Telecommunication Application Project 2022

Arttu Leinonen, TVT21SPL
Information Technology, Device and Product Design
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Introduction

Goal of this project is to create machine learning algorithm that can identify which direction is Arduino microcontroller facing (up,left,down or right) based on data from GY-61 sensor.

Objectives

The first objective of this project was to measure raw data from gy-61-acceleration sensor and send that data to rasberry pi with RF- module and forward that data to SQL database.

The next objective was to read that data with your own python script and filter that data for learning algorithm. Final obejective was to program learning algorithm with python.
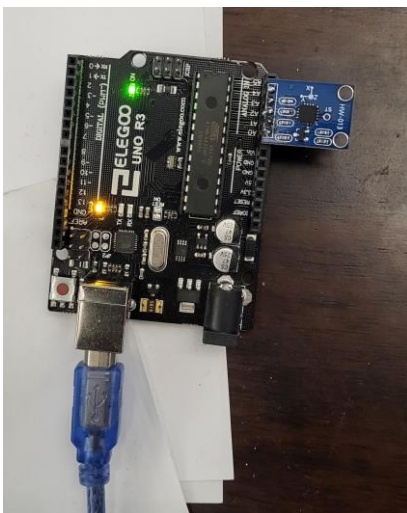

Figure 1, Arduino with gy-61 sensor.

Methods

Arduino application was used to create program which can measure raw data from GY-61 - sensor and send that data to rasperry pi with the help of RF receiver and transmitter module.

Python program that fetched data from SQL database and used mysql connector libary.

Machine learning algorithm was a simple 4-means algorithm which divides sensor data to 4 different categories (up,left,down or right).
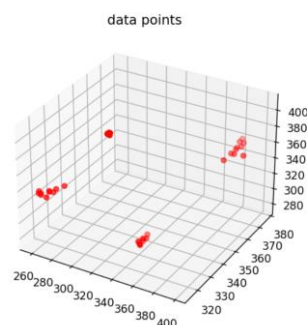

Figure 2,Test data divided to 4 different categories.

Results

Machine learning alogorithm was able to sort seonsor data to 4 different categories with nearly 90% accuracy.
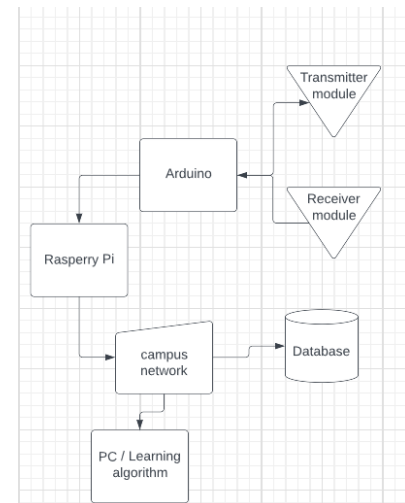

Figure 3, Project layout.

Conclusions

At the time of writing this poster, the project turned out to be a way more diffucult task than first anticipated.

All problems that occured during project were solved eventually with time or with the help of teachers.

This project was a good learning experience about wireless data transfers, python and c++ programming

References

1.Python libraries:

https://numpy.org/doc/stable/reference/ ,
https://matplotlib.org/stable/api/index.html ,
https://pandas.pydata.org/docs/reference/index.html

2. K-means example:

https://towardsdatascience.com/knn-using-scikit-learn-c6bed765be75