

SI100B Project Face Detection and emotion classification

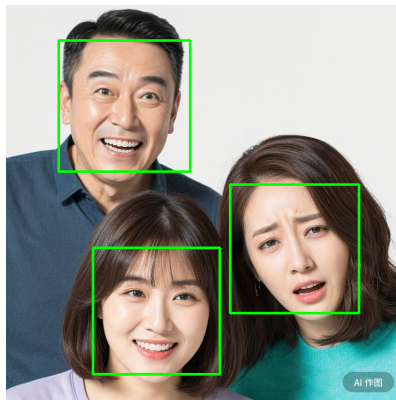
Lecture 0

1 Introduction

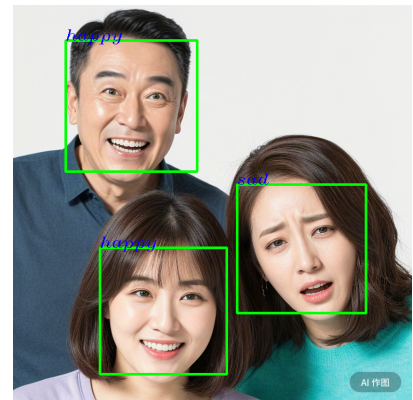
The purpose of our project is to help everyone recognize images and understand basic AI knowledge. We started with the most fundamental classification network, learning what a neural network is, and experiencing the process of building a neural network step by step, as well as its effects.



(a) Read image



(b) Detect face



(c) Classify Emotion

Figure 1: Steps of this project

There are a total of eight lectures, and the content of each lectures is as follows:

1.1 Environment Setup and Image Basics

Install the necessary environment and get familiar with basic image concepts. Run through fundamental knowledge related to images.

Assessment:

Checkpoint (5%)

1.2 Basic Operations with OpenCV

Learn essential OpenCV operations, including reading and writing images, resizing, drawing shapes, and more. Additionally, explore the usage of OpenCV's cascade classifiers.

Assessment:

Checkpoint (5%) & Bonus (5%)

1.3 Model Training

Begin training a model and understand the connections between various components of the model.

Assessment:

Checkpoint (5%) & Bonus (10%)

1.4 Model Inference

Implement the trained model to perform inference and retrieve results.

Assessment:

Checkpoint (5%) & Bonus (10%)

1.5 End-to-End Workflow

Integrate the entire process from reading an image, detecting faces, converting data to tensors, performing inference, and outputting results for visualization.

Assessment:

Checkpoint (10%) & Bonus (5%)

1.6 Data Visualization with Matplotlib

Learn to use Matplotlib for creating plots to display results effectively.

Assessment:

Checkpoint (5%)

1.7 Importance of Data Annotation

Understand the role of labeling and how to enhance incorrectly inferred scenarios by adding data to improve prediction accuracy.

Assessment:

Checkpoint (5%)

1.8 Advanced Topics and Extensions

Discuss additional topics for extra credit, such as real-time data reading from a camera for inference, using YOLO for object detection, and techniques for data augmentation.

Assessment:

Final report (30%)

2 Grading Criteria

- Participation and Engagement(40%)
- Bonus points(30%)
- Project report(30%)