Handwriting Detection and Font Creator

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Learning Goals

All the members in our group are very interested in Machine Learning and would like to get familiar with the basics through working on a project. For this project, we want to:

- Gain intuition about ML concepts
- Learn how to use ML libraries like tensorflow
- Apply concepts we learned in DSA

For this implementation-based project, our team will create a machine learning program that recognizes handwritten characters from A-Z. We will do this by modeling a neural network that will be trained over a dataset containing images of alphabets. By being able to detect the individual characters with an image and training the machine learning algorithm, we will be able to detect and return the text that is given to the machine in handwriting. To achieve this, we will utilize multiple handwritten datasets in kaggle and implement the algorithm to detect handwritten words and sentences.

After achieving this goal, we will be able to extend this project further by creating our own handwritten fonts. Since the machine is capable of detecting fonts and characters, it is able to detect and categorize our own handwriting. Using this categorization, we can analyze what each character's characteristics are and normalize each character using machine learning. After each 26 characters have been normalized by ML, we can create a vector image that will be the font that we create out of our own handwriting.

Resources

- https://data-flair.training/blogs/handwritten-character-recognition-neural-network/?fbclid=IwAR3Y2yjJe2JcOrzCEYSiuMXaWJjobnDTd-1HbOpSYKqK-5PxRaoWvC0BINk
    - This is a machine learning project of handwritten character recognition with a neural network. Since the MVP of our project is to create a program to detect handwritten text, recognizing the individual character can be our first step and this link can be our guideline for the step.
- https://www.icst.pku.edu.cn/zlian/docs/TOG18-Lian.pdf?fbclid=IwAR37JUiF0hEwbdZGaOuJLx9Xq7VAN4KS6Lv2CRU2zlaRvXeiwPC3W3Iyet4
    - This paper describes the implementation of a program that automatically synthesizes personal handwriting for all (e.g., Chinese) characters in the font library by learning style from a small number of carefully-selected samples written by an ordinary person rather than using a huge dataset. This resource will help us reach our goal of generating computer fonts.

- https://greydanus.github.io/2016/08/21/handwriting/
    - This project is not directly related to our project, but it's also about creating a handwritten font based on the existing handwriting dataset using a series of points and we can use this method to create a new font in our project.

Rough Timeline

1. Research ~1 week
2. Create the handwriting recognition tool ~3 days
3. Extract characters from trained data ~1 day
4. Normalize characters ~1 week
5. Create font using the normalized characters, release ~3 days