

# Open Program Plan

ADS MINOR

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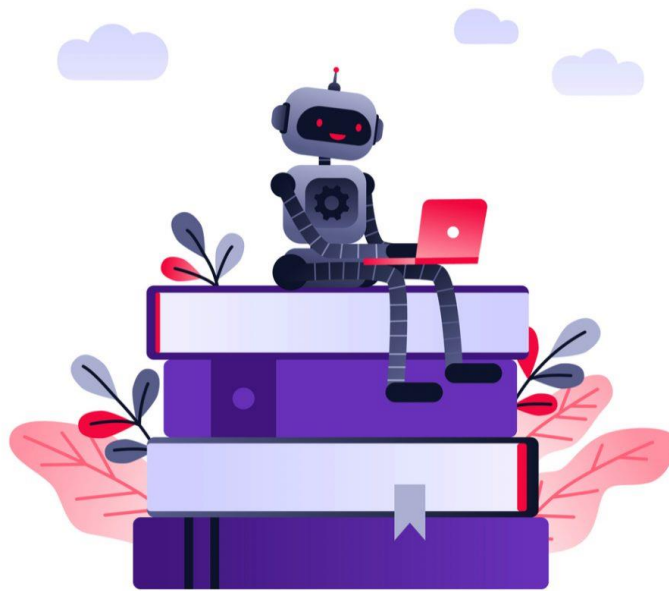


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## INTRODUCTION

The purpose of this document is to provide information about the Open Program of the ADS Minor. Below, the problem will be described, the goal and the methods that I will be using to achieve it.

## PROBLEM

Having done only the ADS-B specialization, I am aware that I might be lacking some of the knowledge acquired in ADS-A. This inevitably will turn into a problem in the later stages of this minor with the upcoming projects and challenges. Thus, I believe the Open Program is a great opportunity to spend my time in catching up with the theory and practice of ADS-A.

## GOAL

The goal that I want to achieve through this Open Program is foremost to understand the concepts behind Machine Learning and to be able to apply them confidently.

My milestones for the Open Program will be in the following order:

- **Understand k-NN, decision trees, SVM, k-means**
- **Apply these algorithms in small exercises** (i.e., from a course)
- Come up with a **bigger challenge experiencing predictive analytics**. For it, the following would be done:
  - Find a dataset (since I am a huge movie fan, I thought maybe using <https://www.kaggle.com/tmdb/tmdb-movie-metadata> or <https://www.kaggle.com/rounakbanik/the-movies-dataset> dataset might be interesting)
  - Applying EDA
  - Do predictive analytics in a Jupyter Notebook
  - Showcase the results/findings, conclusions, and recommendations

## RESEARCH METHODS

In order to have a structure in the Open Program, I will be using the DOT-research framework. It fits well with applied research as it uses existing knowledge to solve problems in practice. Additionally, I will make use of [the ICT Research Methods for Machine Learning Engineering](#).

Objectives	Method	Explanation
Understand the ML algorithms of ADS-A	Literature study (Library)	By reading and searching of explanations on the algorithms, I would be able to understand them and have the necessary theoretical foundation of ML.
Apply the ML algorithms of ADS-A	Proof of concept (Workshop)  Best, good & bad practices (Library)	Note that here I do not mean that applying the algorithms would end-up in a product, but just small exercises that would build my confidence in the ML field.  By “getting my hands dirty”, I want to evaluate what works for me – which algorithms I find easier and which I need to spend more time on. I want to see what algorithms work for my desired solution.
Collect the data & understand it	Document analysis (Field)  Literature study (Library)	To understand the data, I will be working with.  To identify possible ML algorithms for my challenge.
Applying EDA	Exploratory data analysis (Field)	To find something interesting in the data.
Do a data quality check	Data quality check (Lab)	To make sure that the data used is of sufficient quality to base further conclusions on.
Do model validation & evaluation	Model validation (Lab) Model evaluation (Lab)	To ensure correctness of models (i.e., detect overfitting). To verify the correctness and usefulness of the results of the model

\*During this Open Program I will request feedback several times in order to be certain that I am on the right track. (Laboratory)