A bird's-eye view on the habitability of exoplanets via statistical learning techniques

Project for the exam: Machine learning, statistical learning, deep learning and artificial intelligence - Unsupervised Learning

Marzio De Corato

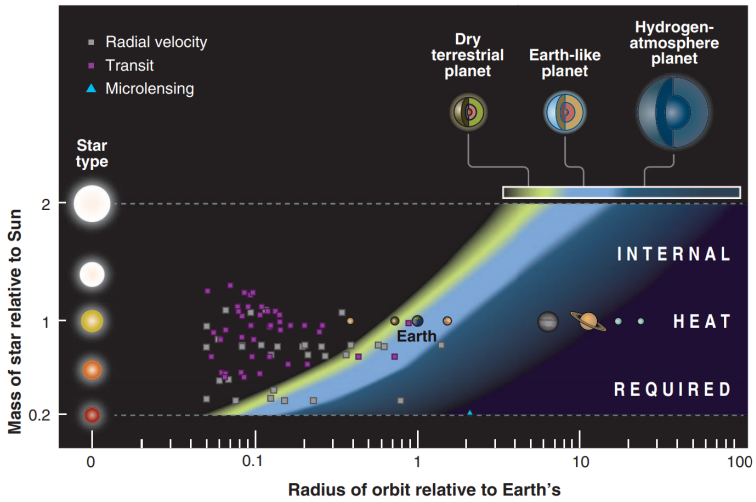
October 27, 2020

Overview

- **FINAL GOAL**: Survey the performances of different statistical learning algorithm in the prediction of exoplanets habitability
- **DATASET**: Planetary Habitability Laboratory @ UPR Arecibo [1]
- **ALGORITHMS**: Decision Tree, Random Forest, Support Vector Classifier, Logistic Regression, Linear and Quadratic Classifier

Exoplanets habitability - theoretical background

- **HABITABILITY**: Rocky planets where water is present in liquid phase
- **LIQUID PHASE OF WATER**: At first order, if water is present, the liquid phase is controlled by the surface temperature
- **ATMOSPHERE**: The atmosphere (CO_2) influences the surface temperature trough the greenhouse effect
- **H_2 and CH_4**: Other gases such as H_2 and CH_4 can produce the greenhouse effect, thus the habitable zone can be extended



References I


http://phl.upr.edu/projects/habitable-exoplanets-catalog/media/pte.