

Lab Exercise 3

CS ELEC 2C

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Abstract

I INTRODUCTION

Convolutional Neural Networks (CNN) is one of the most if not the most popular neural network models for computer vision. They utilize a kernel for recognizing patterns within images. CNNs make use of the locality aspect of objects within images because of the kernel; instead of considering each and every pixel in the image, the kernel is able to take only a subset of that image and share weights or network parameters at many locations. Because of this, CNNs lead the way for image recognition in deep learning.

In this lab exercise, CNNs must be utilized to detect hair types. There are three main types to classify: curly, straight, and wavy hair.

1.1 Dataset

Figure 1 shows an example for each hair type in the dataset. It can be seen that much of these pictures are not in a controlled environment; these pictures have different lighting, backgrounds, etc. to introduce noise to the data. We'll see if different in preprocessing, modelling, and other aspects of the model can influence how it better learns given all this noise in the dataset.

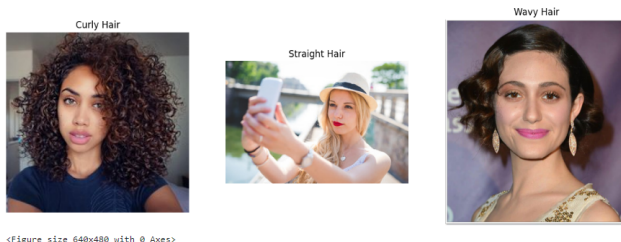


Figure 1: Hair Types Example

II METHODOLOGY

The methodology of this lab exercise follows the usual process for machine learning problems/researches

data \rightarrow preprocessing \rightarrow modeling \rightarrow evaluation

The preprocessing section mainly consists of splitting the dataset into training and testing data, checking the validity of data, as well as many others. The Convolutional Neural Network, like other neural networks, can be customized especially in the number of convolutional layers, different pooling methods, different kernels, etc. Unlike previous models, there really isn't much customization that could be done to them other than the hyperparameters to alter slightly how it works. But when it comes to CNNs, there's a lot more room for varying techniques.

Later in experimentation, we will see how customizing the CNN can affect performance for detecting these hair types. For evaluation, the accuracy metric is used to measure the model's performance.

III EXPERIMENTS

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IV DISCUSSION

4.1 Idea

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Figure 2: Elden Ring Picture

4.2 Another Discussion

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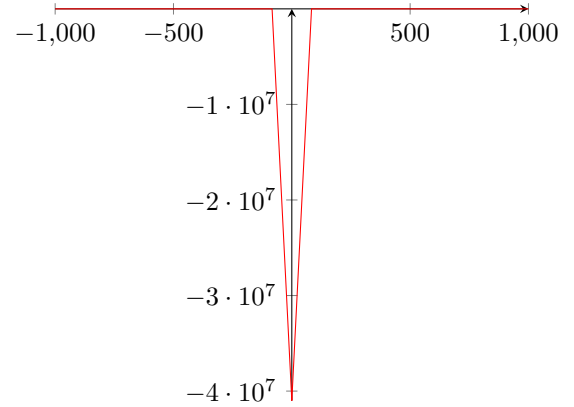


Figure 3: Plotting x^{-3}

V CONCLUSION

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Mitlöhner et al. (2016)

this is a reference (Gaines & Jermier, 1983) vs the regular reference Gaines & Jermier (1983).

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