

PenToPrint with Arduino

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Overview of the Project

We will firstly try to use the IAM dataset to train the model. The dataset provides 115320 isolated images of English words as training input and the same amount of labels in text format. If the dataset does not work well, we will write words by ourselves to create our own dataset.

Plan, Tasks, and Responsibilities

The workload will be shared in the team equally. The main subtasks are listed below.

I. Task 1: Data Collection

Initially, we will utilize the IAM dataset to train the model. This dataset comprises 115,320 isolated images of English words for training and an equivalent number of text labels. Should the IAM dataset prove inadequate, we will proceed to generate our own dataset by manually writing words.

II. Task 2: ML Algorithm and Implementation on IoT Sensor

In the second week, our strategy involves using a CNN with a single channel, appropriate for binary/grayscale image data. We aim to achieve satisfactory accuracy through regularization, parameter tuning, etc. Due to limited computational resources, we plan to minimize the number of trainable parameters by weight pruning. Subsequently, we will train a network on our Arduino to extract features from the images. To enhance our grade, we intend to employ SqueezeNet to reduce computational demands.

III. Task 3: Evaluation and Expected Results

The performance of the model will be evaluated using a confusion matrix and other accuracy metrics.

Description of Main Risks

There is a risk that the dataset may not be sufficiently robust or suitable for our project's needs. Given the computational limitations of our device, we are compelled to limit the number of trainable parameters, potentially compromising the model's accuracy.