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Computer Vision-Based Eye Detection for AR/VR Glasses

Himanshu V Shivde, Dr. R. S. Durge, Prof. Snehal V. Raut, Dr. A.P. Jadhav, Prof. D. G. Ingale
Department of Computer Science and Engineering
DRGIT&R College of Engineering, Amravati

Abstract: *This paper presents a computer vision-based real-time eye detection system designed for Augmented Reality (AR) and Virtual Reality (VR) glasses. The proposed system utilizes advanced deep learning and image processing algorithms to accurately detect and track the user's eye position and gaze direction. The goal is to enable natural, gaze-based interaction within immersive environments while reducing computational load using foveated rendering techniques. The system integrates infrared (IR) cameras, OpenCV, and TensorFlow for real-time image processing and gaze estimation. It demonstrates robust performance across varying lighting conditions and user movements. This research discusses the system's architecture, software pipeline, implementation challenges, and results, illustrating how eye detection can revolutionize interaction in AR/VR technologies.*

Keywords: Computer Vision, Eye Detection, AR/VR Glasses, Deep Learning, Gaze Tracking, OpenCV, TensorFlow, Human–Computer Interaction