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Iris Control Robot

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ABSTRACT: This paper Provides a method to develop a complete embedded system for creating the position of the iris to control the robot Our system is based on a PC and Raspberry Pi Zero board The most significant is the Open CV-based Gaze tracking algorithm. We have implemented iris tracking and blink detection in our project. Paralysis is one of the major imprecations in this world. Most people with a disability depend on others due to a lack of self-mobility and as a result of the loss of independence, people are becoming increasingly inferior to others. 'Quadriplegia' is a special type of paralysis in which the only moving part is the eye. So much effort has been made to help people who cannot afford to make a living. Different strategies are used for the same object and this paper registers a portion of the existing strategy in line with other additional elements that apply to the current framework. Additional features like existing frames from live video, which will be converted from RGB to grayscale using the Gaze tracking algorithm. and Camera Module. The gaze tracking method is coded in Python language, and the image processing work is completed with Open CV

I. INTRODUCTION

The present time of robotizing requests for the advancement of frameworks for truly tested individuals. The pro- posed system aims to help people with physical disabilities. Iris is the only external organ of humans that can move even if the complete body is paralyzed. Consequently, the iris is acquiring significance in the field of automation. Our Eyes have a distinct and random pattern. The idea of Iris management is implemented now not most effective in the sector of robots however additionally in humans with disabilities and wheelchair customers. The main aim of the proposed system can be wheelchair-controlled using Iris. Iris recognition is ac- complished no matter length, function, and the use of math-ematical methods and the usage of a gradient remote. More lately, gadgets have been being advanced whilst iris centroid detection changed into completed using the photo processing toolbox in MATLAB. Traditionally, electronic wheelchair management devices have evolved based totally on visual acuity. In addition, in a few instances picture processing is achieved with the use of Python that's an extraordinary, smooth-to-use editing language, Detection of Iris motion in robot manipulation can be carried out with the use of Morphological Operation. A speedy and green neighborhood set of rules is used to calculate the centroid of the iris. This algorithm is based on the geometric function surrounding the attention vicinity. Active lesions in attention are detected with the usage of a round curve measurement. The active line looks at the boundary of the reader. The eyeball manipulation method is utilized in other utilities consisting of automatic control systems and military tank-capturing devices.

II. BACKGROUND

The human eye is a lovely functional organ of the human body with an awesome physique, photometric functions, and gestures. These functions offer vital Information needed for eye detection and monitoring. In our everyday life, some- one's emotional country, intellectual nation, and needs can be prompted using a person's eye second. With our eyes, we perceive the structures of the physical world and the al- ternative critical details in our lives. In addition, within the area of photography and video modifying the eye plays a crucial role in the technique of Facial reputation. The history of eye tracking dates returned to the second one 1/2 of the 18th Century when researchers determined eye movements to ex- amine mastering patterns. The first trackers used a form of contact lens for the scholar hole. In this putting, eye move- ment changed into accompanied by the usage of an aluminum indicator related to the lens. The authors of the primary non- disruptive optics the usage of mild beams which are seen to the eye after which filmed. The authors also offer a system- atic analysis of the studying and visualization of images. A vital role in eye monitoring studies was made by using author Y Arbus. A.L. inside the 1950's and 1960's. The writer has proven that visible cues depend on the paintings the viewer has to do. When viewers are requested specific questions on the photo, their eyes are conscious

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of the interactive areas of the image. In addition, many capabilities associated with eye monitoring within the subject of human verbal exchange and laptop and eye monitoring programs to help people with dis- abilities have been also developed over the same decade. In the remaining two to three a long time, improvement has been made in eye monitoring because of the creation of synthetic intelligence transportable electronics, and head-to-eye imaging technologies.

