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Smart Wheelchair

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ABSTRACT:

Each person on this planet wishes to live a normal human life, but sadly, accidents, diseases, and age turn that wish into a deficiency. Furthermore, there are many elderly and handicapped individuals, as well as paralysed people, and the number of people continues to rise day by day. They must rely on another people to walk and must undergo physical therapy under the supervision of a physician. of a therapist to recuperate their strain back. The proposed device allows the user to operate easily and freely while also reducing the cost of a therapist's intervention. The development of a smart wheelchair is based on the use of an eye-controlled system to control the wheelchair's mobility. Aside from that, an ultrasonic system provides automatic embedded sensors. Because our project entails creating a method that enables the user to engage with the manual wheelchair at several levels, such as avoiding collisions through object detection, that enables for effective risk management, and a functionality that permits the smart wheelchair to be turned into a bed, It significantly decreases reliance on caregivers or relatives. The wheelchair ensures safety by including capabilities such as object detection and automatic braking. detection to avoid dangers they may meet in their daily lives, such as stairwells, potholes, and so on.

KEYWORDS: Wheelchair, Image-Processing, Paralyzed

I. INTRODUCTION

The wheelchair is a reliant system that is primarily utilised by the elderly and physically disabled. We will provide the design and implementation prototypes of a completely self-contained Eye controlled electric cart in this work. The Eye Control System gives them the freedom and autonomy they need to live a more quick and inexpensive life. They could also be self-sufficient [1-4]. The camera collects a true picture and uses it as input to set the instructions for interacting with the motor driver IC by delivering commands to GPIO pins. Motor driver circuits are used to accomplish various operations such as right, left, stop, or forward [5]. For advanced image processing, the Open CV (open computer vision) package is utilised to detect faces and eyes [6].

The scope of the project includes the A Real-Time Model Based Electric Wheelchair Control by Information Fusion from Eye Tracking for Paralyzed Patient. In order to make our system more effective we can add more numbers of sensors that are highly capable of detecting obstacles accurately and readily [7-10].

The primary goal of this research is to create a vision-based wheelchair system. For obstacle avoidance, an ultrasonic sensor is mounted on the wheelchair. If another system senses an impediment that is quite near to the wheelchair, it sends a signal to the Raspberry Pi, which instructs the motor driving circuit to halt [11-15].

Because our project entails developing a system that allows the user to engage with the smart wheelchair at various levels of control in order to avoid collisions caused by distance measurement, and also a feature which allows the smart wheelchair to be transformed into a mattress, The wheelchair ensures their safety by including technologies such as obstacle detection to prevent collisions and hollow detection to protect them from dangers they may meet in their daily lives [16-17].

II. BACKGROUNDSTUDY (LITERATURE)

A person suffering from locomotors disabilities is provided with a specially designed smart wheelchair which is based on simple tracking of an eye [18-19]. The wheelchair control module is a two-dimensional stage of rotating device installed to a joystick with electrical components of the wheelchair that replaces the manual movement of the wheelchair. Eyeball motion is used as the cursor on the Raspberry Pi display to control the operation of the wheelchair [20-21].

Firstly, a novel method for continual, real-time target detection, path arrangement, and navigation in unknown situations was developed. Second, the system employs an N-cell grid-based graphical interface that modifies the input/output given framework. Third, to reduce the calibration overheads, a method for calibrating the eye-tracking system is implemented [22].

The motion control of a wheelchair is powered using eye gazing in an unknown environment. For those with upper-body limitations, innovative HCIs have eventually installed traditional joysticks. This gesture recognition technology can assist in the efficient and reliable mobility of the wheelchair by automatically determining its direction of motion and velocity in order to avoid obstacles and go forward in the gaze direction of the passenger.

Using a Fish-Eye vision power-assisted wheelchair control is developed with driving assistance.

The fish-eye digital camera is used to gain a wide-angle view at the front of the wheelchair, as well as the motion vectors are solely used in our technique [23-29] for the simpler calibration phase of driver assistance without sophisticated 3D reconstruction.

A.**AbbreviationsandAcronyms**HCI: Human Computer Interface.

