Project name: Handwriting gesture detection and recognition
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Abstract: Working on projects involving Object detection and Deep Networks, it seemed an interesting topic to explore more. One particular field which we looked into was object tracking and hand gesture recognition. On exploring further we came upon an application for implementing these both simultaneously, which was developing a system which can track the finger and draw.

Introduction: The goal of this project is to develop a system that can track finger movement and detect what is being drawn by the finger. This system will be able to identify the handwritten content and convert it to text data using neural networks.

Plan: The 2 main components of the system are

1. Object detection and tracking to detect hand drawn content.
2. Neural Network for recognising the hand drawn characters.

The application will work as follows:

- Use OpenCV to track the movement of the finger and the content that is drawn.
- The captured images are preprocessed to extract the content drawn by the finger.
- The preprocessed images are fed into the neural network.
- The neural network outputs a prediction of the handwritten characters.

Dataset: We require a dataset to train the neural network to recognise characters from handwritten input.
Potential Datasets:

- IAM handwriting Dataset: This dataset contains forms of handwritten English text which can be used to train and test handwritten text recognizers and to perform writer identification and verification experiments. The database contains forms of unconstrained handwritten text, which were scanned at a resolution of 300dpi and saved as PNG images with 256 gray levels.
- Kaggle Handwriting Dataset: This dataset consists of more than four hundred thousand handwritten names collected through charity projects. This dataset also gives flexibility of adding our own data to the existing dataset.
- Creating our own dataset. Although this might be insufficient for training the network effectively, it is something we can always explore if time permits.

Tools: Python, OpenCV, PyTorch or Tensorflow

References:

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