Chapter 5
Controlling Computer Features Through Hand Gesture

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ABSTRACT

This chapter introduces an AI-driven hand gesture recognition system designed to enhance computer settings control, prioritizing improved accessibility and user experiences. Leveraging machine learning algorithms trained on a dataset of relevant hand gestures (e.g., volume and brightness control), this project emphasizes data analysis for trend identification and system refinement. Successful outcomes could stimulate further research and innovation, potentially revolutionizing accessibility and user experience solutions. Ultimately, this endeavor aims to empower computer users with a more intuitive and accessible means of adjusting settings, contributing significantly to human-computer interaction advancement.

1. INTRODUCTION

In today's digital age, computers play an integral role in our daily lives. However, manually adjusting computer settings such as brightness and volume can be inconvenient or even impossible in certain situations, such as when a person's hands are occupied or if they have limited mobility. To address this issue, we propose a project that harnesses the power of AI to enable users to control computer features through hand gestures. This project aims to provide an intuitive and accessible solution for managing computer settings while exploring the potential of AI technology to enhance user experiences. In this proposal, we will outline the project's objectives, methodology, potential impact, timeline, and budget estimate (Babu, 2022).

The initial and most crucial stage in developing a hand gesture recognition system involves creating a hand-tracking system (). This serves as both the primary goal and the foundation of the entire system. Data Glove-based technologies often use sensor devices to record hand and finger movements as multi-parametric data. Other sensors are also utilized to gather data on hand movement and configuration. However, our project opts for a simpler approach, requiring only a webcam and eliminating unnecessary equipment.

Designing a hand gesture recognition system presents two primary challenges. The first is accurately recognizing a person's hand, which is essential because each hand performs a different function in our scenario. When the left hand is recognized, it triggers brightness adjustments, while the right hand triggers volume changes. Subsequently, predefined points are identified based on the detected hand.

Many people heavily rely on computer use, often involving a large keyboard and mouse. Prolonged computer usage, however, can lead to various health issues. Hand gestures, being a natural form of communication, do not have the same adverse health effects as keyboard and mouse use. Therefore, employing hand gestures as an input method offers an appealing alternative for human-computer interaction. Users commonly use touch gestures to convey emotions and ideas, as hand gestures can signify actions, emotions, and thoughts. Gesture recognition technology enables computers to understand and respond to human body language, surpassing the limitations of text- or graphic-based user interfaces ().

2. RATIONALE BACKGROUND

The rationale behind this project is rooted in the growing demand for user-friendly and intuitive interfaces to interact with technology. As technology becomes more pervasive, people increasingly expect devices to be intuitive and easy to use. Traditional

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