

Mission Space Lab Phase 4 report outline



Team name: Alpha Robotics

Chosen theme: Life on Earth

Organisation name: Palatul Copiilor Târgoviște

Country: Romania

1. Introduction

We aimed to transform the raspberry into a meteorological satellite in accordance to the types of clouds visible by the camera, thus creating a live weather forecast.

2. Method

We identified meteorological phenomena according to the types of clouds using the visible light camera, thus transforming the raspberry into a meteorological satellite and creating a live weather forecast. We used OpenCV and the Coral module to differentiate clouds and identify meteorological phenomena. After the image was captured, our sorting algorithm finished, the image is saved along with all related information such as type and coordinates in its metadata.

In the final step, our code created a country-wide forecast, using a CSV file with the following format:

Date/time	Country	City	Weather
2022-04-30_10-16-22	MA	Agdz	sunny
2022-04-30_10-16-36	MA	Mhamid	sunny
2022-04-30_10-16-46	MA	Mhamid	sunny

The data was trained using Google Teachable Machine and in terms of the Coral module, it was used for the data analysis.

3. Experiment results

Our project took the raw photo that looked like this:

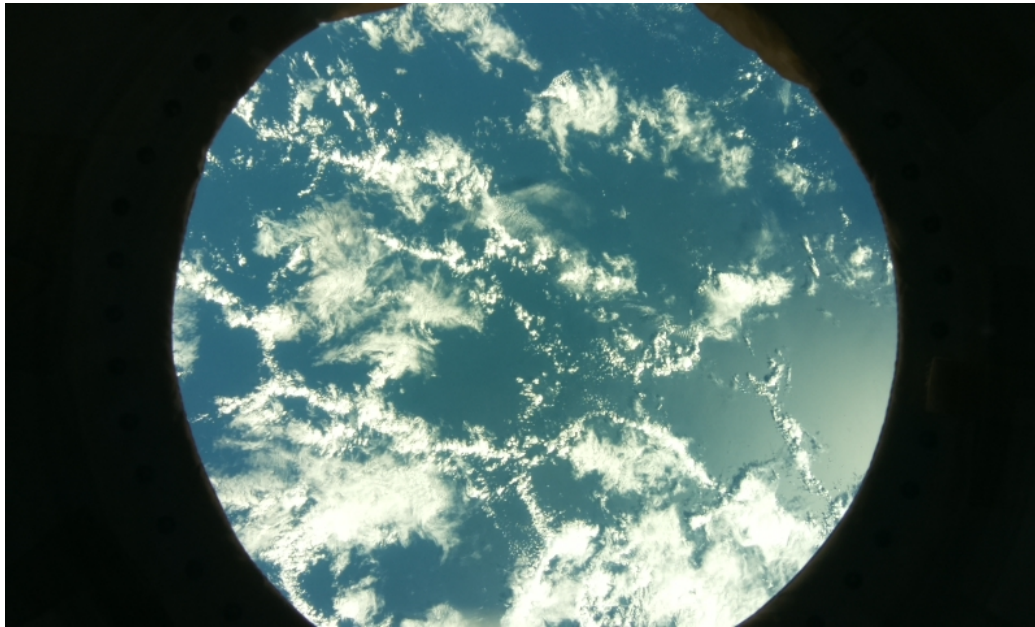


Figure 1: Raw image

After that, our algorithm used Reverse Geocoder to get the country and city, and PyCoral to determine the weather based on cloud patterns, giving us an output that looks like this:

Date/time	Country	City	Weather
2022-04-30_10-36-32	MG	Tranovaho	cloudy

4. Learnings

Due to Covid, most of our work had to be done online, using the VSCode LiveShare extension. We had some challenges getting started with the coral accelerator, but thankfully the phase 2 guide had everything we needed. We never did image classification before, so this was a whole new experience, thus helping us learn a lot of stuff. Next time we would surely do something more complex, putting our new skills to use

5. Conclusion

In conclusion, our experiment's classification was unexpectedly accurate thanks to our sophisticated model. We have learned how to use the Coral module, work with the geographical data and deepen our understanding of Python. Overall, it was a very fascinating and delightful experience. With the task at hand, the new hardware was a huge aid. Going back to the experiment findings, as we said, the results were surprising even compared to our tests, being exactly what we were expecting, a detailed CSV weather forecast, alongside the images and their metadata. Next time we plan on doing something more complex, putting our new skills to good use.

6. Additional notes

We have created a github repository that contains the project data (received-data branch) and source code (main branch).

<https://github.com/AlphaTeamRo/astro-pi>