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WEARABLE DIGITAL CAMERA-OUTCOME OF SIXTH SENSE TECHNOLOGY - A REVIEW

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ABSTRACT

Gesture Recognition is a technology which is used to identify human gestures with the help of mathematical algorithms. Gesture recognition recognizes the hand, tracks the hand movements & also provides information about hand position orientation and flux of the fingers. The color markers are placed at the tip of the user fingers. This helps the webcam to identify the movement of hand and the gesture recognition. The drawing application allows the user you to draw on any surface by tracking the fingertip movements and also the position of the user's index finger. The pictures that are drawn by the user can be stored and replaced on any other surface. The user can also shuffle through various pictures and drawing by using the hand gesture movements. Users hold the inertial pen to write numerals or English lowercase letters and make hand gestures with their preferred handheld style and speed. Technologies are being developed which are able to intuitively express user's intentions, such as handwriting, gestures, and human body language, to naturally control HCI devices. Physical gestures as intuitive expressions will greatly ease the interaction process and enable humans to more naturally command computers or machines.

Keyword: finger, Handwriting technology, Gesture recognition, Human Computer Interface (HCI).

I. INTRODUCTION

Object tracking in real time is one of the most important topics in the field of computer Vision. Detection and tracking of moving objects in the video scenes is the first relevant step in the information extraction in many computer vision applications. This idea can be used for the surveillance purpose, video annotation, traffic monitoring, human-computer interaction, intelligent transportation, and robotics and also in the field of medical. Basically sixth sense is a power of perception seemingly independent of the five senses. This paper introduces about the sixth sense technology, Sixth sense is a wearable gestural interface, which provide freedom to interact with the digital world using hand gestures. Components of Sixth Sense include projector, camera colour markers, mirror & a mobile component. Sixth sense is all about interacting to the digital world in most efficient way. Sixth sense devices are very much different from the computers. This technology uses hand gestures to perform corresponding commands and accessing the operations from the mobile device which is connected to it, & action is projected to on any surface using the projector. With just the movement of hand gestures, user can take the pictures. Camera recognizes the gesture & the framing to which the user is pointing to, this particular recognized frame will be stored in the mobile component. & can be displayed on to any particular surface by using projector. In this camera attached to the ARM11 Raspberry Pi device.

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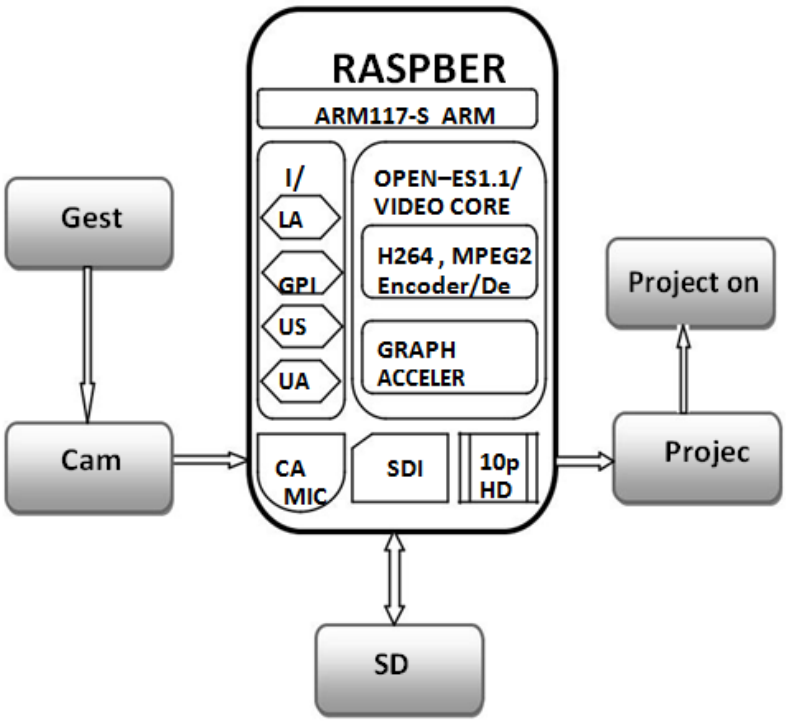
II. BLOCK DIAGRAM



