# Capstone Project #2 – Proposal

## Finding Airports in the Landscape Photos

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**1. Problem**:

Aerospace is the one of the biggest industries in the world. The emerging side of the aviation is unmanned vehicles. Nowadays UAVs are being used by the operators remotely using different kind of control mechanisms which uses electromagnetic spectrum. After some of the popular ongoing developments, some autonomous features will let these vehicles control themselves by the help of AI/ML applications. One of the most important specifications will be the classification of their captured images. I thought one of the basic classifications for aerial pictures would be the aerodromes detection. As it is developed for autonomous cars, they can recognize important variables for the traffic such as traffic lights, crosswalks, pedestrians etc. For UAVs, those should be other aerial vehicles, urban areas, aerodromes, control towers etc. My goal is to contribute to these developments by providing a ML model which conducts deep learning on the aerial pictures to classify the aerodromes.

**2. Client:**

ICAO, Flight Safety Management Systems, Commercial and Military Aerospace Companies, Airline Companies, Air Forces, Any company which searches its future in UAVs.

The results can contribute to the classification of land building in the aerial pictures..

**3. Data:**

NGS Aeronautical Survey Program Photo Gallery is providing air images of approximately 300 secondary airports in USA.

Fig: Air picture of Windsor Locks airport in Connecticut

I will enrich the database with downloading locations satellite images from google maps which includes aerodromes and the ones not includes aerodromes.

https://www.ngs.noaa.gov/AERO/ASPphoto/aspphoto.html

https://www.google.ca/maps

**4. Methodology:**

By building a convolutional neural network the images which includes airports, runways or aerodromes will be classified as the target classification. By using other images that include different landscapes, ML model will classify 0s and 1s.

By collecting more images, the database will help a better ML performance and it will result high accuracy, precision and recall. We might use Keras or Tensorflow libraries.

In general, we can use three methods. Unsupervised Classification, Supervised Classification and Object-based Classification. Supervised and unsupervised are pixel-based approaches to the model. And these methods perform better for the low-resolution images like the images we will use in the data base. Object based approach is mostly being used with the high-resolution image collection. I will decide on the method once I reach the project's progressive phases.

**5. Deliverables:**

This analysis will be presented as a report explaining the process and results. Additional information including raw data, codes and ML model will be stored on a GitHub repository.