Morse Code Implementation using Eye Blinks

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ARTICLE INFO

ABSTRACT

A few medical conditions such as Locked In Syndrome and Amyotrophic Lateral Sclerosis lead to paralysis or motor speech disorder in people which may cause defect in speech or voice. In this case the individual loses his ability to communicate. AAC devices become a rescue for them but they turn out to be expensive and also inaccessible to most of the people. At this pace of time we propose low cost software which helps in converting the message into understandable English language, through eye blinks with the use of Open source Computer Vision, through Morse code which comprises dots and dashes. So, this will serve as an alternative to the AAC devices.

Keywords : AAC devices, Amyotrophic Lateral Sclerosis, Morse code, Computer Vision

I. INTRODUCTION

Speech illness can influence the way a individual attempting to speak clearly and unmistakably to make words. Discourse clutters can be due to certain therapeutic afflictions beginning from brain harm, stroke to loss of motion, and a few other maladies. It can too result in collapse of central anxious system's fringe harm amid mischances which can take off a individual totally not able to communicate. In loss of motion, the capacity to control muscle development is constrained indeed around the eye muscles and squints are the as it were way for the understanding to communicate. In such conditions, a framework which is helpful as well as simple is required for the quiet. Since discourse impedance isn't specifically hurtful to the quick wellbeing of the patient, it isn't taken in thought as much it ought to be taken within the advancement of a therapeutic gadget. Human communications are ordinarily through voices and expressions. Other than common dialects (e.g., talked dialects, composed dialects), sign dialect comprising of facial expressions and body signals is another fundamental communication way for extraordinary individuals beneath specific conditions; in the interim, the body motion is exceptionally significant to progress the adequacy of human intuitive. Particularly, finger signal may be a generally steady fashion composed of hand developments. The diverse advances utilized for actualizing the communication between paralyzed patients and the individuals going to and caring for them are mouth incited joysticks,

incited breathe puffing straws, tongue development examination, switch mounted close user's head, etc. These frameworks are expensive to actualize, increment push on the patients, and require talented labor to set up and keep up the framework for appropriate working. Barely any gadgets have been created that can address this issue in a patient-friendly and cost-effective way. This work points to plan a basic and cost-effective computer program for patients enduring from discourse clutter as well as individuals with the as it were alternative of eye movements/blinks utilizing eye flickers of the individual. Eye-blink at normal interims can be deciphered for shaping words for communication. A productive, real-time flicker detection calculation can be utilized for nearly any reason like ON/OFF of machines at domestic, factories etc. The Morse code was created within the early 19th century when the individuals did not have any thought of developing circuits to send voice messages from one put to another. The transmit frameworks were implies of sending and accepting messages with offer assistance of electronic driving forces. The Morse code was named so after its innovator, Samuel F B Morse. It proceeds to be the least demanding, productive, and reasonable implies of communication as the gadgets required by it was exceptionally basic. This strategy demonstrated that capability in English was a prerequisite to communicate with the rest of the world. Afterward on, this code was acknowledged universally and a common Worldwide Morse code has been created and utilized. Morse code was prevalently known as the dialect of dabs and dashes. A long time afterward, this dialect came up with extemporized forms like transmitting content data as a arrange ment of flipping tones, changing brightness levels, or ticks that can be straightforwardly decoded by a gifted audience or an eyewitness without the utilize of any extraordinary sort of hardware. It has been the foremost easiest and reasonable strategy of transmitting and getting messages. Over the a long time this strategy was basically utilized in radio

communication but nowadays this technique has numerous applications in flying, naval force, and assistive strategy like making a difference individuals with incapacities to communicate. We point to grant back to individuals with discourse clutters but there are a few military-strategic circumstances where it can be valuable as well. Here inside eye-blinks, the client can effortlessly express himself/herself. This prepare appears to be time-consuming but it's not, once with a few hone the client will get quick at this.

II. LITERATURE SURVEY

Many researchers have been done with Morse code eye blink authentication and few have a very good add- on to these security characteristics. Real time Eye Tracking for Password Authentication [1] Proposes a process to authenticate the gazing PIN entry, eye detection and pin identification tracking application using a smart camera in real time. Quantitative Analysis of Tennis Experts Eye Movement Skill [2] The actual expert Tennis player and a beginner Tennis player propose a measurement of the eye movements. The players compare and analyze the measured eye movements. The main observation in this paper is that fora moment beginner tends unconsciously to follow the tennis ball. Smart-Eye Tracking System [3] proposes an intelligent eye tracking system for disabled and elderly persons.