III.RELATED WORK

The devices which are used in Sixth Sense Technology are Camera, Coloured Marker, Raspberry pi, Projector, and Mirror, The camera is connected to ARM11 Raspberry Pi device and it recognizes individuals, images, pictures, gestures that user makes with his hand. There are colour markers placed at the tip of users fingers. Marking the user's fingers with red, yellow, green and blue coloured tape helps the webcam to recognize the hand gestures by using the combination of open CV library and the rasping language. Wearable visual computing uses body-mounted cameras to capture contextual information. In this regard, reports several studies proposing different locations to attach standard video cameras to the wearer's clothing. Locating the camera near the eyes, for example on a hat, yields images that closely match the user's perspective. Other work has shown merit in placing the camera on users' shoulders, on their chest Startle Cam, Sixth Sense or Gesture Pendant, and in multiple other locations on the body. While these placements offer several advantages, each requires the wearer to add elements to their wardrobe or to don technology in visually apparent areas of the body. several projects have proposed body-mounted cameras to support gestural interactions.

Sixth Sense can project digital information atop physical objects, which can be adjusted using hand gestures captured by a body-worn camera. Gesture Pendant, Hover Flow and Imaginary Interfaces also use a chest-mounted camera for capturing hand gestures. All these techniques force the user to perform gestures with the hands at the height of the chest, which can be tiring and draws attention from others. Further, chest-mounting electronics have been shown to introduce serious social issues, suggesting the need for a more discreet placement. User can take the pictures. Camera recognizes the gesture & the framing to which the user is

pointing to, this particular recognized frame will be stored in the mobile component. & can be displayed on to any particular surface by using projector. ARM boards have power saving features due to which they are widely used in mobile electronic devices where low power consumption is critical consumption goal. Remote module is a Raspberry Pi ARM11 board which has HDMI port to display processed handwritten signals in larger view by interfacing projector with it. Booting Unit Whenever we start the power supply, NAND flash controller of System on Chip (SOC) will automatically copy the initial 4KB data to stepping stone. At the same time, Booting unit will be retained in the initial of 4KB NAND flash.

Followed to this, different functions are realized by boot loader such as switching off the watchdog, settings system timer, setting Memory Management Unit (MMU), modification at the NAND flash controller. Operating System LINUX Kernel In this design, we are using real time multitasking kernel, which performs various functions like process creation, Scheduling and Communication etc. In this design, we mainly introduce the porting technology of LINUX kernel. Application for this design includes various parts like information collection from touch message, Graphical User Interface (GUI) display & program processing. Now, processor reads data, processes it and extracts information contents in the signals. This contained information in the signals is extracted in relative registers by inquiring Interrupt Request Number (IRN). This is called interrupt mode of the processor. Such an information in the signals is kept in a global touch message queue. After these steps, processor returns to its initial mode. A video projector, also known as a digital projector, may project onto a traditional reflective projection screen, or it may be built into a cabinet with a translucent rear projection screen to form a single unified display device. Common display resolutions for contemporary (as of 2012) portable projectorsinclude SVGA (800×600 pixels), XG A (1024×768 pixels), 720p (1280×720 pixels), and 1080p(1920×1080 pixels). A few camcorders have a built-in projector suitable to make a small projection; a few more powerful "pico projectors" are pocket-sized, and many projectors are portable. CRT projector using cathode ray tubes. This typically involves a blue, a green, and a red tube. This isthe oldest system still in regular use, but falling out of favour largely because of the bulky cabinet. However, it does provide the largest screen size for a given cost.