III. THE PROPOSED SYSTEM

The prototype of the proposed system can be implemented using raspberry Pi and an Arduino. Raspberry Pi is a mini-computer that plugs into any monitor or TV. It has a 900MHz quar-core ARM processor. The proposed system flow is shown in Figure1. The Pi camera module is connected to the Raspberry Pi via a camera serial interface. The pi cam- era capture video of an eye continuously and Raspberry Pi processes the video frame by frame. For real-time image processing, Open CV (Open Source Computer Vision) library is integrated on Raspberry Pi. Python is used to program the Raspberry Pi with the real world. The proposed data is then transferred to the receiver Raspberry Pi drives the DC motor according to the data coming from raspberry Pi. The live video feed of the Iris was taken as information, and the whole casing was changed over to gray scale. Then, at that point double threshold so the Iris becomes totally dark and the encompassing region is totally dark and the encompass- ing region is totally white. Now fixed 3 points on the frame- left, center and right. If the person is looking left,then the left point and right. If the person is looking left, then the left point is recognized as black. The same thing happens in the case of left and right. Depending on the position of the eye corresponding commands are generated.

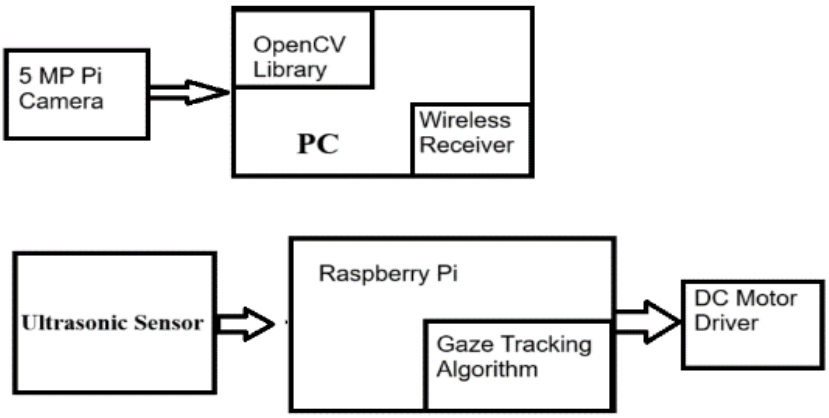

Figure 1: Proposed System

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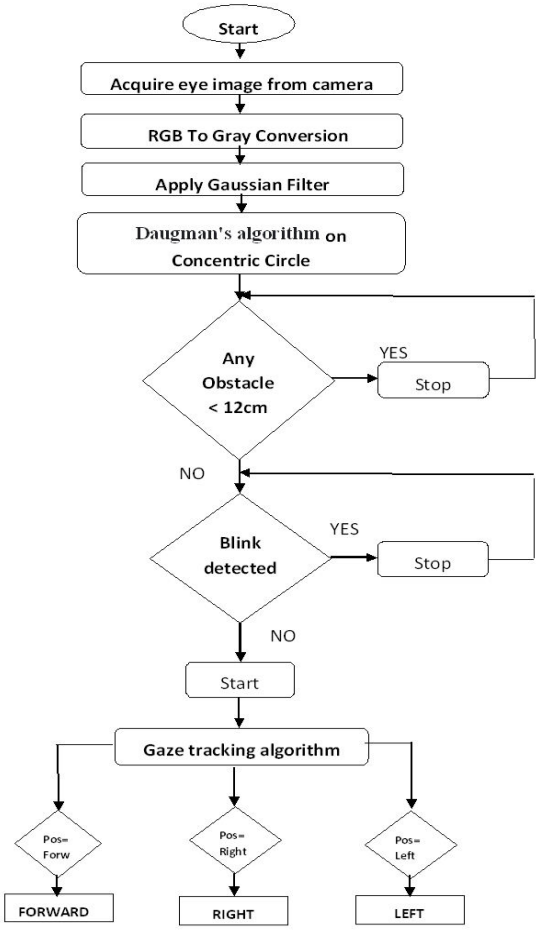
IV. IMPLEMENTATION



The software flow in the proposed system is shown in Figure2

4.1 Face detection and Eye Tracking

Open computer vision open CV is used for eye and face detection. For both the eye and face detection, The Haar cascade organism is used . Camera models detect the user's face when the face is detected and use Haar cascade algorithm to locate and mark the eye area using Haar cascade algorithm. Both eye are available based on distance.