The survey of this research consists of four components, imaging processing module, wheelchair module, appliance controlled module, and SMS manager module. The aim is to implement the use of eye movement for controlling appliances, wheelchairs and for communicating with career. Extension of Desktop Control to Robot Control by Eye Blinks using SVM [4] it proposes accessibility issues that should eliminate, or at least reduce, the distance between people with disabilities and technology. There are still numerous challenges to be overcome for severely impaired people. In carrying out hand's

free tasks, we present eye tracking as a valuable aid to the disability. In addition, we highlight the potential of eye-based interfaces to improve the process of user-machine interaction in "traditional" keyboard and mouse activities. A Novel Approach for Morse Code Detection from Eye Blinks and Decoding using OpenCV [5] In this paper, Medical conditions such as locked in Syndrome and Amyotrophic Lateral Sclerosis lead to paralysis or motor speech disorder. AAC devises become a rescue for them but they turn out to be expensive and inaccessible to most of the people.

They proposed low cost software. Eye Movement Related EEG Potential Pattern Recognition for Real-Time BMI [6] Suggest study that aims to quickly identify the pattern for BMI (Brain Machine Interface). which is deemed an artifact to have been removed by an EEG factor. This paper proposes three methods of extracting characteristic patterns that can be distinguished through several directional ocular movements as a discriminatory ERP pattern. Eye Contact Game Using Mixed Reality for The Treatment of Children with Attention Deficit Hyperactivity Disorder [7] Propose an observation in which the academic function of many children with ADHD. In addition, due to the lack of attention and interpersonal skills, they are having trouble with their social life and often remain in adulthood. This paper provides a solution to the problem, where the advantages of a new type of treatment, an eye contact game which successfully utilizes mixed reality technology, have been introduced and demonstrated.

III. PROPOSED SYSTEM

Our approach is by using mediapipe and openCV. Mediapipe is a google api offers cross-platform, customizable ML solutions for live and streaming media. There are various ML solutions available such as Face Mesh model, Object-detection, pose, hands, holistic, Box tracking and many more. Face Mesh Model is a model which is used frequently by developers. Face Mesh model allows users to map 468 3D landmarks upon a face. Bringing real-time augmented reality (AR) applications, a transform module bridges the gap between face landmark estimation and useful AR applications that are commonly used in everyday life.

Steps

1) Connect your cam to OpenCV and load the live input or give already recorded video
2) Apply mediapipe's face mesh model on input and initialize Morse code
3) Calculate initial EAR's (Eye Aspect ratios)
4) Check if the EAR's values are less than the threshold value
5) If yes that's a blink, then find out whether it's a long or short blink based on duration
6) Append dits and dahs to create a sequence
7) Map matching character for the sequence
8) Append the character to a string to form a word
9) Translate word string and convert it into speech

IV. IMPLEMENTATION

Implementation is the process of converting a new system design into an operational one. It is the key stage in achieving a successful new system. It must therefore be carefully planned and controlled. The implementation of a system is done after the development effort is completed.
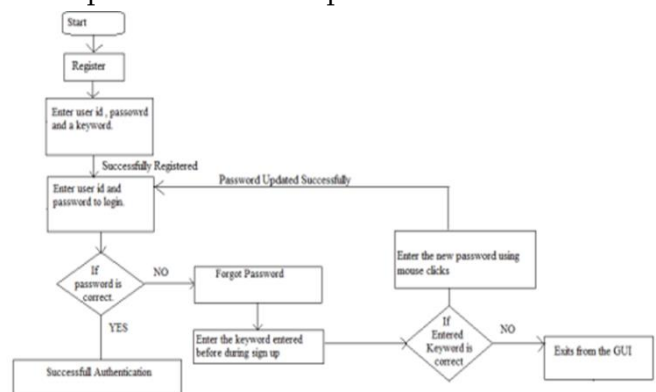

Fig 1 : System Architecture

When the user firsts open this application a GUI (Graphical User Interface) will prompt the user whether he wants to login or register as a new user.

When the user registers, they need to provide the required credentials such as user id, password and keyword. The inputs are stored in a database. When to user needs to login then they must enter the correct credentials which they had given while registering. If the credentials match the ones which were given when they had registered then the authentication is successful. If the credentials are not matching then they must answer the security question with the keyword which they had given when they had registered at the start. If the keyword matches then the user can update the password using the mouse buttons. The updated password is changed in the database. Hence the next time the user logs in they can use the new password which they have set. In a scenario where the keyword does not match then the user exits from the GUI application

V. CONCLUSION

We've shown that, in addition to the conventional way of detecting blinks, the Eye Aspect Ratio has proved to be very effective in detecting blinks. Blink recognition in Morse code can be very helpful for individuals who are paralyzed but still have any eye control. Blinks can be identified more reliably with the aid of improved algorithms and techniques, as we discussed. In addition, these blinks are translated to morse code. A special code may be conveniently invented for patients with lower speech needs, where a particular sequence would indicate a special expression or commands. There is a variety of simple life functions that can be readily communicated with a few instructions that the patient can understand quickly. This system can be used not only by people with body or speech disabilities, but also in areas like libraries, hospitals, and classrooms. This device may be helpful for spies or military personnel who need to send a coded message without the enemy knowing.

VI. REFERENCES

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Cite this article as :