# Advanced Cloud Detection

*2019 ESA Summer of Code in Space*


## Yasser Kassif

The University of Texas at Austin


## Contact Details:


- Location: Austin, Texas, USA - Time Zone: CDT (GMT-5)
- Email: yasser@utexas.edu, Phone: +1(832) 231-0902, Skype: ykassif
- Github: ykassif, Gitlab: yasserk7


## About Me:

I am a mathematics and computer science major at the University of Texas at Austin where I excelled in my classes and I hope to pursue a PhD in Machine Learning after graduating in 2020. I am passionate about using data to gain a deeper understanding of the world. Thus, I was a Teaching Assistant for a Data Mining class where I taught students the inner workings of various Machine Learning algorithms. Also, I worked at a cryogenics laboratory where I developed models finding the best chemical compositions for quantum cooling using Machine Learning. I hope to use my skills and talents in this opportunity with the ESA and Skywatch to effictively complete this project and to dive into the world of open source code.

# Experience:

*The skills and experiences that qualify for this project*

- Technical Skills:
  - Python - including libraries such as numpy, pandas, and scikit-learn
  - SQL
  - R - including CARET, nnet, and e1071 libraries
  - Java - experience with Machine Learning and Android Development
  - Misc: Git, Docker, and Bash
- University Courses:
  - Data Structures, OS, etc - learned the fundamentals of computer science
  - Software Engineering - learned git and how to properly work within a team and how to design clean and efficient code
  - Data Mining and Artificial Intelligence - learned the fundamentals of machine learning
  - Math Courses: Numerical Analysis, Applied Linear Algebra, Number Theory, and Complex Analysis

*These example notebooks I made as a Teaching Assistant will demonstrate my ability in developing machine learning algorithms using scikit-learn*

- Tutorial #2: Decision Trees = Guides student through implementing decision tree algorithm for classification on a real dataset.
- Tutorial #3: Naive Bayes and KNN = Walks the student through implementing Naive Bayes and KNN classification algorithms on a real world dataset.
- Tutorial #4: SVM and Neural Nets = Teaches how to implement SVMs, Neural Nets, and Ensembling methods for classification.
- Tutorial #5: Clustering = Helps student learn how to implement various clustering algorithms.

## Project Abstract:

To combine commercial satellite imagery with varying degrees of cloud mask quality with external data sources such as weather and basemaps to advance cloud detection capabilities using various Machine Learning algorithms.

## Why Me?

*Why should I be selected and what sets me apart from the other student applicants*

- I already have experience as a Teaching Assistant for machine learning classes which required me to have a deep understanding into the how Machine Learning algorithms work and how to code them.
- I have undertaken courses on the topic of code design and strive to write clean and well documented code. My github profile is a testament to this fact
- I have deep interest in the field of Artificial Intelligence and specifically machine learning. This opportunity will allow me to utilize my existing skills and expand them into the world of open source code while helping SkyWatch more accurately detect clouds.
- I have a great deal of experience in developing classification algorithms from my time in the Schroeder cryogenics laboratory at the University of Texas.
- I am located in Austin, Texas. A big tech hub in the United States with a vibrant coding community that I actively participate in. I plan to attend Capital Factory meetings where I could seek out help and insight from engineers from companies such as Google and Anaconda (an open source contributor to the jupyter project)

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