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CIS 330

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26 April 2019

## Project Proposal

We will implement a facial recognition system to identify between a dog and cat, utilizing neural networks to solve the problem. Specifically, we want to execute a program that can identify the difference between a dog and a cat by using only profile pictures (full frontal facial shots of a subject). The program must be able to identify landmark facial features of a dog and a cat, such as noses or ears, through a process of machine learning. Therefore, the aim of this project is to create a neural network that corresponds to the particular machine learning task of supervised learning in order to perform the desired task of classification of images. In order to achieve an optimal neural network system, we must implement several key features of selection, extraction and classification of an image in order for the system to be able to learn and form correct decisions.

Our first priority is to create a working feature selection process to identify either: specific landmark features, feature-based algorithm, or identify the face in its entirety, holistic algorithm. There are three common strategies to feature selection: the *filter* strategy, the *wrapper* strategy, and the *embedded* strategy. We will identify the best suited strategy after doing a substantial amount of research and analysis on neural networks and facial recognition. After identifying the relevant features, the program will extract those features and ultimately classify the image.

Milestones:

- 4/28 – Research and analysis:

    ⇒ Neural networks

    ⇒ Machine learning; supervised learning

    ⇒ Front/Back propagation

- 4/29 – Find a working baseline code and check with instructors to ensure that it is the best fit. Then begin importing into C/C++.

- 5/6 – Find/Gather a large data set of suitable images of dogs and cats. Begin modifying code to adapt to our specific requirements.

- 5/13 – Check-in with instructors to ensure we are on the correct path without unnecessary deviations and errors. Implement a working supervised learning algorithm.

- 5/20 – Check-in with instructors. Implement front/back propagation.

- 5/27 – Check-in with instructors. Possibly implement a learning rate by using a weight update of the neural network.

- 6/3 – Perform final testing and debugging to ensure a proper working program.

- 6/7 – Submit final project.

* This is a tentative schedule; any changes will be notified to the instructor. *