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# PARALYZED PATIENT ASSISTANCE USING IOT

## ABDUL RASHEED.S, Dr. T. VELUMANI

*Abstract—* Technology has always lent a helping hand for people with disabilities such as visual impairment, speech impairment, people with motion disabilities or disorders etc. Assistive Computer Technology is any piece of equipment that is customized to make life easier for a person who has a disability. In human-computer interaction, computer accessibility refers to the accessibility of a computer system to all people, regardless of disability or severity of impairment, examples include web accessibility guidelines. Accessible computer equipment and PC access aids can make it easier for computer users to use word processing programs, surf the Internet, and send email, but they can also help non-computer users handle many non-computer tasks. Disability management is a critical task since it is caused by employing a digital system to assist the physically disabled people. Interacting with real or virtual objects with help of a human eye is gaining popularity. In this method, a camera is set to focus on one or both eyes and record the eye movement. The system observes the movement of iris and identifies the requirement of the patient by notifying the caretakers. The proposed algorithm is initialized on detecting a face from the camera feed, under satisfactory illumination. Face and Eye movement is detected for the user and the corresponding activity is performed in the screen as pointer movement. Here the pointer mapping is applied between the identified ROI from the captured live feed data and the interaction screen of the user. Supervised learning with back propagation is used to identify the input type and click operation on the particular action event. Based on the user blink operation, required option is selected and its notification is generated to the caretaker in SMS.

*Index Terms* – Human Computer Interaction, speech impairment, Supervised learning.

## I. INTRODUCTION

Interest in the potential of digital images has increased enormously over the last few years, fueled at least in part by the rapid growth of imaging on the World-Wide Web. Users in many professional fields are exploiting the opportunities offered by the ability to access and manipulate remotely-stored images in all kinds of new and exciting ways. Image Indexing is an application for

Abdul Rasheed.S, Student, B.Sc Computer Science, Rathinam College of Arts and Science, Coimbatore, Tamil Nadu, India – 641021, (e-mail: abdulrasheed.bcs19@rathinam.in).

Dr. T. Velumani, Assistant Professor, Department of Computer Science, Rathinam College of Arts and Science, Coimbatore, Tamil Nadu, India – 641021, (e-mail: velumani.cs@rathinam.in).

processing document images which is a part of a business workflow at where roles are assigned to perform specific functions. In a typical workflow, document images progress from role to role based on information specified in data entry fields. In response to the data entry, Image Indexing updates the status of the image and, if specific criteria have been met, transitions the image from role to role. The problems of image retrieval are becoming widely recognized, and the search for solutions an increasingly active area for research and development.

### 1)Image Processing

In imaging science, image processing is processing of images using mathematical operations by using any form of signal processing for which the input is an image, a series of images, or a video, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it. Images are also processedas three-dimensional signals where the third-dimension being time or the z-axis.

### 2)Cognitive Analysis

Eye tracking is the process of measuring either the point of gaze(where one is looking)or the motion of the eye relative to the head. An eye tracker is a device for measuring eye positions and eye movement. Eye trackers are used in research on the visual system, in psychology, in marketing, as an input device for human computer interaction, and in product design.

### 3)Disability Management

Disability is the consequence of an impairment that may be physical, cognitive, mental, sensory, emotional, developmental, or some combination of these. A disability may be present from birth, or occur during a person's life time.

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## II.  SYSTEM DEVELOPMENT

### 1) *Existing System:*

For persons with disabilities, the keyboard, mouse, and monitor are of prime concern so adaptive hardware and software have been developed to provide alternatives. Assistive technology devices have been created to enable people with disabilities to use modern touch screen mobile computers such as the iPad, iPhone and iPod touch. Any system that aids individuals who are not independent verbal communicators is known as an augmentative communication system. From providing help with reading despite a visual impairment, to keeping the deaf included in a group conversation, to helping patients with shaky hands have a meal independently there are many assistive technologies that are helping the disabled get assistance when and where they need it. There are a lot of apps and gadgets that can help ease the difficulties people with disability face on a daily basis and this article presents some of these. It is important to recognize that assistive technology devices required by people with disabilities include hardware and software as well as stand-alone devices. Assistive technology devices are available in a variety of categories to address functional capabilities of students with disabilities. By using computing technology for tasks such as reading and writing documents, communicating with others, and searching for information on the Internet, students and employees with disabilities are capable of handling a wider range of activities

