Implementing Live Face Detection for Real-Time Demographic Analysis via CNNs

Abstract

The advancement of deep learning has significantly impacted computer vision, particularly in the areas of face detection and demographic analysis. This project focuses on the implementation of Convolutional Neural Networks (CNNs) for real-time age and gender detection using live face detection. The system is designed to accurately predict an individual's age group and gender by processing facial images captured in real-time. Leveraging a live feed, the model detects and localizes faces, which are then analyzed to extract meaningful features. These features are passed through multiple layers of convolutional filters, pooling, and fully connected layers, enabling the model to learn both spatial and hierarchical patterns. The pipeline includes robust data preprocessing techniques such as normalization and data augmentation to improve the model's generalizability and performance under various conditions. The system's accuracy and efficiency are evaluated using standard metrics like accuracy, precision, recall, and F1 score. This project has practical applications in fields such as security, personalized marketing, and interactive systems, where understanding real-time demographic information is essential. The results demonstrate the effectiveness of deep learning and CNNs in delivering accurate and efficient age and gender detection in a live setting, paving the way for future advancements in this domain.