This also covers three-tube home models which, while bulky, can be moved (but then usually require complex picture adjustments to get the three images to line up correctly). Using LCD light gates. This is the simplest system, making it one of the most common and affordable for home theaters and business use. Its most common problem is a visible “screen door” or pixilation effect, although recent advances have reduced the severity of this effect DLP projector using Texas Instruments’ DLP technology. This uses one, two, or three microfabricated light valves called digital micro-mirror devices (DMDs).

IV. BACKGROUND SUBTRACTION

Background subtraction (BS) is a common and widely used technique for generating a foreground mask (namely, a binary image containing the pixels belonging to moving objects in the scene) by using static

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cameras.As the name suggests, BS calculates the foreground mask performing a subtraction between the current frame and a background model.It contains the static part of the scene or, more in general, everything that can be considered as background given the characteristics of the observed scene. A static camera is observing a scene Goal: separate the static background from the moving foreground Background subtraction Shot boundary detection Commercial video is usually composed of shots or sequences showing the same objects or scene Goal segment video into shots for summarization and browsing (each shot can be represented by a single key frame in a user interface Difference from background subtraction the camera is not necessarily stationary.For each frame compute the distance between existing one and the current one. Pixel by pixel differences is possible.Differences of colour histograms.Colour block comparison. an image's foreground is extracted for further processing (object recognition etc.). Generally an image's regions of interest are objects (humans, cars, text etc.) in its foreground. After the stage of image pre-processing (which may include image denoising, post processing like morphology etc.) object localisation is required which may make use of this technique. Background subtraction is a widely used approach for detecting moving objects in videos from static cameras. The rationale in the approach is that of detecting the moving objects from the difference between the current frame and a reference frame, often called "background image", or "background model".

Background subtraction is mostly done if the image in question is a part of a video stream. Background subtraction provides important cues for numerous applications in computer vision, for example surveillance tracking or human poses estimation. However, background subtraction is generally based on a static background hypothesis which is often not applicable in real environments. With indoor scenes, reflections or animated images on screens lead to background changes. In a same way, due to wind, rain or illumination changes brought by weather, static backgrounds methods have difficulties with outdoor scenes. A motion detection algorithm begins with the segmentation part where foreground or moving objects are segmented from the background. The simplest way to implement this is to take an image as background and take the frames obtained at the time t, denoted by I (t) to compare with the background image denoted by B. Here using simple arithmetic calculations, we can segment out the objects simply by using image subtraction technique of computer vision meaning for each pixels in I (t), take the pixel value denoted by P [I (t)] and subtract it with the corresponding pixels at the same position on the background image denoted as P [B].In mathematical equation, it is written as:

$$P[F(t)] = P[I(t)] - P[B]$$

The background is assumed to be the frame at time t. This difference image would only show some intensity for the pixel locations which have changed in the two frames. Though we have seemingly removed the background, this approach will only work for cases where all foreground pixels are moving and all background pixels are static. A threshold "Threshold" is put on this difference image to improve the subtraction (see Image thresholding).

$$|P[F(t)] - P[F(t+1)]| > \text{Threshold}$$

This means that the difference image's pixels' intensities are 'thresholded' or filtered on the basis of value of Threshold. [4] The accuracy of this approach is dependent on speed of movement in the scene. Faster movements

may require higher thresholds. Mixture of Gaussians method approaches by modelling each pixel as a mixture of Gaussians and uses an on-line approximation to update the model. In this technique, it is assumed that every pixel's intensity values in the video can be modeled using a Gaussian mixture model.[7] A simple heuristic determines which intensities are most probably of the background. Then the pixels which do not match to these are called the foreground pixels. Foreground pixels are grouped using 2D connected component analysis. Even "impoverished" motion data can evoke a strong percept. Estimating 3D structure Segmenting objects based on motion cues. Learning dynamical models Recognizing events and activities improving video quality (motion stabilization)

