A COMPARATIVE STUDY OF EYE GAZE VIRTUAL KEYBOARD FOR ENHANCED HUMAN COMPUTER INTERACTION

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Abstract

This research conducts a comprehensive comparative analysis of various eye gaze virtual keyboards, aiming to evaluate their efficacy in improving human-computer interaction (HCI) for individuals with motor impairments. Employing a systematic approach, we assess key features,accuracy, and user experiences across different designs to uncover the strengths and limitations inherent in each. The study not only sheds light on the current state of eye gaze virtual keyboard technology but also provides valuable insights for future advancements, ultimately contributing to the development of more accessible and user-friendly communication tools.

Keyword : AI Algorithm, virtual Keyboard, computer vision, Human computer interaction (HCI), Eye gaze technology, Eye movement detection, Machine Learning.

1 Introduction

Imagine using just your eyes to type and control a computer. For many people with difficulty using their hands or other body parts, eye gaze virtual keyboards are a game-changer. These special keyboards let users control a computer by moving their eyes. But, with so many types of eye gaze keyboards out there, which one works the best? In this study, we're diving into the world of eye gaze virtual keyboards to figure that out. We want to understand which keyboards are super accurate and easy to use. This is important because it helps people who face challenges in using regular keyboards to communicate and interact with computers. Our goal is to compare different eye gaze keyboards and highlight what makes each one good or not-so-good. By doing this, we hope to help improve these eye gaze keyboards and make them even better tools for people who rely on

them for their daily communication and computer use. So, let's embark on this journey of exploring eye gaze virtual keyboards and making technology more accessible for everyone.

2 Background Information

Eye gaze virtual keyboards are an innovative interface technology designed to facilitate communication and interaction for individuals with motor impairments or disabilities. Utilizing advanced eye-tracking technology, these keyboards allow users to input text or commands by directing their gaze towards specific on-screen elements. This technology is particularly valuable for those who may have difficulty using traditional input methods, such as physical keyboards or touchscreens. The development of eye gaze virtual keyboards has gained traction in the field of assistive technology, aiming to enhance the accessibility and communication capabilities of individuals facing motor challenges.By harnessing the power of eye movements, users can engage with digital devices, type messages, and navigate interfaces with a level of independence not achievable through conventional means.

3 Comparative Analysis

In this comprehensive analysis, we will systematically evaluate various research articles by scrutinizing key variables including usability, accuracy, layout, typing speed, and the utilization of diverse technologies.

Research Articles	Usability	Keyboard Layout	Accuracy Speed	Typing	Methodology
Eye gaze controlled virtual keyboard, 2019[2]	Moderate	Customized	91%	-	HoG descriptor, 68 face marks
Eye gaze controlled wheelchair system with virtual keyboard for disabled person using Raspberry pi ,2022[1]	Moderate to High	Customized	97%	-	HoG descriptor, 68 face landmarks, Raspberry pi
A Novel Multimodal Gaze controlled Hindi virtual keyboard for disabled users, 2016[3]	Moderate	Customized Hindi Keyboard	-	11 letters/ min	-
EyeBoard:A fast & accurate eye gaze based text entry system,2012[4]	Moderate	Fitaly layout	-	5.23w pm	-

Table 1: Comparative Analysis

4 Conclusion

In conclusion, the comparative study of eye gaze virtual keyboards has shed light on notable insights. The evaluation encompassed usability, accuracy, layout efficiency, typing speed, and the technological foundations. Findings suggest that variations exist among different eye gaze virtual keyboards, with some excelling in certain aspects, such as enhanced usability or faster typing speeds. Consideration of user preferences, contextual relevance, and technological advancements becomes pivotal in selecting an optimal eye gaze virtual keyboard tailored to specific needs. Future improvements in this area should aim to bring together these factors to make eye gaze virtual keyboards even better for users.

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