III. METHODOLOGY

Camera is at a distance of 10 to 14cm from the user eye, images of the face will be captured by the camera and then the location eye pupil will be detected once it is done, the average center value from the corner is calculated by system algorithm from which the information about the eye movements can be calculated , camera and raspberry pi is being connected directly hence the commands generated by the source code which is activated by the processed image will enable the gpio pins of raspberry pi which in turn sends the command to the Arduino through the zigbee module where the Arduino is connected to the motor driver which in turn is connected by the motor and then wheels these wheels will move accordingly [30-34].

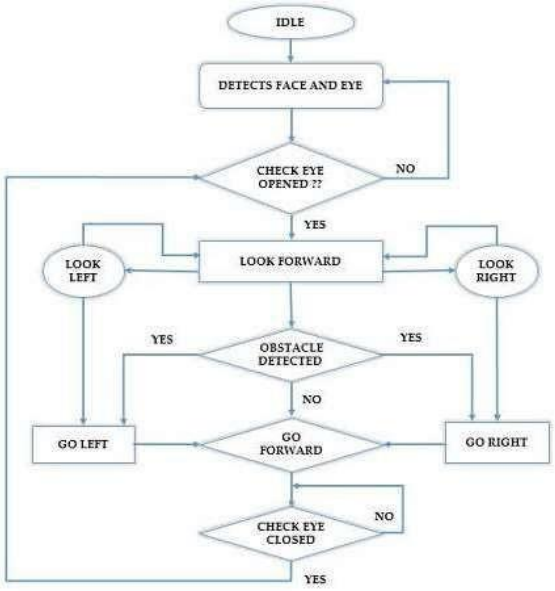

Figure 1: Flow Chart

IV. IMPLEMENTATION

Camera is at a distance of 10 to 14cm from the user eye, images of the face will be captured by the camera and then the location eye pupil will be detected once it is done, the average center value from the corner is calculated by system algorithm from which the information about the eye movements can be calculated , camera and raspberry pi is being connected directly hence the commands generated by the source code which is activated by the processed image will enable the gpio pins of raspberry pi which in turn sends the command to the Arduino through the zigbee module where the Arduino is connected to the motor driver which in turn is connected by the motor and then wheels these wheels will move accordingly [35-41].

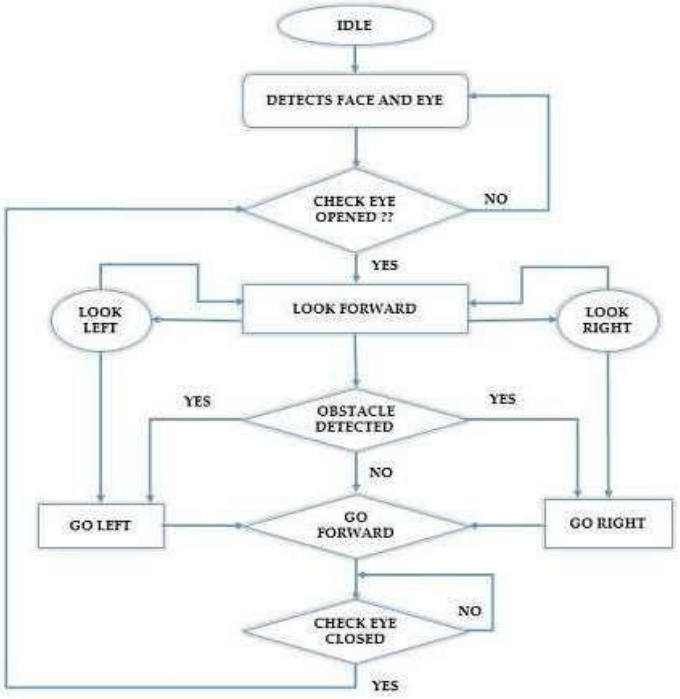

Figure 1: Flow Chart

V. CONCLUSION

The wheelchair which is eye gazed can be regarded as the alternative resource for the people who are physically disabled the features of the digital image processing will be the attention call for the wheelchair that is run by the eye gaze.

The movement of wheelchair using eye gaze ie the movement like right , left, forward and backward is implemented successfully. The obstacle avoidance has been done by the ultrasonic sensor, when it detects the obstacle it will stop there itself.

VI. ACKNOWLEDGEMENT

We would like to thank Dr.Shantharam Nayak for his valuable suggestion, expert advice and moral support in the process of preparing this paper.

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