is the cutting-edge technology. Displayers have a tendency to take on three dimensions. The ability to see 3D pictures without glasses is the most appealing feature of holographic 3D displays. Artificial Intelligence and Neural Networks are used to customise the experience for consumers using AI and IoT, with the inclusion of Gesture sensors to increase interactivity and user experience.***

Introduction

A software agent known as an intelligent virtual assistant (IVA) or intelligent personal assistant (IPA) may conduct tasks or provide services for a person based on instructions or queries. The word "chatbot" is sometimes used to refer to virtual assistants in general or those that may be accessible via online chat. Online chat systems are sometimes used just for amusement purposes. Some virtual assistants can understand and respond to human speech using synthetic voices. Users may ask their assistants questions, operate home automation devices and media playback using voice commands, and handle other basic activities like email, to-do lists, and calendars with vocal (spoken?) commands .[2] The term virtual assistant, or virtual personal assistant, is also often used to designate contract employees who work from home and do administrative chores normally handled by executive assistants or secretaries. Smart advisors are a sort of consumer-facing AI programming that may be contrasted with virtual assistants. Virtual assistants are task-oriented, whereas smart advisor systems are subject-oriented.

Methodology

The current research looked towards combining holography with the capabilities of virtual assistants such as:Finger movements and motion sensors are used to create an interactive holographic display.A motion sensor in this system recognizes finger actions (swiping and pinching) and transforms them into holographic picture rotation and enlargement/reduction, respectively.A user may do a variety of tasks with gestures, such as changing the music by swiping.The recent growth in the field of personal assistants has prompted the development of a more user-friendly interface. HALO is a method for bridging the gap between the user and the helper. Figure 1 depicts the system's fundamental flow.

Publisher: Noida Institute of Engineering & Technology,
19, Knowledge Park-II, Institutional Area, Greater Noida (UP), India.

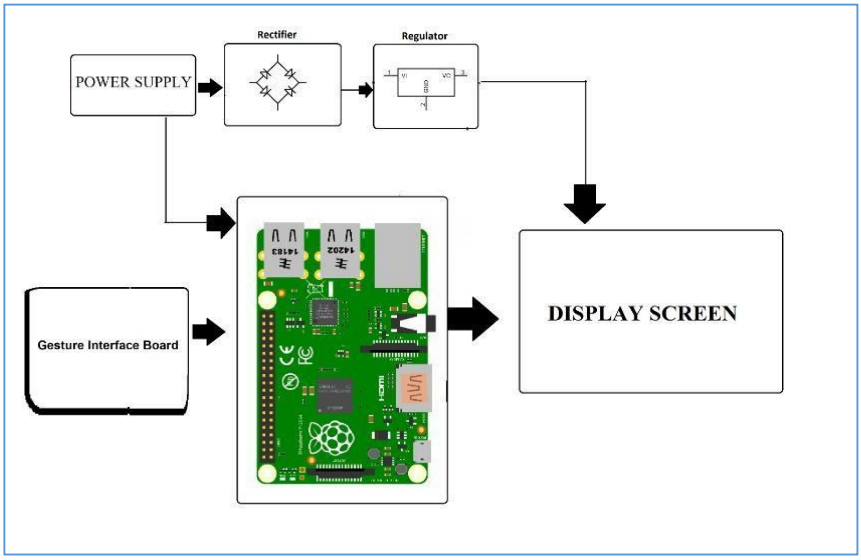

Fig1: Block Diagram

Holographic Display

- Holographic display will be controlled by the Raspberry pi/Arduino Uno
- 4 parallel displays will be used to create the hologram

Fig 2. Holographic Display

Publisher: Noida Institute of Engineering & Technology,
19, Knowledge Park-II, Institutional Area, Greater Noida (UP), India.

