Search For Extraterrestrial Intelligence: Reverse Image Search

Corrina Wu

Github Repo

Define the problem

What is the question your project is attempting to answer?

The Breakthrough Listen project attempts to identify signals from extraterrestrial intelligence from the signals the radio telescopes received around the world.

Where does your project fit within the broader conversation/controversy surrounding your topic?

The border conversation on this topic would be the possibility of the existence of extraterrestrial intelligence. My project uses the signals received from radio telescopes to explore the possibility of the attempted communication from extraterrestrial intelligence.

Goal

In my part of the project, the goal this semester is to try to develop a program that can identify similar patterns in the data based on a known interference using reverse image search.

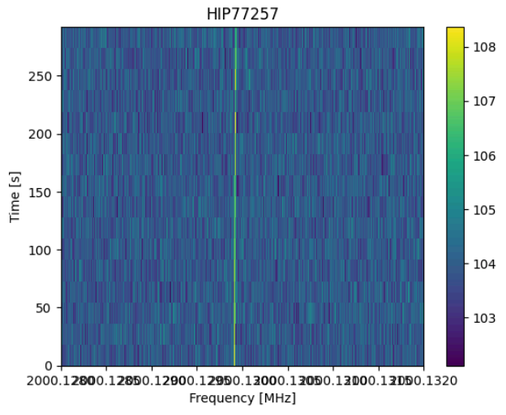
The Data

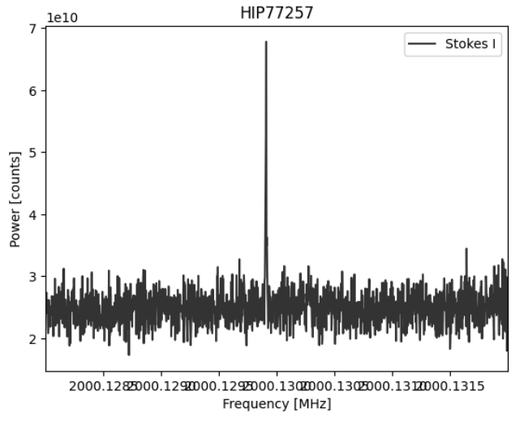
Where does it come from? What bias might be present in the data?

The data come from radio telescopes around the world. Possible bias could be the interference in our environment such as WiFi signals, satellite, and GPS. There could also be biases in our own concept of what ET signals look like.

What were some of the other issues with the dataset? How did you deal with those issues?

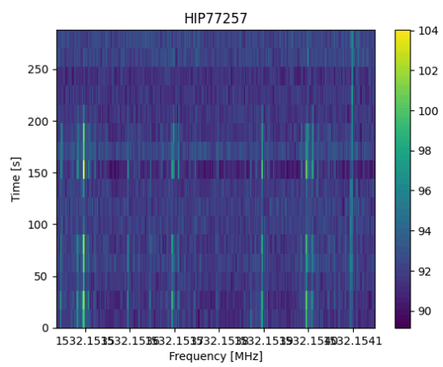
It was difficult to interpret what each set of data mean by looking at the numbers. Using graphs to visualize the data can increase interpretability of the data considerably.



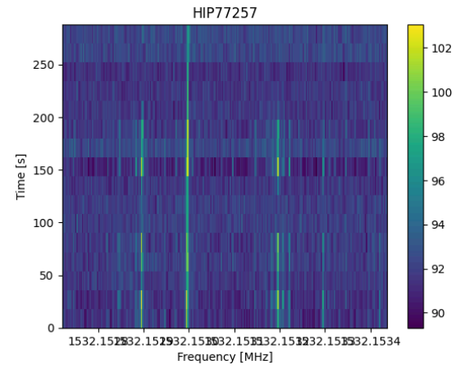


The Model / Solution

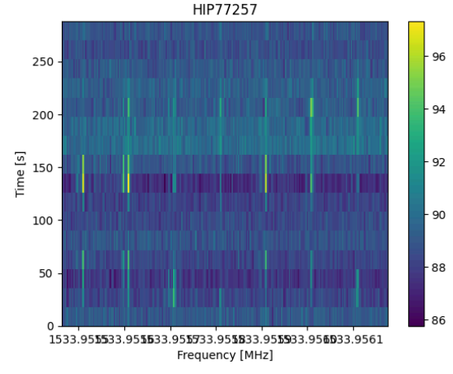
I used the imagenet of ResNet50 after preprocessing the data. I was able to find the nearest neighbors that are similar to my target interference pattern based on euclidean distance and cosine similarity.



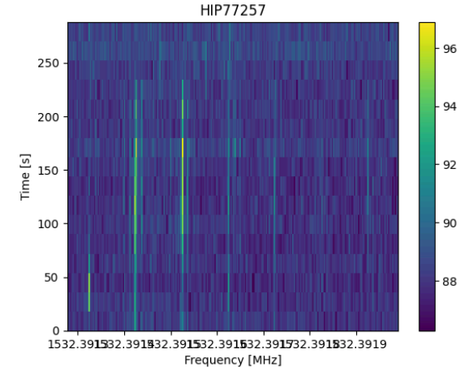
Target Interference Pattern



1st Nearest Neighbor



2nd Nearest Neighbor



3rd Nearest Neighbor

Impact / Next Steps

This program can be used to eliminate the interference with similar patterns to all the known interference in the enormous amount of data so that it will be easier to find the signal that are potentially from ET. Future work could be testing and improving the accuracy and efficiency of the program so that it can be ran on a larger scale.

Acknowledgements

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