Track-e Hardware/Python API

Overview

This document provides an overview of the implementation used to collect and process sensor data for the Track-e project, and details some of the reusable functions used to do so. Note that this program utilizes the PyMata3 module from the pymata\_aio library for interfacing with the Arduino, and that there is a 2-step setup process.

Setup

1. Compile and run [FirmataPlus](https://github.com/MrYsLab/pymata-aio/wiki/Uploading-FirmataPlus-to-Arduino) on your Arduino Uno, typically through the Ardunio IDE.
2. Execute TrafficMonitor.py

Also make sure that you’ve edited the constants related to the database connection to match your database. (See the Database/Python API for details.)

Environmental Variables and Constants

|  |  |  |
| --- | --- | --- |
| Variable | Description | Supported Values |
| DB\_ADDRESS | Server address of database. | Any valid database URL |
| DB\_NAME | Name of database. | Any string |
| TABLE\_NAME | Name of Table. | Any string |
| USERNAME | Username for database. | Any string |
| PASSWORD | Password for database. | Any string |
| SAMPLE\_RATE | Rate in *ms* of data collection from ultrasonic sensor. | Integers from 33 to 127 |
| SENSOR\_IO\_PIN | Pin number of ultrasonic sensor. | Any valid integer |
| LED\_PIN | Pin number of LED *(optional)*. | Any valid integer |
| LED\_ENABLED | Sets whether optional LED is to be used. | True/False |
| THRESHOLD\_VALUE | Sensor value which determines a detection event. | Positive integers < 200 |
| THRESHOLD\_COUNT | Number of consecutive detections required for a detection event. | Any valid integer |

Function: *dataHandler(data):*

This function determines if the ultrasonic sensor has detected traffic. It utilizes *THRESHOLD\_VALUE* and *THRESHOLD\_COUNT* constants, which are pre-calibrated for the Track-e project. If data is less then *THRESHOLD\_VALUE* for a *THRESHOLD\_COUNT* number of consecutive values, then traffic has been detected and the function calls appropriate functions to response such as *generateQuery()* and *Blink().*

*data:* is an array of length = 2. The data[0] denotes the pin from which the data was received and data[1] is the location of the actual value.

Track-e Dependencies

PyMata\_aio: <https://github.com/MrYsLab/pymata-aio>

FirmataPlus\*: <https://github.com/MrYsLab/pymata-aio/tree/master/FirmataPlus>

\*Included in PyMata\_aio repository