This project focused on simulating IIoT sensor data using MQTT, CoAP, and OPC UA, and visualizing it in real time. My personal goal was to build a working multi-protocol simulation and gain experience using GitHub Desktop and Python outside of a notebook environment.

I was responsible for implementing the MQTT sensor simulation, setting up the visualization script, and ensuring the data pipeline worked in real time. I also wrote the final report sections, created the visual output, and handled uploading everything through GitHub Desktop.

I learned how MQTT works and how it compares to CoAP and OPC UA, especially in terms of reliability and ease of use. This was also my first time structuring a multi-file Python project in a virtual environment and managing it with GitHub Desktop instead of using Jupyter.

I initially struggled to set up my GitHub Student account and later faced errors while installing and using libraries like aiocoap and asyncua. I overcame these by focusing on getting MQTT fully functional and tweaking the visualization script to run without threading errors.

The knowledge I gained about protocols, library debugging, and project structuring will be useful for future IoT, data visualization, or automation projects. If I return to this project, I’d improve it by adding proper CoAP/OPC UA support, and possibly containerizing the entire setup for easier deployment.