



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume 5, Issue 2)

Available online at: www.ijariit.com

Eye ball movement controlled mouse and keyboard using camera

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ABSTRACT

Some are not ready to work with PCs in light of a sickness. Eye controls of extraordinary use to the eventual fate of characteristic contribution as well as more essentially the impeded and debilitated. Besides executing a controlling framework in it empowers them to work PC without the assistance of someone else. It is increasingly useful to the crippled. Those have to work PCs without hand this one is most valuable those can work cursor by the development of the eye. In this paper, the camera is catching the picture of eye development. First, distinguish student focus position of the eye. At that point, the distinctive minor departure from understudy position gets diverse development of cursor. The Implementation process for Pupil location utilizing Raspberry Pi and on the terminal of the Raspbian picture introduced on a raspberry pi. The eye tracker depends on pictures recorded by a transformed webcam to gain eye developments.

Keywords— Virtual keyboard, Virtual mouse, Eyeball controlled computer, Raspberry Pi, PIR sensor

1. INTRODUCTION

PC's are assuming a noteworthy job in our lives as the training and happiness ventures use it frequently. The PC's are utilized with the info gadgets like console and mouse in like manner for every one of these reasons. It is simple for a solid user, but this might be not all that simple for a physically tested client who cannot move his appendages to utilize these info gadgets. In such cases, it is desirable to use input strategies that can be controlled through eye movements. To empower such substitute information techniques a framework was made which pursues a low-value way to deal with control a mouse cursor on a PC framework. The eye tracker depends on pictures recorded by a transformed webcam to get the eye developments. These eye developments are then diagrammed to a PC screen to position a mouse cursor likewise. The development of the mouse is done consequently by altering the position whereof visual perception. The camera is utilized to catch the picture of

eye development. Starting late there has been creating energy for making typical association among human and computer. Studies for human-PC collaboration as a rule enrolling are introduced. The vision-based interface technique extracts development information with no amazing cost sorts of rigging from a data video picture. In this manner, the vision-based technique is viewed as a convincing procedure to make human PC interface systems. For vision-based human PC association, eye following is a hot issue. Eye following examination is perceived by the emergency of astute applications. In any case, to develop a fantasy based multimodal human PC interface structure, an eye following and their affirmation is done. Progressing eye input has been used most a significant part of the ideal opportunity for crippled customers, who can use only their eyes for data.

2. RELATED WORK

Cheng-Chih Wu, Ting-Yun Hou, "Tracking students' Cognitive processes during program debugging— An eye-movement Approach": This study explores students' cognitive processes while debugging programs by using an eye tracker. Students' eye movements during debugging were recorded by an eye tracker to investigate whether and how high- and low-performance students act differently during debugging.

Aasim Raheel, Syed M. Anwar, "Real-time text speller based on eye movement classification using wearable EEG sensors": Making the machine more empathic to the user is one of the aspects of affective computing. Signal procured by Brain-Computer Interface frameworks is utilized to process brain signals for controlling different gadgets for human ease. P300 based content speller is one of the devices utilized for eye-writing, however, eye movement based content speller can create fine and exact comes about as contrasted with P300 based content speller. This paper presents a robust solution for utilizing eye muscular-movement for typing text content. Eye movement is a brawny and husky movement, yet by utilizing EEG signals for eye movements, we have obtained EEG signal

for diverse users and after that utilizing those signals we have finally created a framework for content spelling as a cursor movement over the letter sets. All analysis were executed on runtime procured datasets of numerous users to arrange the indicator in three classes lastly utilizing them as an aide sign to spell the content. The accuracy of the proposed system for the right movement left movement and blink is 70%, 80% and 79% respectively.

3. PROBLEM STATEMENT

The physically challenged find it more difficult to access the PC's with input devices like keyboard and mouse, as their limb movement is not normal. In such cases, the gross usage of PC's also decrease and the fields in which PC's play a vital role gets affected.

4. PROPOSED SYSTEM

Here, in this square diagram the whole system is compelled by Arm11 processor and this processor is realized on the Raspberry Pi Board. so this board is Here, in this square graph the entire framework is constrained by Arm11 processor and this processor is actualized on Raspberry Pi Board. so this board is associated with the screen, camera, and SD card.

