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Assignment 8 Project report

System architecture and approach

In Dataniz we build the structure of our system using two smart fridges and a smart dishwasher. These devices have boards and sensors that match the device. When active, Dataniz generates and sends information about its devices to MongoDB and MongoDB stores it into a database. It is stored in a collection named after the link name used and virtual. Next we connect to our TCP server and client using python. We run the TCP server, then the client and enter the needed connection info. We then tell the server which query we want. After receiving the query from the user, the server requests and receives the data from mongodb via pymongo, searching for the collection name and then the sensor for whichever data is needed. Moreover, we need to generate data from Dataniz and create data to work with. In the code, we also use the most recent data made in case we don't load data for three hours and it wouldn't work. It then calculates the needed data and displays it to the user, waiting either for another query when given or exits with the exit code.

Research findings on IoT sensors and data & Details of any algorithms, calculations, or unit conversions implemented

When researching data on each sensor that was needed, it seems that sometimes the data given is not the data we would need for the query, but instead given at a different unit of data that we would need to convert for whichever was needed. Specifically, the Ammeter is given by amps, the thermistor is usually given by Celcius, water flow sensor can give liters or gallons depending on how the units are produced in Dataniz, and the moisture meter can be given in either Volumetric Water Content(VMC) or the Relative Humidity(RH). With the moisture meter, it usually gives the percentage of VMC where to find the RH would need to be converted by using the Moisture meter and Thermistor's data in VMC and Celsius, respectively, calculating the Saturated Vapor Pressure(SVP) and then using that to find the RH itself. The Water Flow Sensor data that was used was also used with our time functions and instead found a way to get the data from the last three hours where the hour intervals are separated in order to find each cycle with a maximum of three cycles. We get the total of water used in each cycle and average it out to see how much water is used in each cycle, thus completing the query.

How Dataniz metadata was used, or an explanation of why it was not applicable

We didn't use metadata much for Dataniz. For the server to gather the information the program goes through all the payloads once for the needed ones based on the name of the needed device. Metadata was not used mostly because we didn't know how to integrate it with what already worked whereas instead of created data, we wanted to work with data that felt like it was given by real people by every minute of which was generated.

Challenges faced and how they were addressed

One of the main challenges was implementing the queries based on data from a certain time like the average temperature of the fridge for the three hours. We used the timedelta function from the datetime python module to search for the data that we needed, but also near the end of the code creation, we had implemented using the most recent data and then going on from there whether it be three hours ago or two hours from now and three hours ago for the cycles. Another challenge was getting the needed information from MongoDB. We solved this by taking the name of the needed sensor and searching through the data for that device. This was used instead of using metadata as we wanted to use data that felt real.

Feedback for dataniz.com

Dataniz is a complex platform that needs visual tutorials on how to use the website on certain parts. On the main page there is a tutorial button on the main page that just says a few sentences on what to do, which isn't enough. And other parts don't really have an explanation, like the metadata section does not tell you anything on what it is or what to do with it. We are mostly left to figure it out on our own. A detailed video or feedback implementation would be good for future use or so that the creators of Dataniz would not have to keep doing repeated explanations on why it might not work.