ANALYSIS OF TOOLKITS FOR FACIAL RECOGNITION SYSTEM

Kravchenko, M.A., Kovalenko, S.M.
National Technical University «Kharkiv Polytechnic Institute», Kharkiv

Facial recognition is a computer vision task. Their main task is to automatically recognize and identify faces in images or videos. These systems use computer vision and machine learning algorithms to detect special features of human faces, such as face shape, eye position, nose, mouth, etc. Using these features, the systems can create unique face templates that are used to identify a specific person.

In recent years, personal identification systems have remained relevant due to the development of biometric technologies and their widespread use. The need for continuous improvement of these components arises from numerous cybersecurity and privacy challenges that require innovation for software components.

The purpose of this report is to provide a comparative analysis of the components used in identification systems. A three-step analysis is used to identify the strengths and weaknesses of these components. This information is intended to help you improve your own identification system, taking into account the specific needs and constraints of your project. The report analyzes off-the-shelf components (OpenCV, Dlib, Keras, TensorFlow, and DeepFace) to identify their strengths and weaknesses. For example, high performance and reliability in face detection were noted, but it was noted that effective training requires significant computing resources and a large amount of data.

At the first stage, the efficiency of the algorithms and their stability are studied and compared. For example, DeepFace and TensorFlow are based on advanced mathematical algorithms that provide high speed and accuracy of identification [1]. At the same time, OpenCV and Dlib are characterized by stable operation even in different lighting conditions [2].

The second stage analyzes the complexity of model training and their sensitivity to noise. Components based on deep learning require significant computing resources to train models efficiently. Some algorithms can be sensitive to noise, which can lead to a decrease in accuracy.

The last step involves optimization steps. For example, accurate face detection can reduce the amount of information that needs to be processed, lowering computational costs. Saving intermediate results of calculations and using them in subsequent queries can reduce the number of repeated calculations.

The analysis resulted in information that formed a vector aimed at creating a competitive solution of its own.

References:

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