INTELLIGENT AUTOMATED ASSISTANCE SYSTEM

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Abstract— In this paper we introduce an intelligent Automated Assistance System which does many works. The device will be working based on raspberry pi computer. It will be basically a voice based device which works basically on voice input. User can also give other kind of inputs through phone or gesture. The project features some of the latest trends in current IT scenario such as Wearable devices, IOT, Home automation, Artificial Intelligence, Machine learning, Cloud Computing etc... The wearable device will be an assistant for the user who can give reply to user's wide number of queries either as voice or through its display. It will interact with other systems by means of IOT, thus provides a fully automated system. Implementation of sixth sense technology concepts are another aim we would like to implement. 'Sixth Sense' is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information.

Index Terms— raspberry pi, IOT, Home automation, Artificial Intelligence, Machine learning, Cloud Computing, sixth sense.

I. INTRODUCTION

As computing technology becomes more advanced and less expensive, it can be built into an increasing number of devices of all kinds. We introduce a way to eliminate the traditional way of information access, storage and manipulation i.e. the information from paper, screen and digital storage. Although there have been many advancements in technologies that enables us to connect the digital world to physical world, there aren't any technologies as of now which bridge the gap between the digital world and physical interaction with the real world. Our project aims to bridge this gap. In addition to personal and handheld computers, the almost infinite list of possible intelligent devices includes cars, medical instruments, geological equipment, and home appliances. The project features some of the latest trends in current IT scenario such as Wearable devices, IOT, Home automation, Artificial Intelligence, Machine learning, Cloud Computing etc...The wearable device will be an assistant for the user who can give reply to user's wide number of queries either as voice or through its display. It will interact with other systems by means of IOT, thus provides a fully automated system. Which also contains 'SixthSense', is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information.

II. BACKGROUND

Intelligent Virtual Assistant

An intelligent virtual assistant is an engineered entity residing in software that interfaces with humans in a human way. Gestures can originate from any bodily motion or state but commonly originate from the face or hand. This paper Personal Assistant for User Task Automation "Personal Assistant for User Task Automation" presents the approach to develop a personal assistant that reduces the use of input devices like mouse and keyboard on our personal computer. Giving commands via speech makes it user friendly. This paper also describes the representation model, available personal assistants in the market, along with the implementation of this system. Details about the additional feature of remote access and addition of new commands that makes it different from others are also mentioned. [4]

Home automation

Industry alert are based on manual intervention. Notification for any circumstances in Industry not provided. Appropriate action for this condition taking is a system which will automatically monitor the industrial applications and generate Alerts/Alarms or take intelligent Decision using concept of IOT. And also design the system to Take Intelligent Decision and Control Devices. Such a system is ," Industrial Automation using Internet of Things (IOT)". [1]

The proposed method in "Speech Recognition Based Wireless Automation of Home Loads- E Home" is aimed at designing a voice controlled and GSM based smart home system. The system is designed in such a way that it is easy to install and use. The system has two main sections; they are MATLAB section and embedded section. The devices can also be controlled from distant locations through SMS. So, a GSM module is associated with the control part.[2]

"Home Automation Using Internet of Things" proposes a system that will provide remote control of home appliances and also provide security against the mishaps when the home host is not at home. This paper is mainly concerned with the automatic control of light or any other home appliances using internet of things(IOT) concept have been used here . It is meant to save the electric power and human energy. This project is made with the help of controller and raspberry pi. The various appliances connected to the micro controller and sensor is connected using wireless network.[3]

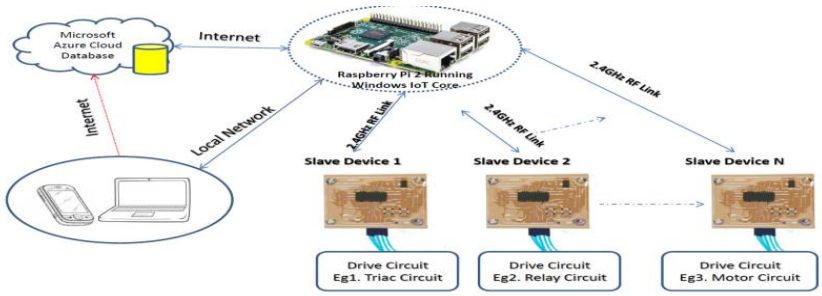

Fig. 1: Automation using raspberry pi

Object recognition

The modern world is enclosed with gigantic masses of digital visual information. Increase in the images has urged for the development of robust and efficient object recognition techniques. Most work reported in the literature focuses on competent techniques for object recognition and its applications. A single object can be easily detected in an image. Multiple objects in an image can be detected by using different object detectors simultaneously. The paper "Techniques for Object Recognition in Images and Multi-Object Detection" discusses various techniques for object recognition and a method for multiple object detection in an image.[5]

The paper "A Survey on Moving Object Detection" is set on the theme that Object detection and tracking are the key steps for automated video analysis. Object detection in a video is usually performed by object detectors, background subtraction techniques or motion based methods. Object detectors are binary classifiers it classifies the sub images into object or background. It requires manually labeled examples to train a binary classifier. Background subtraction technique needs a training sequence that contains no objects to build a background model. Then it compares images with a background model and detects the changes as objects. Motion-based methods avoid training phases and use motion information to separate objects from the background. This paper covered more methods on doing object recognition.[6]

