**Methodology**

Sensors

The wearable device includes a VL53L0X Time-of-Flight Ranging Sensor, LSM9DS1 iNEMO inertial module (3D accelerometer, 3D gyroscope, 3D magnetometer).

The Web Interface

We made a website that acts a central device for pairing the wearable device through Bluetooth connection. The main purpose of the web interface is to act like a server, this will handle the training for deep neural networks and monitor the system for live plotting. It includes the summary (training and validation) of the trained model that will be helpful for data analysis. The data collected sent by the peripheral device are stored in an array before the model is trained then the C-header file containing the hex array will send back to the device through Bluetooth file transfer by a block of 128 bytes of data iteratively.

Peripheral

The Arduino Nano 33 BLE Sense is the motherboard of the wearable device. The purpose of this peripheral device is to send data to the web interface to retrieve the hex array content of the C-header file that will be used in position tracking. The web interface and the wearable device has its compatibility when sending or receiving data using the CRC32 file checksum. It will check if the two are similar after the file transfer is complete, if it is not, the model import will be cancelled. This happens because of the noise interference such as network errors and disk write errors.

Data analysis