**Limitations:**

1. Gesture are difficult in understanding, informal etiquette, information might get distorted, etc.

2. It is not precise and sometimes it is vague and plain.

3. One cannot make long explanation or conversation through gesture.

4. It is one of the informal types of communication, where it is not suited for official purposes.

### 2) *Proposed System:*

The proposed method reflects the advantages of the webcam which was a highly effective sensor for rapidly developing computer vision technology. Web cam limits the accuracy of eye movement analysis and eye tracking with the quality of videos captured by cam. The issues in accuracy are considered and solved using eye movement analysis models that work on five feature points of the eyes also called the iris center. Also the dependency of the iris center point can be reduced by constructing six types of time-varying eye movements. The CNN are also trained to identify the eye movements and positioning them, that would help reduce errors like real and artificial eye movements.

### 3)*Features:*

In this method, a camera is set to focus on one or both eyes and record the eye movement. The main focus of this paper is on computer vision based eye detection. Based on the data obtained from the analysis, the eye movement can be used directly or detected over video frames in case of real-time eye tracking systems. There are many issues such as eye openness, variability in eye size, direction of head, etc.., Several technique have been introduced. This system proposes a technique to develop a non-intrusive interface of providing non-contact head and eye based control of computer systems for people with motor difficulties. Such an interface used to replace a traditional interface like a normal mouse thus helping the severely disabled to use the computer just as a normal individual would. It makes use of human iris tracking and blink detection for this purpose.

### 4)*Software Description:*

**Front End: C#.NET**

C# is a modern, object-oriented, and type-safe programming language. C# enables developers to build many types of secure and robust applications that run in . NET. C# has its roots in the C family of languages and will be immediately familiar to C, C++, Java, and JavaScript programmers. C# is pronounced as "C-Sharp". It is an object-oriented

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programming language provided by Microsoft that runs on .Net Framework.By the help of C# programming language, we can develop different types of secured and robust applications Window applications,Web applications,Distributed applications,Web service application,Database applications etc..C# is approved as a standard by ECMA and ISO. C# is designed for CLI (Common Language Infrastructure). CLI is a specification that describes executable code and runtime environment..C# programming language is influenced by C++, Java, Eiffel, Modula-3, Pascal etc. languages.

**Back End: SQL Server 2016**

Microsoft SQL Server 2016 is a relational database management system (DBMS) for Windows platforms that can be used for building, deploying and managing applications located on premises or in the cloud. It provides a bevy of and improved capabilities, including a stretch database feature, which can be used to store some data on premises and send infrequently used data to Microsoft's Azure cloud. Applications can access all data, regardless of where it's stored.The Always Encrypted feature makes it possible to encrypt data at rest and in at the column level.Polybase, which integrates SQL Server with Hadoop's Distributed File System and enables Hadoop data to be queried with SQL and joined with native relational data.

*5)System Implementation*

To measure a torsional movement of the iris, the image of the iris is typically transformed into polar co-ordinates about the centre of the pupil; in this co-ordinate system, a rotation of the iris is visible as a simple translation of the polar image along the angle axis. Then, this translation is measured in one of three ways: visually, by using cross-correlation or template matching, or by tracking the movement of iris features.Methods based on visual inspection provide reliable estimates of the amount of torsion, but they are labour intensive and slow, especially when high accuracy is required. It can also be difficult to do visual matching when one of the pictures has an image of an eye in an eccentric gaze position

## III.  MODULES DESCRIPTION

*1) Capturing The Video Feed And Identifying The Human Face Region:*

Camera is activated to capture the live feed provided from the user. From the captured input, ROI is identified by checking face pattern. Captured input is stores as image and the pixel point values are normalized to recognize the face input and eye input. Face and eye detection algorithm using the viola jones is used to identify the region. By using edge detection and shape detection, the eye pattern is recognized and the input is filtered from the image

*2) Determining The Region Of Interest (ROI) And Mapping The Human Eye:*

Pattern matching algorithm is used to compute the pattern related to the mouse movement. From the continuous images, the ROI is identified and filtered from the images. The pixel points of the ROI is compared in each images. The input image undergoes image enhancement technique to extract the iris movement. The enhancement technique such as sharpening and segmentation are applied to the captured image frame. Sharpening is done to neglect the background of the image this in turn gives the accurate pixel value of iris. The movement pattern is identified by checking the same pixel of the detected shapes. From the movement of the pixel values, pattern of mouse movement is detected. Supervised learning with back propagation is used to identify the input type and click operation on the particular action event.