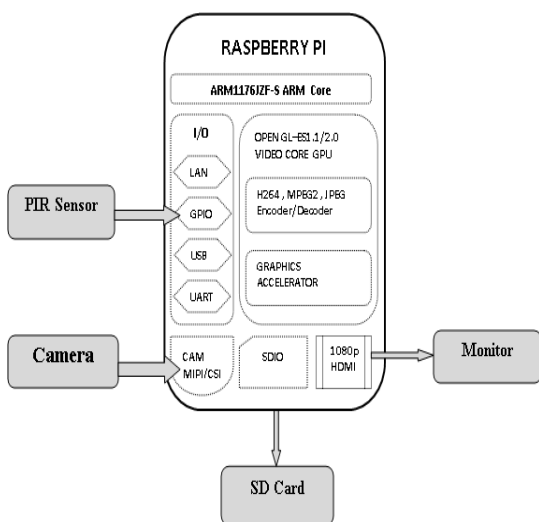


Fig. 1: Proposed system

Those all fragments are related by USB connectors. Raspberry Pi is the key part in taking care of module which keeps on screens eye advancement by interfacing USB camera. The camera will conceivably get the image if the PIR sensor separates some proximity for the most part camera will be off. USB 2.0 makes USB Cameras ideal for some imaging applications. USB Camera will be an interface with raspberry pi. Raspberry Pi will be using SD card, by then the present Raspbian OS and opencv on the raspberry pi. The first picture will get by USB Camera. Focus on the eye in the picture and distinguish the centre position of understudy by opencv code. Take within position estimation of understudy as a reference, and a short time later the accompanying the assorted estimation of X, Coordinates will be set for the explicit request. By then it is transmitted through ZigBee.

5. HARDWARE USED

5.1 PIR sensor

PIR sensors empower you to identify development, frequently used to perceive whether a human has moved in or out of the sensors run. They are close to nothing, sensible, low-control, easy to use and don't wear out. Thus they are commonly found in machines and contraptions used in homes or associations.

They are much of the time implied as PIR, "Withdrew Infrared", "Pyro electric", or "IR development" sensors.

PIRs are in a general sense made of a pyroelectric sensor (which you can see above as the round metal can with a rectangular valuable stone in the center), which can perceive measurements of infrared radiation. Everything transmits some low measurement radiation, and all the more sweltering something is, the more radiation is created. The sensor in a development discoverer is actually part in two sections. The clarification behind that can't avoid being that we are planning to perceive development (change), not average IR levels. The two sections are wired up with the objective that they counterbalance each other. In case one half watches basically IR radiation than the other, the yield will swing high or low.

5.2 Raspberry Pi

Raspberry Pi board is a small scale wonder, pressing significant registering power into an impression no bigger than a charge card. It's prepared to do some stunning things, however, there are a couple of things you're going to need to know before you dive straight into the briar patch. The processor at the core of the Raspberry Pi framework is a Broadcom BCM2835 framework on-chip (SoC) interactive media processor. This implies by far most of the framework's segments, including its focal and designs handling units alongside the sound and correspondences equipment, are fabricated onto that solitary part covered up underneath the 256 MB memory chip at the focal point of the board (see Figure 1). It's not simply this SoC structure that makes the BCM2835 distinctive to the processor found in your work area or PC, be that as it may. It likewise utilizes an alternate guidance set design (ISA), known as ARM. The BCM2835 SoC, situated underneath a Hynix memory chip Developed by Acorn Computers back in the late 1980s, the ARM design is a moderately extraordinary sight in the work area world. Where it exceeds expectations, be that as it may, is in cell phones: the telephone in your pocket more likely than not has no less than one ARM-based handling center covered up away inside. Its blend of a basic decreased guidance set (RISC) engineering and low power draw settle on it the ideal decision over work area chips with high power requests and complex guidance set (CISC) designs. The ARM-based BCM2835 is the mystery of how the Raspberry Pi can work on simply the 5V 1A power supply given by the locally available small scale USB port. It's additionally the motivation behind why you won't discover any warmth sinks on the gadget: the chip's low power draw straightforwardly converts into next to no waste warmth, notwithstanding amid entangled handling undertakings. It does, nonetheless, imply that the Raspberry Pi isn't good with customary PC programming. Most of the programming for work areas and PCs is worked in light of the x86 guidance set design, as found in processors from any semblance of AMD, Intel and VIA. Subsequently, it won't keep running on the ARM-based Raspberry Pi. The BCM2835 utilizes an age of ARM's processor configuration known as ARM11, which thus is structured around a form of the guidance set engineering known as ARMv6. This merits recollecting: ARMv6 is a lightweight and ground-breaking design, yet has an opponent in the further developed ARMv7 engineering utilized by the ARM Cortex group of processors. Programming created for ARMv7, similar to programming produced for x86, is tragically not perfect with the Raspberry Pi's BCM2835—in spite of the fact that engineers can, as a rule, convert the product to make it appropriate. Saying this doesn't imply that you will be confined in your decisions. As you'll find later in the book, there is a lot of programming accessible for the

