Proposal of project of ME532

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The CIFAR-10 dataset [1] has been selected for this project. This dataset contains 80 million tiny images, which includes airplane, automobile, cat and others. The goal of project is to train the model to detect cat images from cars and birds (6,000 images for each). Capturing the features of cat (like HW4Q1) creates the feature vectors and labels as training data to train the model. Using the test data to get the error and compare three algorithms. (1000 images will be selected for training, or less due to long running time).

[1][Learning Multiple Layers of Features from Tiny Images](https://www.cs.toronto.edu/~kriz/learning-features-2009-TR.pdf), Alex Krizhevsky, 2009.

https://www.cs.toronto.edu/~kriz/cifar.html

* Algorithm 1: Linear regression

1. Least square solution — Y = A\*w
2. Ridge regression – training model and testing model
3. Error rate — comparation with other algorithms

* Algorithm 2: Hinge loss, SVM

1. Max margin classifier — midpoint of two classes
2. Cross validation — soft margin
3. Calculation of misclassification

* Algorithm 3: Neural Network

1. The number of layers: 2
2. 2/3 input nodes + output nodes
3. Selection of randomly weights — Features \* weights + bias
4. Adjustment of weights

GitHub Link: https://github.com/wanrum/ME573-Project.git

Timeline of Project

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| --- | --- |
| Tasks | Time |
| Algorithm 1 | Nov 2 |
| Algorithm 2 and The First Report | **Nov 17** |
| Preparation of Algorithm 3 | Nov 23 |
| The Second Report | **Dec 1** |
| Coding of Algorithm 3 | Dec 4 |
| Preparation of report and Submit Results | **Dec 12** |