*3) Creating The User Interface For Assistance Service And Displaying The Options:*

The application interface is created to list out the specific needs for the patients which is operation by using the human machine interaction. Gesture recognition enables humans to communicate with the machine (HMI) and interact naturally without any mechanical devices. Using the concept of gesture recognition, it is possible to point a finger at the computer screen so that the cursor will move accordingly. This will allow user to select the

required option from the list. The interaction applications and significant internal intellectual property relating to algorithms and methods for performing and implementing robust, consistently accurate and cost-efficient eye tracking.

### 4) Enabling The Pointer Option And Selection Of Requirement:

In the pointer operations, pixel grouping is applied as the process of image object segmentations. It turn helps to split the iris and eye component from the input image as the focused ROI. It will detect only pixel points and its coordinate by applying the pattern matching algorithm using the learning process. Using this coordinates the movement of iris is calculated. The pixel coordinates are generally in (x,y) form. By considering the previous and current y point position, whether the user is reading current or next or previous line can be determined.

### 5) User Notification:

Patient interaction screen is a computer access method that allows those with disabilities to navigate and control their computer with their eyes, similarly as an everyday computer user uses a mouse to control their computer. Understand users' intentions – With eye tracking the device knows where the user's focus is at any given point in time. This powerful information can be used to create much more intuitive user experiences for any computing system. It is fundamental to create truly humanized technology. Create new user experiences and humanized user interfaces – By combining eye tracking with other input modalities, for example, keyboard, mice, joystick, touchpad and voice commands, it is possible to create more intuitive user experiences.

## IV. CONCLUSION

Based on the face and eye movement, the user input in mouse can be generated and the same is used to generate the notification to the user. The processing system is carried out in four phases: Observing the iris movement, Identification of input operation, Based on the input operation the prediction of task to be performed, Executing the task and produce the output and gather the feedback from the user regarding the carrying into action, to improve the cognitive power of the system. Once the input is identified based on their eye contact then it generates the notification to the caretaker in terms of voice reporting and message notification.

## FUTURE WORK

Another potential direction for future research would be to relax the constraints under which current iris-recognition systems operate. With this in mind, it would be particularly desirable to decrease the required level of operator participation even while increasing the physical distance from which evaluation takes place. An important direction for future efforts is the design and execution of controlled, large-scale research studies.

## REFERENCES

[1]  Abdullah, Mohammed AM, et al. "Robust iris segmentation method based on a new active contour force with a noncircular normalization." IEEE SMC (2016).

[2]  Meng, Chunning, and Xuepeng Zhao. "Webcam-Based Eye Movement Analysis Using CNN." IEEE Access 5 (2017): 19581-19587.Naruniec, Jacek, et al. "Webcam-based system for video-oculography." IET Computer Vision 11.2 (2016): 173-180.

[3]  Khelbude, Priyanka, and Sushama Shelke. "Real time iris controlled robot." Green Engineering and Technologies (IC-GET), 2016 Online International Conference on. IEEE, 2016.

[4]  Nasor, Mohamed, et al. "Eye-controlled mouse cursor for physically disabled individual." Advances in Science and Engineering Technology International Conferences (ASET), 2018. IEEE, 2018.

[5]  Garagad, Vishwanath G., and Nalini C. Iyer. "A novel technique of iris identification for biometric systems." Advances in Computing, Communications and Informatics (ICACCI, 2014 International Conference on. IEEE, 2014.

[6]  Rebsamen, Brice, et al. "Controlling a wheelchair indoors using thought." IEEE intelligent systems 2 (2007): 18-24.

[7]  Kierkels, Joep JM, et al. "Using an eye tracker for accurate eye movement artifact correction." IEEE Transactions on biomedical engineering 54.7 (2007): 1256-1267.

[8]  Kaufman, Arie E., Amit Bandopadhay, and Bernard D. Shaviv. "An eye tracking computer user interface." Virtual Reality, 1993. Proceedings., IEEE 1993 Symposium on Research Frontiers in. IEEE, 1993.

[9]  Hu, Baosheng, and MingHua Qiu. "A new method for human-computer interaction by using eye gaze." Systems, Man, and Cybernetics, 1994. Humans, Information and Technology., 1994 IEEE International Conference on. Vol. 3. IEEE, 1994.

[10] Ballard, Philippe, and George C. Stockman. "Computer operation via face orientation." 1992 11th IAPR International Conference on Pattern Recognition. IEEE, 1992.