ARMv6 guidance set, and as the Raspberry Pi's ubiquity keeps on developing, that will just increment.



Fig. 2: Raspberry Pi

5.3 Zigbee

Zigbee is an IEEE 802.15.4-based determination for a suite of abnormal state correspondence conventions used to make individual territory systems with little, low-control computerized radios, for example, for home robotization, medicinal gadget information accumulation, and other low-control low-transfer speed needs, intended for little scale ventures which need a remote association. Thus, Zigbee is a low-control, low information rate, and closeness (i.e., individual zone) remote specially appointed network. The innovation characterized by the Zigbee determination is proposed to be less complex and more affordable than different remote individual territory systems (WPANs, for example, Bluetooth or increasingly broad remote systems administration, for example, Wi-Fi). Applications incorporate remote light switches, home vitality screens, traffic the board frameworks, and other shopper and modern gear that requires short-run low-rate remote information transfer. Its low power utilization limits transmission separations to 10– 100 meters viewable pathway, contingent upon power yield and ecological qualities.



Fig. 3: Zigbee

5.4 Camera

The Raspberry Pi Camera Module v2 is an astonishing 8 megapixel Sony IMX219 picture sensor phenomenally made an extra board for Raspberry Pi, highlighting a fixed center purpose of intermingling. It's fit for 3280 x 2464 pixel static pictures, what's more backings 1080p30, 720p60 and 640x480p60/90 video. It adds to Pi by the system for one of the little associations on the board upper surface and uses the submitted CSI interface, sorted out particularly to interfacing to cameras. 8-megapixel neighborhood targets sensor-arranged for 3280 x 2464 pixel static pictures. Supports 1080p30, 720p60 and 640x480p90 camcorder is strengthened in the most recent variant of Raspbian, Raspberry Pi's favored working framework. The board itself is pretty much nothing, at around 25mm x 23mm x 9mm. It also weighs basically over 3g, making it ideal for adaptable or various applications where size and weight are fundamental. It accomplices with Raspberry Pi by the procedure for a short strip interface. The dazzling Sony IMX219 picture sensor itself has an area goal of 8 megapixels and has a fixed spotlight purpose of assembly arranged. Regarding pictures, the camera is fit for 3280 x 2464 pixel static pictures, what's more backings 1080p30, 720p60 and 640x480p90 video.



Fig. 4: Camera

6. SOFTWARE USED

6.1 Python

The Raspberry Pi gets the important portion of its name from a long-standing tradition of using a regular item to name new figuring structures—from extraordinary microcomputers like the Acorn, Apricot and Tangerine to even more undeniably current brands including Apple and BlackBerry—yet the second half comes thoughtfulness of the Python programming language. Python is an anomalous state language. This infers Python code is sent in, all things considered, indisputable English, giving the Pi bearings such that races to learn and easy to seek after. This is in stepped separation to low-level tongues, like developing operator, which are closer to how the PC "considers" anyway essentially unfathomable for a human to seek after without comprehension. The strange state nature and clear language structure of Python make it a huge mechanical assembly for any person who needs to make sense of how to program. It is in like manner the language that is proposed by the Raspberry Pi Foundation for those planning to progress from the fundamental Scratch.