Gesture sensor

Fig 3. ADPS-996

Integration of additional Features

- Additional Features such as music player and other applications will be added to HALO
- These features will allow better interaction with the help of the gesture controls

Music Player App

A music player app made with python, Tkinter, it is a full GUI app having features like swipe to next or previous, raise volume etc.

Key Features

- Gesture based movement between tracks
- An attractive GUI interface
- Lightweight Structure

Results and discussions

Hand Gesture Recognition using Python and OpenCV

Hand gesture recognition is a fun project for a Computer Vision enthusiast to undertake since it contains an easy-to-follow step-by-step approach that allows you to create more sophisticated things on top of these notions. For a long time, gesture detection has been a fascinating topic in the Computer Vision field. This is owing to the fact that real-time segmentation of foreground objects from a crowded backdrop is a difficult challenge.The most apparent explanation is that when a person looks at a picture and a computer looks at the same image, there is a semantic gap. Images are essentially 3-dimensional matrices to a computer, yet humans can readily figure out what's in them. As a result, computer vision problems continue to be a challenge. Take a look at the illustration below.

Input Segmentation [9]

Publisher: Noida Institute of Engineering & Technology,
19, Knowledge Park-II, Institutional Area, Greater Noida (UP), India.

Segment the Hand region

The initial stage in hand gesture identification is to locate the hand area by removing any other distracting elements from the video stream. At first, this may appear to be alarming. But don't be concerned. Using Python and OpenCV will make things a lot simpler!

Background Subtraction

First, we'll need a quick way to distinguish between foreground and background. We use the notion of running averages to do this. We programme our system to look at a certain scene for 30 frames. We compute the running average across the current frame and the preceding frames throughout this time.After we've figured out the background, we'll bring in our hand and tell the system that it's a new entry into the background, making it the foreground object. But how are we going to get rid of the foreground on our own? Background Subtraction is the solution.

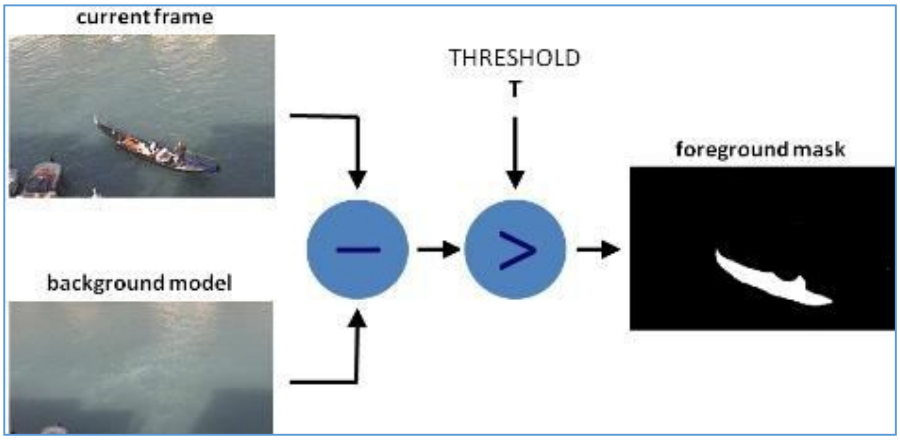

Fig 4 Background Subtraction

Thresholding and Motion Detection

To detect the hand region from this difference image, we need to threshold it such that just our hand region is visible and all other undesirable parts are painted black. This is exactly what Motion Detection is for.Thresholding is the process of assigning pixel intensities to 0s and 1s depending on a certain threshold level, allowing us to isolate our item of interest from the rest of the image.

Contour Extraction We discover contours in the final image after thresholding the difference image. Our hand is supposed to be the contour with the biggest area.

Publisher: Noida Institute of Engineering & Technology,
19, Knowledge Park-II, Institutional Area, Greater Noida (UP), India.

