PROJECT REPORT

COMPARE VGG16 AND RESNET50 MODELS ON FACIAL RECOGNITION AT AN ANGLED POSITION

VINCENT KURNIAWAN SUGIARTO
21.K1.0041

Faculty of Computer Science
Soegijapranata Catholic University
2024

ABSTRACT

Facial recognition is popularly used to unlock devices, verify attendance, and enhance public security because it provides a convenient method of execution and functions without contact between devices. However, despite these advantages, the ability to recognize faces that are turned away from the camera, partially obscured, or heavily obscured is a significant challenge for this technology to survive in real-world environments. In this paper, we will discuss these limitations in detail and will strive to address them through experimental comparisons between some of the most widely used deep learning models for face recognition: VGG16 and ResNet50, with special attention to tilted face recognition and off-center processes. Data augmentation techniques (e.g., rotation and flipping) are used to build a dataset 1, so that both models are trained and tested on a dataset 1, as well as dataset 2. Both models achieved 90% accuracy for the dataset 1 in testing, demonstrating comparable performance when provided with a favorable environment. However, on the dataset 2, ResNet50 achieved an accuracy of 82.42% (compared to VGG16 which had an accuracy of 75.78%), confirming its greater resilience to variations in data distribution. We validated this with a real-world dataset (with different rotation angles and studied distributions) commonly used to train facial recognition systems, making this study useful for researchers intending to use ResNet50 as a model to ensure effectiveness and flexibility..

Keyword: Face Recognition, VGG16, ResNet50, Convolutional Neural Networks, Data Augmentation