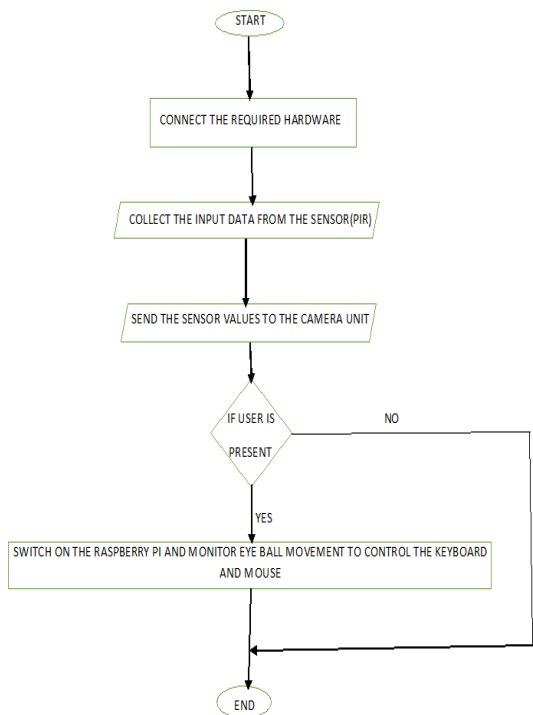
7. WORKING

The eye ball controlled mouse and console is constrained by Arm11 processor and this processor is actualized on Raspberry Pi Board. The Raspberry Pi is associated with a screen utilizing an HDMI link. The SD card on the Raspberry Pi is utilized as the capacity gadget. The board is likewise associated with a camera which catches the picture of the eyes. Every one of these segments is associated with the assistance of USB connectors. The PIR (Passive Infrared Sensor) sensor is utilized to recognize the development of the eyes. Just when the development is recognized the camera turns on and catches the picture or else the camera remains off. USB 2.0 camera is perfect as it is lightweight and can be effectively interfaced with the Raspberry Pi. The Raspian OS and the open cv are introduced on the SD card mounted on the Raspberry Pi. Raspberry Pi is the key component in handling module which screens eye development by interfacing USB camera. The virtual console is structured utilizing python programming and by introducing the Tkinter library for the console plan and Pyautogui library for mouse pointer movement. The picture is right off the bat caught by the camera. The eyes are engaged and the focal point of the student is recognized with the assistance of the open cv code. The Center position of the student is taken into reference and the organized are set to birthplace. The development further is noted and the information is transmitted through ZigBee. As the eye moves toward any path the movement is noted on a 2D plane and the directions are transmitted and utilizing this information the mouse on the screen moves. and if the eye blinking is used as a click then add another line in the end

8. CONCLUSION

Ordinary research has analyzed the differences between examining authorities and novices with a true objective to

perceive how to develop better instructive approaches and gadgets. In any case, such research still requires solid and target verification to set up the believability of its revelations. In this examination, the test outcomes give target eye-following confirmation that attests the hypotheses made reliant on the disclosures of existing investigation: Most understudies see reference indicates and give more thought these zones while investigating. Low-execution understudies will when all is said in done research programs impulsively, while unrivalled understudies investigate programs in an undeniably canny way.



The genuine differences among high-and low-execution understudies with respect to their emotional systems lie in the past's ability to plan in the midst of the exploring method. World class understudies will, by and large, organize the code into pieces, and their recognition and investigating techniques rely upon prior learning joined with their ability to perceive issues. Low-execution understudies, of course, remain fixed on the syntactic nuances, finally fail to manufacture the fitting mental models for investigating. These closures have attracted the wake of breaking down the differences among high and low-execution understudies by applying genuine tests: the - test for spatial data, and successive examination for brief data. Simply vital real results have been represented in the closures, guaranteeing the end authenticity. Past research has revealed an association between working memory limit and the scholarly activities related to examining mental number juggling, a fleeting memory, keen thinking, and basic reasoning. This examination certifies this relationship. In any case, further examination is relied upon to all the more promptly appreciate the relationship, and such examinations require firmer verification. By researching the differentiations among high-end low-execution understudies concerning their visual thought and look ways in the midst of investigating, a strong association was found between examining aptitudes and the related

scholarly activities, showing the essentialness of the teacher's assistance with structure up these emotional limits while educating exploring capacities. Adaptable instructional systems and media can be arranged subject to these examination disclosures. For example, the learning of system gadgets might be proposed to empower understudies to structure debugging tasks, audit prior information, split the code into imperative pieces, process estimations, and pursue the program reasonably.

9. ADVANTAGES

- It is very user-friendly, personalization, convenience, applicable to a special environment.
- Interaction is more efficient and enjoyable.
- Good performance in good lighting condition.
- Less expensive.
- Better accuracy with minimum effort.
- It Will be useful to a severely impaired person
- It Will be useful for multitaskers
- It Will take the field of VR into another dimension

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