Project Name Here

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1 Abstract

Neural network has been successfully applied to many machine learning topics such as speech and object recognitions, and machine translation in recent years. Neural network can learn new features automatically instead of doing feature engineering by hand, making it very power of dealing with complex problems.

In this project, we are going to adpot neural network techniques to do handwritten digits recoginition. The shapes of handwritten digits varies from people to people, thus are hard for simple machine learning algorithms to classify them. We will investigate how to apply neural network to this recognition problem.

2 Methods

Neural network

3 Resources

We plan to use the "Modified National Institute of Standards and Technology (MNIST)" dataset for training and testing. For comarison, we plan to use libraries from Python scikit-learn to perform the same recognition task (the "Expected to achieve" item).

4 Milestones

4.1 Must achieve

Implementation of a multi-classes classifier built on neural network.

4.2 Expected to achieve

Adopt other machine learning libraries other than neural network for the purpose of performance comparison.

4.3 Would like to achieve

Analysis of the result. Find out the reason about why one algorithm outperforms others.

5 Final Writeup

In the final writeup, we will first include the detailed mathematical representation of this neural network for solving this problem. The training and testing processes will be described in the final report as well. For the performance, we will include the training and testing results and the comparison (if we finished the "expected to achieve" item) of different machine learning algorithms. Furthermore, we will analyze the result (If we finished the "Would like to achieve" item) to find out possible reasons for one algorithm to outperform other algorithms.

6 Bibliography

1. Stefan Knerr, LCon Personnaz, and GCrard Dreyfus, "Handwritten Digit Recognition by Neural Networks with Single-Layer Training," IEEE.

2. Chris Bishop. Pattern Recognition and Machine Learning. 2006, Chapter 5.