Post-Performance Analysis (PPA)

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Introduction

The purpose of this post-performance analysis report is to conduct a rigorous assessment of the performance of the video-based control system implemented in the context of our capstone project. The video-based control system was strategically designed and implemented with the overarching objectives of automating a standing desk. This analysis aims to thoroughly evaluate its effectiveness in meeting those objectives.

This report presents a comprehensive analysis of the performance of the video-based control system, encompassing a thorough evaluation of its strengths, weaknesses, opportunities, and threats. The analysis is based on building the system and entails a meticulous examination of the system's performance in relation to its intended outcomes and targets. Through this post-performance analysis, our goal is to gain valuable insights into the system's performance, identify areas of improvement, and provide strategic recommendations for future enhancements.

The findings and analysis presented in this report are intended to serve as a valuable resource for decision-makers, stakeholders, and team members involved in the project, as well as for future projects that may require video-based control systems. The report aims to provide a comprehensive understanding of the system's performance and serves as a foundation for informed decision-making and strategic planning.

Objectives and Goals

The following portion of this report reviews the objectives and goals our team set out to accomplish when coming up with the idea for creating a video-based control system to automate standing desks.

1. Efficiency Enhancement: The primary objective of the video-based control system for automating standing desks is to improve the efficiency of desk height adjustments, enabling smooth and seamless transitions between sitting and standing positions. The goal is to minimize the time and effort required to manually adjust desk heights, leading to increased productivity and reduced interruptions in workflow.

2. User Experience Enhancement: The system aims to provide a positive and user-friendly experience for the end users by simplifying the process of adjusting desk heights through an intuitive and easy-to-use video-based control interface. The goal is to enhance the overall user experience, promoting user satisfaction and comfort in utilizing the standing desks.

3. Ergonomic Benefits: The system aims to promote healthy ergonomic practices by automating desk height adjustments according to individual users' preferences and ergonomic guidelines. The goal is to facilitate proper posture and reduce strain on the musculoskeletal system, leading to improved comfort and well-being for users.

4. Customization and Adaptability: The system aims to offer customization options for users to personalize their desk height settings and accommodate individual preferences and needs. The goal is to provide a flexible and adaptable solution that can cater to different user requirements and adapt to changing preferences over time.

5. Safety and Reliability: The system aims to ensure safety and reliability in the automated control of standing desks, with built-in safety features to prevent accidents or damage. The goal is to provide a secure and dependable system that can be trusted for long-term use without compromising safety standards.

Methodology

The post-performance analysis of the video-based control system involved a systematic approach that combined both quantitative and qualitative methods to thoroughly evaluate the system's performance and effectiveness. The analysis aimed to assess how well the video-based control system performed in achieving its intended objectives and goals.

Since this is only a prototype, only so many quantitative and qualitative methods could be applied.

System Performance Metrics: Quantitative data on system performance metrics, such as response time, accuracy, and system errors, was collected from the system's logs and records. These metrics provided quantitative measures of the system's performance and efficiency.

User Feedback: Qualitative feedback received throughout both terms from the professor and teaching assistants were used.

Comparative Data: Comparative data from other similar video-based control systems or benchmark data from industry standards were collected to provide a basis for comparison and evaluation of the system's performance against established benchmarks.

Analysis

The post-performance analysis of the video-based control system for automating standing desks revealed several insights and results in relation to the objectives and goals of the project. The following analysis highlights the strengths, weaknesses, opportunities, and threats (SWOT analysis) of the system, along with key findings and recommendations for future improvements.

Strengths:

- Improved System Performance: The system demonstrated enhanced performance in terms of reduced response time and increased accuracy
- Positive feedback: The system was well-received by the professor and his teaching assistants

Weaknesses:

- Quality of Camera Sensor: Due to the poor camera quality of the sensor, a laptop had to be used instead of a Raspberry Pi, which affected the overall aesthetics and functionality of the system.
- Issues with Raspberry Pi Operating System: The Raspberry Pi operating system had issues with computer vision, which required the use of a C server instead of Python, resulting in a lack of asynchronous processing.

Opportunities:

- Improve Computer Vision: In the future, there is an opportunity to enhance the computer vision capabilities of the system to accurately detect only the closest user and avoid object recognition from objects in the background, resulting in more precise and reliable control of the standing desks.
- Optimize Signal Output: The system constantly outputted signals, which could be optimized to output signals only when the closest user is detected, reducing unnecessary signal processing and improving system efficiency.

Threats:

- Technological Limitations: The system's reliance on camera sensors and the limitations of the Raspberry Pi operating system posed challenges in achieving optimal performance and functionality.

- Competition: The market for automated standing desks is competitive, and there may be other video-based control systems or alternative solutions that could pose a threat to the system's market share.

Conclusion

In conclusion, the post-performance analysis of the video-based control system for automating standing desks has provided valuable insights into the strengths, weaknesses, opportunities, and threats of the system. While the system demonstrated improved performance and positive feedback, challenges related to camera sensor quality and operating system limitations were identified. However, there are opportunities for future improvements, including enhancing the computer vision capabilities and optimizing signal output. The findings from this analysis serve as a foundation for further refinement and enhancement of the system to make it more efficient, accurate, and user-friendly. Overall, this post-performance analysis provides valuable feedback and recommendations for future iterations of the video-based control system for automated standing desks.