

Preface

This project was conceived in part for the fulfillment of the Semester IV Project for MSc Data Science and Spatial Analytics at Symbiosis Institute of Geoinformatics, Pune in academic year 2022.

The field of crater counting has for the most part been a giant effort from geologists, using manual methods for purpose of crater counting and in turn, age dating of planets such as Mars and Mercury and moons such as Earth's Moon. Automation in crater counting, however has been a long-known concept, albeit, difficult to implement and rather inaccurate at times.

My motivation for this study was the summer project I had performed at Symbiosis Institute of Geoinformatics. In my previous project, I tried implementing world class neural networks such as YOLOv5 classification algorithms to detect and classify craters. However, accuracy was not up to par, and the work of labelling thousands of craters is a time consuming and tiring process. The idea of using Generative Adversarial Networks was to create high quality synthetic image samples, that would aid such classification algorithms. This study therefore aimed at comparatively analyzing the best GAN models in existence, for the purpose of creating such synthetic crater datasets.

As the project has reached completion, the goals of the projects have been achieved, and it is clear that appropriate use of appropriate GAN models will definitely improve the future class of crater detection algorithms that I may work on. I have learnt tremendously from this opportunity and find myself more knowledgeable about this subject than I ever would have, if I had not carried out this project.