OPTISENSE: A WEB-BASED EYEWEAR RECOMMENDER SYSTEM BASED ON FACE SHAPE WITH AUGMENTED REALITY (AR)

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Abstract

OptiSense is an online eyewear recommendation system, that aims at enhancing online shopping with a personalized recommendation system and engaging virtual try-on component. The system utilizes content-based filtering and augmented reality (AR) to recommend appropriate eyewear according to users preferences such as style, type of frame and shape of face. Its goal is to address the challenges of conventional eyewear-browsing practice, including having to go to physical stores and the inability to virtually test the items in online shopping. Using the AR technology and webcam, users are able to put on glasses and see them in real-life scenarios, which makes it more interactive and convenient. OptiSense has been developed based on the waterfall model and implementing tools such as HTML, CSS, JavaScript, PHP, MySQL, and WebAR to support its steady performance. The functionality and usability testing were performed among the students at the university aged 18 until 25 with a 100% functionality success rate and an 86.45% of usability satisfaction. These findings indicate that this system will be efficient in assisting the user to decide purchases with high levels of confidence. OptiSense intends to utilize personalization and immersive technology to bridge the gap between online and brick-and-mortar shopping to become a business solution in a modern market of eyewear. Additional features that can be added in the future include password reset, real time facial detection, and intelligent recommendations powered by machine learning.

Keywords*: recommender system, augmented reality, eyewear, virtual try-on, content-based filtering*

1. Introduction

Selecting suitable eyewear is often a complex task, particularly in online shopping environments where users are unable to physically try on products. This study introduces OptiSense, a web-based eyewear recommender system designed to enhance the online eyewear purchasing experience. The system applies content-based filtering techniques to generate personalized recommendations based on individual attributes such as face shape, frame type, and style preferences (Roy & Dutta, 2022). In addition, OptiSense incorporates Augmented Reality (AR) technology, enabling users to virtually try on eyewear in real time using a webcam or smartphone camera (Du et al., 2022). The project is developed specifically for university students aged 18 to 25, with testing conducted at Universiti Teknologi MARA (UiTM), Perlis Branch. The primary objective is to deliver an intelligent and interactive system that improves user satisfaction, simplifies decision-making, and bridges the gap between physical and digital eyewear shopping experiences.

2. Methodology

This project adopted the waterfall methodology, which provides a clear and structured development process through sequential phases. The development of OptiSense followed five main stages: requirement, design, development, testing, and documentation. In the requirement phase, information was gathered to define user needs and system objectives. The design phase involved creating system workflows, user interfaces, and database structure. Development was carried out using HTML, CSS, JavaScript, PHP, MySQL, and WebAR tools for the AR try-on feature. Testing was conducted to ensure the system met its functional and usability goals, while documentation compiled all findings

into the final report. The waterfall model was chosen for its effectiveness in managing system development and meeting user needs (Pratama et al., 2024).

3. Results / Findings

The development and testing of OptiSense demonstrated its effectiveness as a personalized eyewear recommender system. Functionality testing was conducted using a set of predefined test cases for both user and admin roles. Both the user and admin sections achieved a 100% success rate across all test steps, confirming the reliability and robustness of the system's core functionalities. Usability testing was carried out using the Post-Study System Usability Questionnaire (PSSUQ) with 30 participants, including UiTM students and eyewear shop staff. Participants evaluated system usefulness, information clarity, interface design, and overall satisfaction. The mean score of 2.21 corresponds to an 86.45% satisfaction rate, indicating strong positive feedback. Most users agreed that OptiSense was easy to use, visually appealing, and helpful in guiding eyewear selection. The results confirm that OptiSense is both functional and user-friendly, making it a suitable solution for users seeking personalized eyewear recommendations through an interactive and engaging platform.

4. Novelty of Research

OptiSense introduces an innovative approach by combining personalized recommendation with real-time AR-based virtual try-on in a web application. Unlike many existing eyewear platforms, which offer static catalogs or limited interactivity, OptiSense allows users to visualize and assess different frame styles on their own faces, enhancing decision confidence. The system's use of content-based filtering ensures accurate matching based on individual user preferences and characteristics (Zhao et al., 2023). Furthermore, the integration of WebAR eliminates the need for dedicated apps, making the system more accessible. This project also contributes academically by showcasing the effectiveness of AR in improving user engagement and satisfaction in e-commerce (Du et al., 2022). In the context of Malaysia, where online eyewear try-on systems are still emerging, OptiSense offers a timely and practical solution that reflects current consumer needs and digital trends.

5. Conclusion or Future Work

OptiSense demonstrates the feasibility and effectiveness of a web-based eyewear recommender system enhanced by AR technology. Future work will focus on implementing real-time facial detection, improving mobile responsiveness, and incorporating machine learning algorithms to refine recommendation accuracy and enhance the system's scalability for broader user adoption.

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