**ArcFace: Additive Angular Margin Loss for Deep Face Recognition**

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**Paper Link:** <https://ieeexplore-ieee-org.unh-proxy01.newhaven.edu/document/9449988>

**Short Description:**

This project aims to implement the ArcFace method in the context of a facial recognition system. ArcFace, with its Additive Angular Margin Loss, enhances the ability to differentiate between faces in images by considering both feature distances and angular relationships between feature vectors. By implementing ArcFace, the project seeks to improve the accuracy and robustness of facial recognition systems, particularly in challenging scenarios. The specific tasks of the project may include integrating the ArcFace loss function into an existing deep learning model for face recognition, training the model on relevant datasets, and evaluating its performance through testing and validation.

**Dataset Description:**

**Format:**

The dataset comprises images of various individuals, categorized and stored in separate folders named after each individual. The images are in common formats such as .png, .jpg, and .jpeg.  
  
**Data Source:**

The Dataset used in the chosen GitHub code is <https://github.com/paul-pias/Face-Recognition/tree/master/data/facebank>

**Annotation Tools:**

In this project, we leverage the powerful combination of MTCNN for face detection and the ArcFace model for face recognition. We begin by employing MTCNN, a robust face detection algorithm, to locate and extract faces within images. Once faces are detected, we apply the ArcFace model, which utilizes the Additive Angular Margin Loss to perform accurate face recognition.

To enhance the usability of the system, recognized faces are annotated with their respective names, allowing for easy identification. Additionally, we offer an optional feature to provide confidence scores, offering insights into the model's level of certainty in the recognition results. This two-step approach, utilizing MTCNN for detection and ArcFace for recognition, enables us to build a comprehensive facial recognition system that is both accurate and user-friendly.

**Sample Outputs:**

**Output Type:** Images

**Content Description:** The sample outputs consist of images with annotated faces. Each image shows a detected face with a bounding box, and if applicable, the recognized name or identity label associated with that face.

In a project that uses the MTCNN (Multi-task Cascaded Convolutional Networks) for face detection, the system takes an input image, detects faces within it, and provides an output image that includes bounding boxes around the detected faces along with their associated confidence scores, often represented as percentage values.

In the sample outputs below, an image displays a detected face with a bounding box drawn around it. Adjacent to the face, there is a label indicating the recognized name with confidence intervals. This output demonstrates how the system identifies and annotates faces in real-world scenarios.

**Sample 1:**

A child with long hair smiling

Description automatically generated A person with a green rectangle

Description automatically generated

**Sample 2:**

A group of women smiling

Description automatically generated

**References:**

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[**https://github.com/paul-pias/Face-Recognition/tree/master/data/facebank**](https://github.com/paul-pias/Face-Recognition/tree/master/data/facebank)