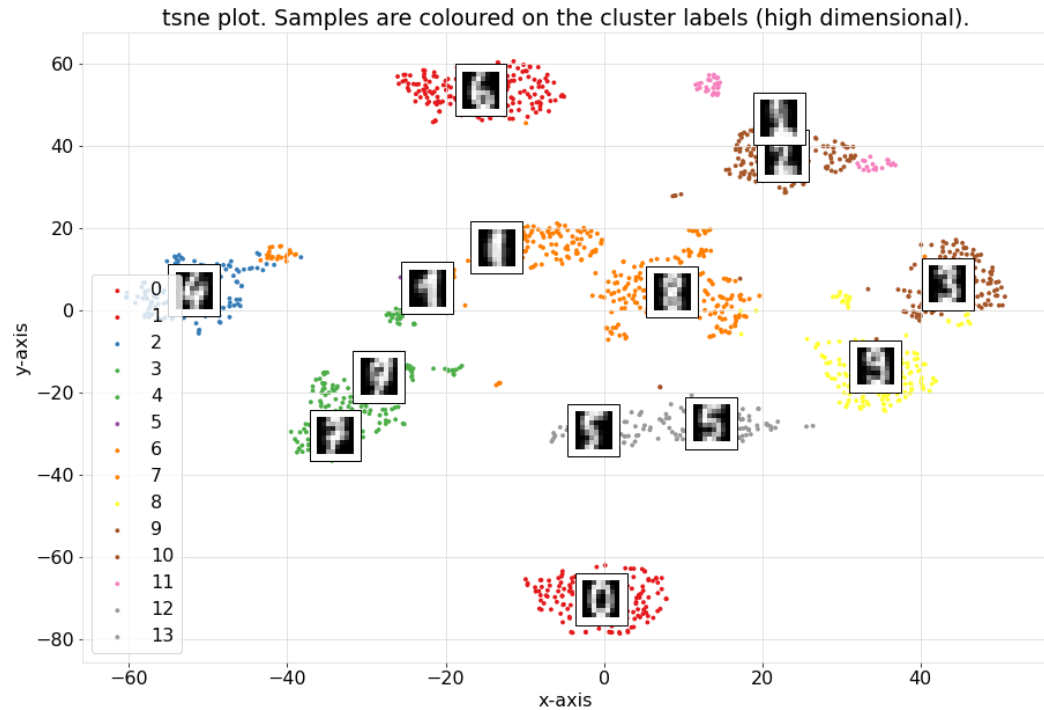


1. Introduction

- Our final project will be a number-recognition app that will have the capability of understanding and recognizing a number that is drawn. Essentially the user will be tasked with drawing a digit, where our app will have the responsibility of predicting the drawn digit.
- Questions
 - How can information within the dataset be divided?
- The remainder of the report will continue to explore and answer the ideas exposed above.

2. Body

- Data
 - This project will be utilizing the MNIST dataset. The dataset is a crucial aspect of training within the project, as it contains over 60,000 examples of handwritten digits. It is often used for training various image processing systems, along with being regarded as a general training set in machine learning as a whole. The dataset, through the appropriate optimizations, is capable of achieving near-human performance. Through the MNIST dataset to train our module, we should be capable of providing the module the resources to predict hand drawn digits. The module will use pattern recognition techniques to make its predictions.
 - The data set was created by Yann LeCun (Courant Institute, NYU) and Corinna Cortes (Courant Institute, NYU).
- Analysis
 - How can information within the dataset be divided?
 - Methods - The primary method performed was clustering of the data.
 - Analysis - The data was represented in a scatterplot, which was organized and separated into clusters that can be seen below:



- Conclusion - The dataset can be visualized within a scatterplot that contains clusters representing the data, which serves to demonstrate how the data is divided. Each cluster clearly represents a specific number ranging from zero to nine.

- Results

- Through continued development and a guided approach to develop the model, the model is capable of performing its required operations with a ninety-seven percent accuracy and one percent loss. The model gained these results through proper optimizations to the model, and the general effectiveness of the MNIST data set.
- Many failures were discovered throughout the development of the project. The primary issue and failure we had was the method used to process images for the model. Despite the high accuracy of the model, improper image input—through resizing, invalid lighting, or inaccurate coloring of the digit—contribute to an increased amount of inaccuracy that may prevent the model from accurately predicting the expected digit.

3. Conclusion

The report analyzes the capability of creating a number-recognition app through the use of the MNIST dataset developed by Yann LeCun and Corinna Cortes at Courant Institute, NYU. Through the appropriate optimizations and understanding of the data through a visual scatter plot cluster representation, the model is capable of performing at a ninety-seven percent accuracy and one percent loss.