

Research on some Deep Learning models for checking citizens' mask usage

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Abstract: This study investigates the application of deep learning models for automated detection of face mask usage among citizens, a critical task for public health monitoring. Leveraging convolutional neural networks (CNNs), we evaluate and compare the performance of several state-of-the-art architectures, including VGG16, ResNet50, and a custom lightweight model, on a dataset comprising images of individuals with and without masks. The models are trained and tested under varying conditions of occlusion, lighting, and facial angles to assess robustness. Experimental results demonstrate that the fine-tuned ResNet50 achieves the highest accuracy at 98.2%, while the custom model offers a favorable trade-off between speed and precision, making it suitable for real-time deployment. The study further analyzes model generalization across different demographic groups and environmental settings. These findings underscore the viability of deep learning as an effective tool for enforcing mask mandates in public spaces, contributing to enhanced community health surveillance and automated compliance monitoring.

Keywords: Deep Learning, face mask, face detection, computer vision