

6G Simultaneous Sensing and Sensing

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Overview

The goal of that project is to get data using a radar and a camera. We need to do some data processing to extract feature from both input. The radar will be used to get accurate distance and angle. The camera will be used with YOLOv8 to get object detection and recognition.

Acknowledgement

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- Finally, all WinLab for their welcome for this internship.

Future works

- Create own program for radar
- Upgrade the python program so it is faster
- Implement a new environment
- Get a real fusion between camera and radar

Advantages

- Camera and radar are cheaper than a LIDAR.
- Robust to the weather.
- Recognize object faster with the camera
- Low energy consumption
- Less moving part so less risk of problem

Hardware/Software

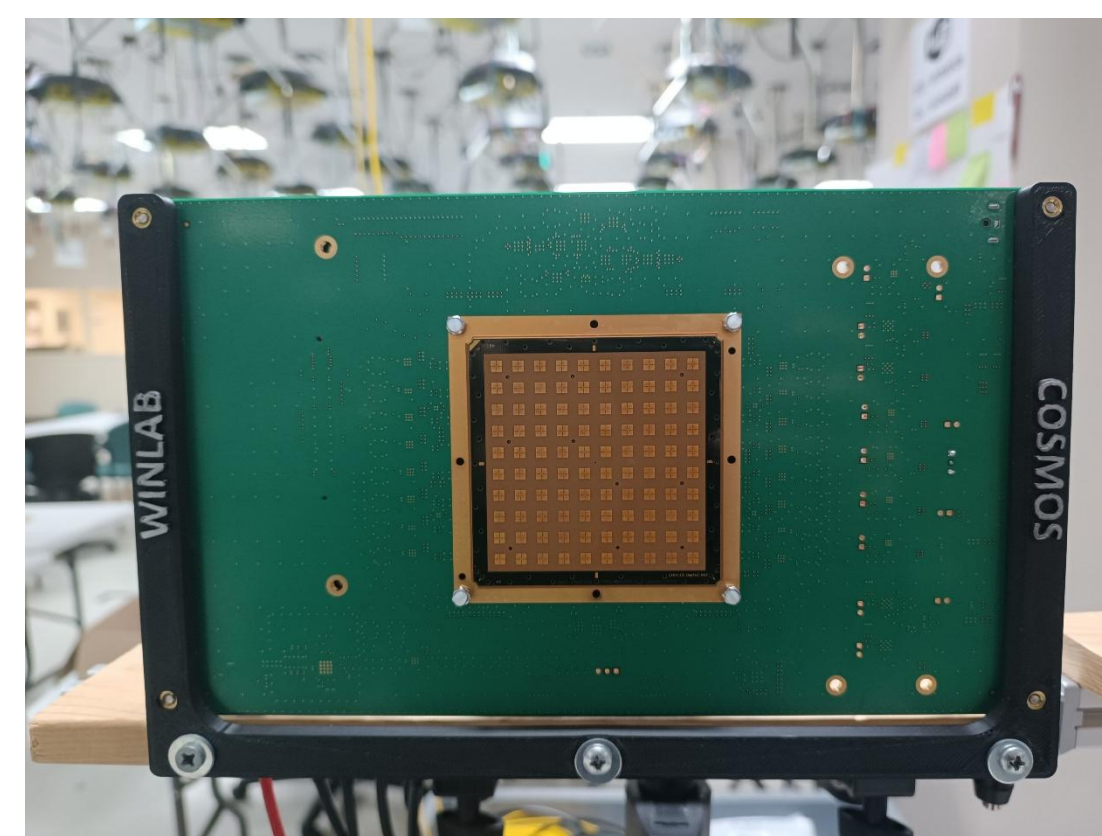
Camera

We developed this project using an integrated camera from a laptop and a ZED 2i camera



Radar

For the radar, we are using 2 IBM 28GHz phased-array antenna array (PAAM) running with 2 TX and 2 RX antennas



Progress

To start the development, we started by working on the camera. For the camera, we used YOLO. After testing multiple versions of yolo, we decided to use yolov8 because it is fast, stable and it has proven its use in multiple projects.

The program is made it output files containing video and log of detection. It is made so you can choose the classes to detect and the length of the output files.

For the radar, we are using O-JRC platform. We adapted the code for our setup. We verified the distance estimation works well but the angle resolution was low. We also observed that it works for only one target.

