

SIT225 Data Capture Technologies

Pass Task: Plotly data dashboard

Overview

Plotly Dash apps give a point-&-click interface to models written in Python, vastly expanding the notion of what's possible in a traditional "dashboard". With Dash apps, data scientists and engineers put complex Python analytics in the hands of business decision-makers and operators.

Hardware Required

- i. Arduino Nano 33 IoT device,
- ii. USB cable,
- iii. LSM6DS3 module on the Arduino Nano 33 IoT for Gyroscope data.

Software Required

- i. Python 3.
- ii. Plotly Python library

Pre-requisites: You must do the following before this task

Week 6 activities in the unit site.

Task Objective

In this week, you have learned how to use Plotly Dash for visualisation. In this task, you will need to use Dash to create visualisation of Gyroscope data which has 3 variables x, y and z. You will need to collect at least 10 minutes of data (or reuse previous week's Gyroscope data) and plot data so that the graph can be navigated interactively.

Steps:

1. Connect the sensor for collecting data samples, if previous week's data is not available. Make sure you perform different activities during the data collection so that interesting patterns are observed during data analysis.
2. Data should be available in CSV format.
3. Create a Plotly Dash app to create graph on Gyroscope CSV data with below requirements. You should explore Plotly online documents as appropriate.
 - a. Graph types should be selected based on a drop-down menu including, but not limited to, basic charts (scatter plots and line charts) and statistical charts (distribution plots).

- b. Interactively select data variables x, y, and z with options to select either of them or all of them using a drop-down menu.
 - c. Interactively select number of data samples to display in the graph. A text box can be suitable for the user to input the number of samples, the graph is then updated accordingly. In case the number of samples is less than the total number of samples, there should be a next/previous button for navigation through the data, clicking on the navigation button previous (or next) N samples are displayed.
 - d. Create another visual, such as table, to summarise the data currently being displayed in the graph such as statistical properties. This summary needs to be updated if the graph changes due to user action on the graph UI.
4. You can use Dash in Python Jupyter environment (such as Jupyter Lab) or create Python script (.py file) and run your app in command line as per your convenience.

Submission details

Q1. Perform week 6 activities mentioned in the unit site and produce outputs.

Q2. Paste Plotly Dash Python code and explain the program steps, how plots were generated, and interaction was handled. Provide insight on each plot w.r.t. the data segments.

Q3. Create a video in Panopto/CloudDeakin showing your program execution, graph output, user interaction and share the video link here.

Q4. Create a subdirectory 'week-6' under directory 'SIT225_2024T2' in your drive where you copy the Python script file, Arduino sketch file if any, data file and the generated graphs. Commit and push to changes to GitHub. Include the link to your repository here with a GitHub page screenshot of weekly folder content. A tutor may try to access your GitHub link, if necessary. Give access to your tutor by adding tutor's email address as a collaborator of your **private** repository.

Instructions

Consolidate outputs following the submission details above into a single PDF file.

Submit your work

When you are ready, login to OnTrack and submit your pdf which consolidates all the items mentioned in the submission detail section above. Remember to save and backup your work.

Complete your work

After your submission, your OnTrack reviewer (tutor) will review your submission and give you feedback in about 5 business days. Your reviewer may further ask you some questions on the weekly topics and/or about your submissions. You are required to address your OnTrack reviewer's questions as a form of task discussions. Please frequently login to OnTrack for the

task ***Discuss/Demonstrate*** or ***Resubmit*** equivalent to fix your work (if needed) based on the feedback to get your task signed as ***Complete***.