Final Project Proposal

B351 / Q351

Basic Information

Project Title

Image classification using CNN

Short Project Statement

In this project, we will build a self-learning AI to classify images as “Airplanes”, “Birds”, or “Ships”, reserving the ability to add more classification categories later. Moreover, it is an implementation of the powerful Convolutional Neural Network (CNN) machine learning algorithm. The dataset we use is CIFAR-10 which consist of 60,000 32*32 colored images labeled in 10 classes like airplane, cat, deer, truck, etc. In our CNN, these images will go through convolutional, nonlinear, pooling layers, and fully connected layers, then they will be classified as one of the classes. In the dataset, we have 50,000 training images and 10,000 testing images. The main result will be the accuracy of the model. We will also create a user interface where people can select images from the testing set to test. The demonstration will be a PPT as well as a word document which contains the theory, some of the critical implementation and final results.

Team Members

1. Name Emma Cai
2. Name Aaron Leslie
3. Name

Background

Nowadays, there is a need to create AIs to free humans from tedious work. A part of these AIs are self-learning AIs which mimic the learning process human does. This project aims to build one using a Convolutional Neural Network to classify images. We will use CIFAR-10(Link) training set to train it and testing set to test it.

There are many existing solutions to this, which attempt to classify all 10 labelled classes given by CIFAR-10, listed on a leaderboard page (Link). We will attempt a simplified version of this problem, collecting the 10 classes into just 3. We expect our attempt to classify into 3 classes well, but not stack up to the best and more sophisticated 10 classification solutions.

This project can be very challenging. First, understanding the Math behind CNN and successfully implementing it can be challenging. Second, build a user interface can also be difficult since neither of us have experience with python GUIs. Third, how to communicate and collaborate efficiently and successfully finish the project as a team can also be a challenge.

Third-Party Libraries and Technologies

We will be using NumPy to do Matrix computation, Matplotlib to draw pictures and TkInter to complete the GUI

To demonstrate our knowledge of the project, we might won’t use libraries like tensorflow.

Deliverables

By the end of the project, we will have a GitHub repo contains all of our work.

More specific, we will have readme.md, the code, the doc file and a PPT.

Our program will be able to classify 32x32 colored images contained in the CIFAR-10 test file with some degree of accuracy, and the user will be able to select specific images to test and view the program's result.

Timeline

1. First Week (Nov.3~Nov.9): complete the final project proposals.
2. Second Week (Nov.10~Nov.16): finished the learning and most of the code for CNN before Check-in 1.

   (can be extended to check-in 2)
3. Third Week (Nov.17~Nov.23): finish all the code include the API before Check-in 2.

   (can be extended to next week)
4. Fourth Week (Nov.24~Nov.30): finish all the code and begin all sort of document include PPT
5. Fifth Week (Dec.1~Dec.7): complete finial report draft before Dec.9
6. Final Week (Dec.8~Dec.15): preparing poster and complete group reflection

Acknowledgement

Instructor Mentor 1_____ Signature _____

Instructor Mentor 2_____ Signature _____

Team Member 1_____ Signature _____

Team Member 2_____ Signature _____

Team Member 3_____ Signature _____