

Telecommunication Application Project 2022

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IN00CS94 – 3002 Telecommunication Application Project 11op

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 raspberry 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 objective was to program learning algorithm with python.

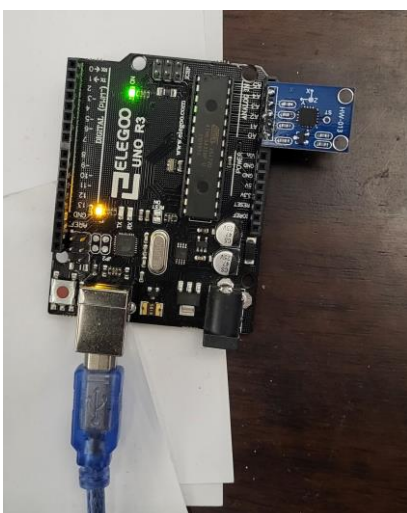


Figure 1, Arduino with gy-61 sensor.

Methods

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

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

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

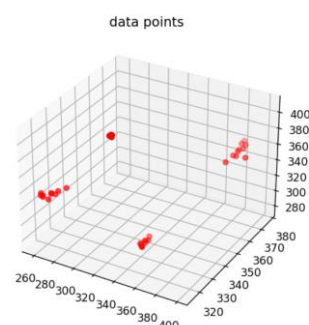


Figure 2, Test data divided to 4 different categories.

Results

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

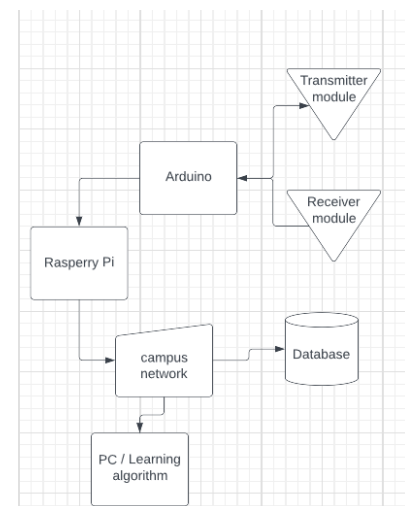


Figure 3, Project layout.

Conclusions

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

All problems that occurred 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>