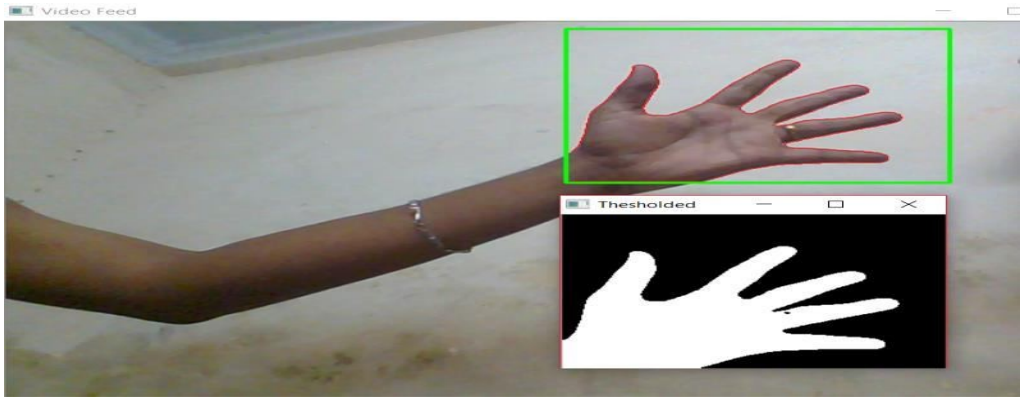

Fig 5. Result

Conclusions

This is so accurate that holography is no longer science fiction; it is rapidly expanding its reach, and the day is not far away when it will be in our pockets.Despite the fact that our proposed project only focuses on a few basic applications such as (Changing the music on swipe etc.)It has the potential to be evolved into a lifelike AI with inconceivable possibilities in the future.

It may be made even smaller to make it more portable and user-friendly. For the time being, HALO will give users a whole new level of experience with Basic Operations as well as a glimpse into the future of technology.

References

[1] Apple Progressing with 3D Holographic Projection Technology (The Macintosh News Network] http://www.aboutprojectors.com/ 2008.
[2] Holographic projection technology creates impact - An Activ8-3D product story. Edited by the Marketing week Marketplace editorial team Sep 2, 2009
[3] Newest Technology: 360Brandvision™ Offers 3D Video Holograms in 360 Degrees. Las Vegas, NV (PRWEB) November 10, 2008. PR WEB Press Release. (www.prweb.com)
[4] Church via Holographic Telepresence Video. June 24, 2008. http://churchrelevance.com/church-via-holographic-telepresence-video/.
[5] Samidha Garg, S.N.Singh; 'Performance Comparison Of High Frequency Single Phase PWM Inverters Using PSpice',Volume No.1,Issue No.1,2013,PP.001-008,ISSN :2229-5828
[6] Satyendra Sharma, Dr.Brahmjit Singh; 'Planning and Optimization of UMTS Network Radio Link with Limited Interference',Volume No.2,Issue No.1,2013,PP.009-012,ISSN :2229-5828
[7] L.NavinkumarRao, S Gairola; 'Steady -State and Dynamic Performance of the Static Var Compensator (SVC) Phasor Model',Volume No.2,Issue No.1,2013,PP.013-016,ISSN :2229-5828
[8] Rishi Singhal, S.P. Singh and Dr V. K. Pandey; 'Design of Phase Compen-sation Circuits For Multistage OP-AMP',Volume No.2,Issue No.1,2013,PP.017-019,ISSN :2229-5828
[9] Mohd Yunus Khan, Saroj Kumar Padhi and R.K. Singh; 'Extraction ,Characterization And Engine Performance of Jatropha Curcas Oil',Volume No.2,Issue No.1,2013,PP.021-028,ISSN :2229-5828
[10] Srivastav, Vivek; 'Analytical Study of Traffic Behaviour in a Network on Chip Architecture',Volume No.2,Issue No.1,2013,PP.029-032,ISSN :2229-5828

Publisher: Noida Institute of Engineering & Technology,
19, Knowledge Park-II, Institutional Area, Greater Noida (UP), India.