Department of Electrical and Computer Engineering

Scanned Text Enhancer/Reader or Mild Automatic Photoshop:

Project Proposal

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Project Idea 1: Scanned Text Enhancer and Reader

This project came to me as I was doing my reading homework for a history class I am currently enrolled in. Many of the assigned readings were scans of books or journals that were hard for me to read, both in making out the words and in staying focused over the course of a long reading. One idea I tried was using a text-to-speech program to have the readings read aloud such that I can follow along by both sound and sight, more akin to a lecture with a powerpoint, than strictly reading. This worked for some readings, as some were pdfs with text, but the scanned images were a different story.

I eventually started looking into Optical Character Recognition (OCR) programs and translating these images into text readable by my computer. But many of these programs were costly, inefficient, and sometimes even ineffective. I think if I can properly implement digital image processing skills learned in this class, I can improve upon what these programs do and make these assignments easier for not just myself, but others in the future.

My goals with this project would likely have to start small as I have about a month to work on this with my still developing skills. To start, I want to try to make these scans easier for a human to read. Increasing readability will help both people who read the scans as is, as well as make them hopefully easier to process for a machine. My next step would be to start reading letters, which I would likely have to train a machine learning (ML) algorithm (or find one) to accomplish this. I believe given enough time, I may be able to do this part but I am not confident the time I have will allow. Next, would be merging the two ideas by making these scans easy enough to read that the ML model can read the letters to a high enough degree of accuracy that one can properly understand the text provided.

I do not plan for much hardware to be required in this project but maybe I could find a way to implement a camera or scanner to attempt to do live readings(similar to Google's live translation), but that seems like an option to pursue further outside the timeframe of this class.

In terms of data, I plan on using the scans of documents from my history class, as well as finding my own data. For my own data, I would both search the internet, as well as possibly create my own data of scanned books that I own.

Project Idea 2: Mild Automatic Photoshop

The idea behind this project came when I took a headshot at the recent Bradley Job Fair. They had an area to prepare, lint rollers, mirrors, and more, before the shot. I took the time to get ready but, as someone who has a lot of hair, I tend to "shed" a bit, both in terms of loose hairs and dandruff. Personal problems aside, despite lint rolling myself just before, my professional headshot came back with a few hairs and flakes, not overwhelmingly so, but to a point that I would like them removed. I do not own a license to Adobe Photoshop or any other image editing software; I also do not know how to use an image editing software. But, I do know how to use Matlab/Octave.

My solution to my problem would be to write a program that can remove these unwanted additions from my image. From here, I seem to have two options, either manually find the locations of these blemishes, and then use filtering techniques from class to remove them or to find a way to have these automatically detected and then removed. I initially thought I may need a ML model to do so but I believe that if I can pick the correct mask values, I may be able to find a way to pick up these small annoyances without doing so manually or through the training of a ML model.

I do not anticipate the use of much hardware in this project. I believe that the main way I could do so would be using a camera and attempting to edit in real time. This will likely be determined by the time I have to implement and where my focus goes, such as focusing on better filtering or real-time operation.

I plan to collect data from my own images as well as look for other images online. Finding data seems to be a slight issue in the short term but I believe I may find resources if I look hard enough. As I do not plan on using a ML model, I believe that a smaller sample size of data may be enough to test and have a proof of concept.