V. CONCLUSION

Three-Dimensional (3D) range cameras have recently appeared in the marketplace for use in surveillance (e.g. cameras affixed to inanimate objects) applications. We present Free Glass a wearable hands-free 3D gesture-sensing Digital Eye Glass system. Free Glass comprises a headmounted display with an infrared range camera, both connected to a wearable computer. It is based on the Mann Glas computerized welding glass, which embodies HDR (High Dynamic Range) and AR (Augmented/Unmediated Reality). Free Glass recontextualizes the 3D range camera as a surveillance (e.g. cameras attached to people) camera. In this surveillance context, the range camera is worn by the user and shares the same point-of-view as the user. Computer vision algorithms therefore benefit from the use of the range camera to allow image segmentation by using both the infrared and depth information from the device for 3D hand gesture recognition system. The gesture recognition is then accomplished by using a neural network on the segmented hand. Recognized gestures are used to provide the user with interactions in an unmediated reality environment. Additionally, we present applications of Free Glass for serendipitous gesture recognition in everyday life, as well as for interaction with real-world objects (with and without gesture recognition). A plurality of Free Glass units can be used together, each sensor having a different spreading sequence, or the like, so that a number of people can collaborate and share the same or similar Unmediated Reality space(s). This method is used for tracking the various objects which have different size, shapes and colors.Avoiding technology improved several infrared rays sensors and supersonic wave sensors together and measure the range in real time between the objects and the guestures. Nowadays using multimedia applications is common in classroom teaching. As we know that use of chalk produces dust which pollutes air and also it is found that chalk dust causes hazardous effects on health of students and parents. In the other hand, use of multimedia helps in better teaching and learning process. Companies like Hitachi, Panasonic, are manufacturing smart equipments which can efficiently replace the traditional blackboard. This design includes two modules viz. ARM9 board processor for unit which will be controlled by user i.e. teacher called handheld Unit hardware and Embedded Linux operating system for its software. Another module is remote unit which consist of Raspberry-Pi ARM 11 Board. Teacher has to write on a notebook sized touch screen which is interfaced with ARM11 handheld unit board. Written signals are converted into electrical signals and given to ARM11 board by using wireless RF module (Zigbee). Then Arm11 board controls and processes these signals and displays the written contents by the projector in large view by interfacing projector to HDMI port provided

with Raspberry-Pi. This complete module makes classroom teaching more efficient and easy for the sake of students and teachers.

REFERENCE

[1] BCM2835 Media Processor; Broadcom". Retrieved 13 February 2013 http://www.broadcom.com/products/BCM2835

[2] Di WU,Yang Zhang "Wireless Electric Board Based on an ARM-based Embedded System" , School of Mechatronics Engineering, University of Electronic Science and Technology, Chengdu 611731, China, 2010 IEEE.

[3] DiWU,YanG Zhang, Baoding Zhou "Wireless Electric Board Based on an ARM-based Embedded System", IEEE International conference computer science and information technology (ICCSIT) Volume 5, pp 268-270, September 2010.

[4] https://en.wikipedia.org/wiki/Video_projector

[5] K. Altun, B. Barshan, and O. Tunçel, "Comparative study on classifying human activities with miniature inertial and magnetic sensors," Pattern Recognit., vol. 43, no. 10, pp. 3605–3620, 2010.

[6] Akl, C. Feng, and S. Valaee, "A novel accelerometer-based gesture recognition system,"

[7] IEEE Trans. Signal Process., vol. 59, no. 12, pp. 6197–6205, Dec. 2011

[8] W. C. Bang, W. Chang, K. H. Kang, E. S. Choi, A. Potanin, and D. Y. Kim, "Self-contained spatial input device for wearable computers," in Proc. IEEE Int. Conf. Wearable Comput., Oct. 2003, pp. 26–34.

[9] Miao Liu, TianMiao Wang, HongXing Wei YouDong Chen, "Real time Analisis of Embedded CNC System Based on μC/OS-II," Computer Engineering, Volume 32, Issues 22, November 2006.

[10] Jean JLabrosse, MicroC/OS-II: The real-time