Sixth sense

Generally, we use pen and paper to scribble. But now a days we are writing / painting in digital form, that is we use laptops or our desktops. We are confined in the pen paper or digital computer screens to write or read anything, which is in digital form. We cannot directly interact with this digital data. In the paper "Virtual painting/writing with hand gesture using sixth sense device" they have discussed how we can directly interact with digital data using human hand gesture. This modern technology with which interaction of human with computer is made realistic rather than the old formal way (typing over keyboard or pointing through mouse) is called sixth sense technology [7]

Hand gesture recognition embedded system can be used as an interfacing medium between the computer and human using different hand gestures in order to control the computer. In this proposed system, a real time vision based hand gesture interaction prototype which depends upon finger gestures using color markers is designed. In "Virtual control hand gesture recognition system using raspberry pi" they developed an embedded system by which one can communicate with any digital device with less hardware requirements and using an external camera to capture the gestures. To avoid the limitations of PC an embedded system consisting of Raspberry Pi which is a Linux based platform is used to identify different color markers on the fingers and when the mouse emulation is started the software tracks those markers using the camera.

They maintained their main aim of creating a framework with low cost and effective gesture interpretation system which uses computer vision to analyze different sets of gestures or actions done using the human fingers.[8]

The system in ," Raspberry Pi Based Gesture Photography" proposed to make use of Raspberry Pi hardware as the heart of the device and a USB camera to capture images from the real world. The camera captures images based on hand gestures; manipulates it and stores the final image in the main workstation which is connected via the Wi-Fi network. Hence, this technology allows us to interact with digital information using hand gestures.[9]

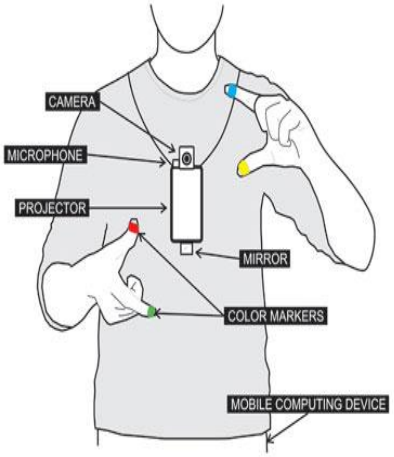

Fig. 2: Sixth sense concept implementation

III. INTELLIGENT AUTOMATED SYSTEM

We introduce an intelligent Automated Assistance System which does many works. The device will be working based on raspberry pi computer. It will be basically a voice based device which works basically on voice input. User can also give other kind of inputs through phone or gesture. The project features some of the latest trends in current IT scenario such as Wearable devices, IOT, Home automation, Artificial Intelligence, Machine learning, Cloud Computing etc... The wearable device will be an assistant for the user who can give reply to user's wide number of queries either as voice or through its display. It will interact with other systems by means of IOT, thus provides a fully automated system. Implementation of sixth sense technology concepts are another aim we would like to implement. 'Sixth Sense' is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information.

Rasberry pi

The Raspberry Pi board is the central processing unit which is responsible for voice recognition, image capturing, gesture recognition, image processing and sending the final processed image to the required workstations. It belongs to a class of single-board computer (SBC) which is a computer built on a single small circuit board, with microprocessor(s), memory (M), built-in input/output (I/O) ports and other basic features required in a functional computer. It is a credit card-sized single board computer (SBC) developed by the Raspberry Pi Foundation. The Raspberry Pi 2 model B is the latest released version, based on the Broadcom BCM2836 Arm7 Quad Core Processor system on a chip (SOC) running at 900 MHz, 1GB LPDDR2 extended RAM, Fully HAT (Hardware Attached on Top) compatible, 40pin GPIO, ability to connect a Raspberry Pi camera and touch screen display (each sold separately),10/100 Ethernet Port and a Micro SD slot for storing information and loading operating systems.

Fig. 3: Raspberry Pi 3 Boards

Camera interface

We make use of USB camera (webcam) for capturing images from the external world (Fig. 4). This type of camera is used instead of Raspberry Pi camera for the work to be cost effective and the former also provides sufficient cable length compared to the later. The camera module is plugged into the Pi and it captures 20MP clear resolution images, which is suffice for general applications.

Headset

A headset combines a headphone with a microphone. Headsets are made with either a single-earpiece (mono) or a double-earpiece. The voice will be recognized using this and send to the processor.

Projector

For implementing the sixthsence technology we make use of a projector …the mirror is used for reflecting the image capturing and placing it on surface using the projector.

IV. CONCLUSION

Although there have been many advancements in technologies that enables us to connect the digital world to physical world, there aren't any technologies as of now which bridge the gap between the digital world and physical interaction with the real world. Our project aims to bridge this gap. In addition to personal and handheld computers, the almost infinite list of possible intelligent devices includes cars, medical instruments, geological equipment, and home appliances. The project features some of the latest trends in current IT scenario such as Wearable devices, IOT, Home automation, Artificial Intelligence, Machine learning, Cloud Computing etc...The wearable device will be an assistant for the user who can give reply to user's wide number of queries either as voice or through its display. It will interact with other systems by means of IOT, thus provides a fully automated system. Which also contains 'Sixth Sense', is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information. The different types of application using sixth sense gives expendability to project.

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