4.2 RGB to Gray conversation(color image into Gray)

Here is the color image of the meeting to reduce the time delay in System .Image Frame size should be as low as possible because the processor cannot process frames in real time mode .Therefore ,We use the RGB to Gray conversation to turn color images to gray.

4.3 Edge detection

corer detection and the canny edge detection algorithm are used to detect soft edged in the image. Allows easy viewing of a circle/rectangle presented in the image to set the ap- propriate boundary value.

4.4 Detection of Iris from Pupil

The eyelid and the iris are darkened than the surrounding area and are often regarded as reliable feature of the eye. Our algorithm finds students by searching for two black area that meet certain anthropology. Their process, however, may not work well in a verity of light condition due to the limit of skin color module. In general, the use of IR lamp instead of visible light seems to be more suitable for obtaining a dark circle. A technique that supports the discovery of the iris

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and the acquisition of the student requires eye-catching image or high resolution image. Most feature based technique cannot make a closed eye module.

4.5 Gaze Tracking Approach

A model-based measurement method is used. There, the first thing is the construction of a 3D eye model that is similar to human vision and eye view and show in figure.

The eyeball and the cornea are represented as two separate segments. The main boundaries of the eyeball section are the center of the eyeball(e), the eyeball radius (re), the center of the students (p) and the five. The main parameters of the cornea sphere are the center of the cornea (c) and the distance, between both centers of the cornea and eyeball (Rice).Visible axis (No) line connecting the center of the eyeball (e),center of cornea (c) and center of students (p) .however ,The actual optical direction is derived from the optical axis (NV),which is the line connecting the fovea to the cornea and the optical axis (No). that is because five is less useful on the retina of the eye, where the visual acuity is much higher. The angle between the two axes is fixed angle called kappa.

•To draw a point from one linking system to another, rotating R and translating the T-head associated with the camera link system are required. Therefore, the same point in the connection of the camera z c and the connection system z h on the map as given.

