CS – 5143 MOBILE APP DEVELOPMENT
Grad Assignment

According to IBM Cloud Education, machine learning is a subset of artificial intelligence and computer science that utilizes data and algorithms to mimic human learning processes, continuously enhancing its accuracy over time. It's a rapidly expanding field, omnipresent in both academic and industrial discourse.

Apple's CoreML serves as a robust platform for executing machine learning operations. As per the documentation on developer.apple.com, CoreML employs machine learning algorithms to develop models capable of making predictions on previously unseen data. This technology finds application across various domains, including image classification, object detection, and numerous other machine learning tasks.

Once a model is created and saved as an mlmodel file, it can be seamlessly integrated into projects and applications. Subsequently, when users input fresh data, the app leverages CoreML APIs to make predictions based on the provided data.

Core ML is built upon low level primitives called Accelerated and BNS, and Metal Performance Shaders. Several Machine learning tasks are then built on top of CoreML which then let our app take advantage of the various tasks.

CreateML is another part of the swift ecosystem that does the actual training part of this project. Instead of training the model outside Swift ecosystem and then converting the model into mlmodel format, CreateML ensures that you can train your model end-to-end and get an mlmodel directly.

How it works?

We train a model to recognize patterns in our data be it image, text, or sound etc. In this case our image data are put in different folders according to the classes. This is done for both training and testing data. The model is trained on the data and evaluated. Then it is tested on the test set to see how it performs on unseen data.

A lot of time we may have to go back to the drawing board to collect more or better dataset, etc. and so Machine learning task may be described as loop. Collect Data, Train, Evaluate, repeat.

Box Car Corrosion Prediction

For our project we have harnessed the power of COREML and CREATEML to build an app which can predict the boxcar's corrosion level.

1. New

2. Little Rust

3. Moderate Rust

4. Severe Rust

5. Fully Corroded


These are all the images used to create the ML and train.

After we trained our model in the CREATEML, the ML model is then downloaded and placed in the project navigator.

Once our model is in the navigator, we can create a class of it. Say our model is BoxCarsClassification.mlmodel, we can create an instance of the model as follows :

let model = BoxCarsClassification()

This creates an instance of the model in our swift ios project, and from there we can use the instance to predict our data.