V. RESULT

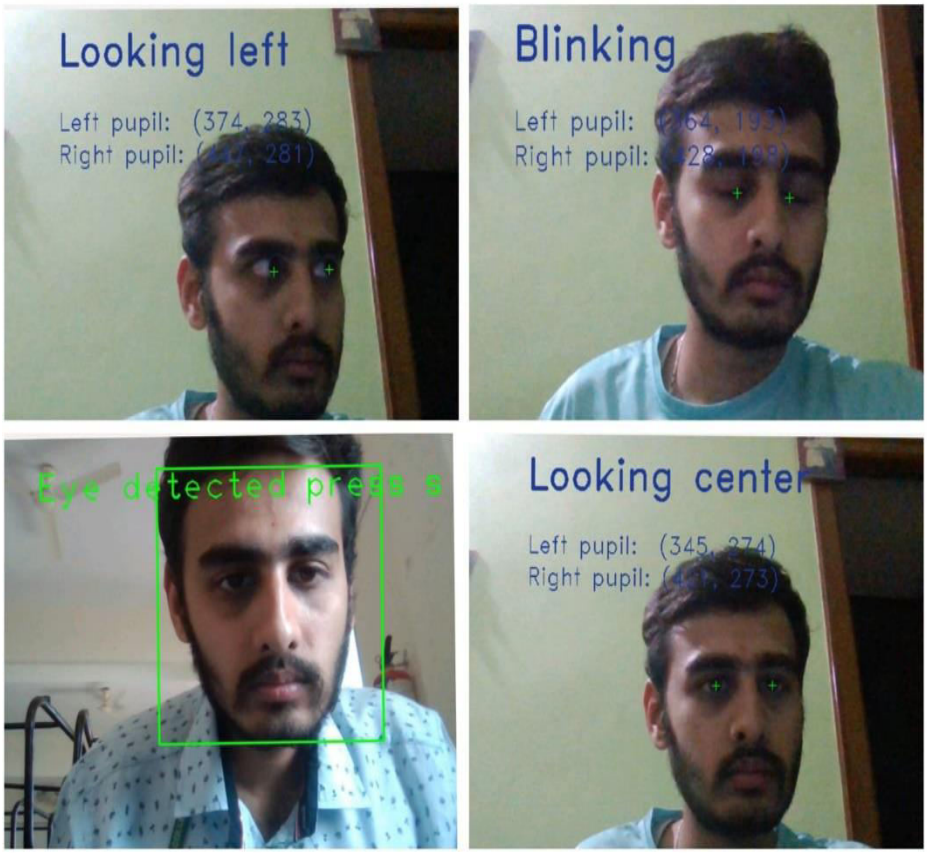

Figure 3: Result

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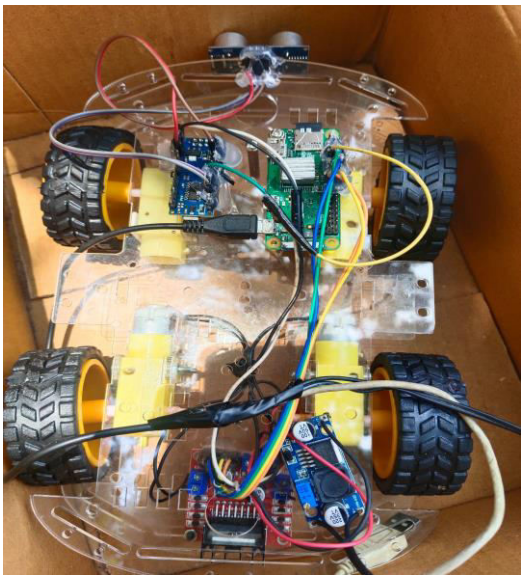

Figure 4: Top View of proposed system

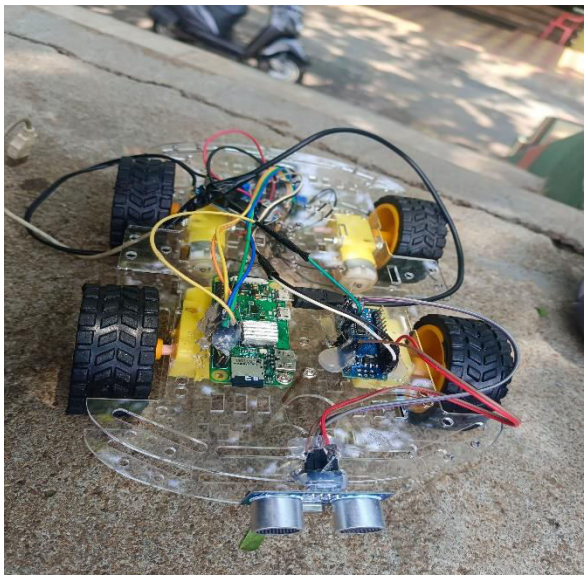

Figure 5: Front View of Proposed syste

VI. CONCLUSION

In this framework, we demonstrate an advancement in standard wheelchairs by incorporating motorized components and simplifying wheelchair control through eye movement tracking for individuals with physical disabilities. The goal of this system is to contribute to society by proposing a framework that could potentially enhance the lives of mil- lions worldwide. Future developments may involve creating a mobile app for wheelchair management and introducing home automation features, enabling disabled individuals to control household appliances without leaving their position. Our research has focused on programming the system to detect faces, eye regions, and iris patterns. we have explored the performance of three different methods for edge detection, a crucial component in image processing. Our system's edge detection technique, based on Region of Interest (ROI) and Edge Length (EL), effectively identifies human eyes. The performance of our proposed framework has been validated against existing standards.

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