ExperiMate

Arduino experiment creator

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Background and Goals

- Arduino is an AVR microcontroller that provides an interface for interacting with sensors.
- The Arduino board is programmed using a dialect of C++ language.
- Arduino provides a low-cost way for novices and professionals to create devices and experiments.
- Since coding could be daunting for novices, a GUI interface is needed for quick experiment creation and extraction of data.

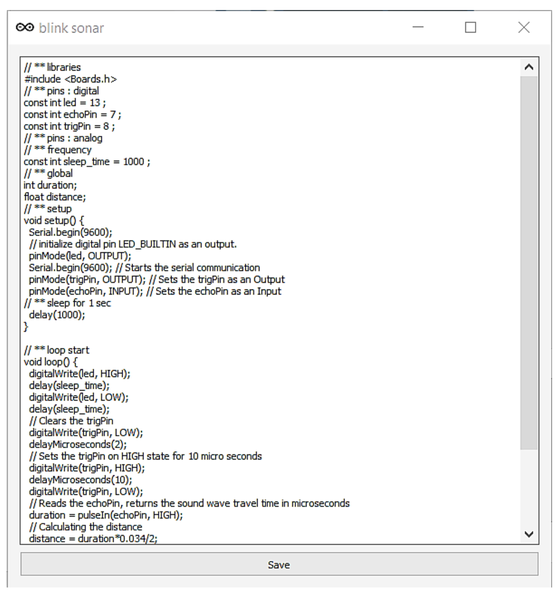
Back end

1. Create a backend API to support basic menu options such as:
   - compilation and upload of Arduino code.
   - creation of new experiments and sensors.
2. management of results using pandas.
3. Create a system to analyze code using a custom tag system and support:
   - Merging code of 2 or more sensors into an experiment.
   - Changing experiment attributes such as the sampling frequency and pin numbers.

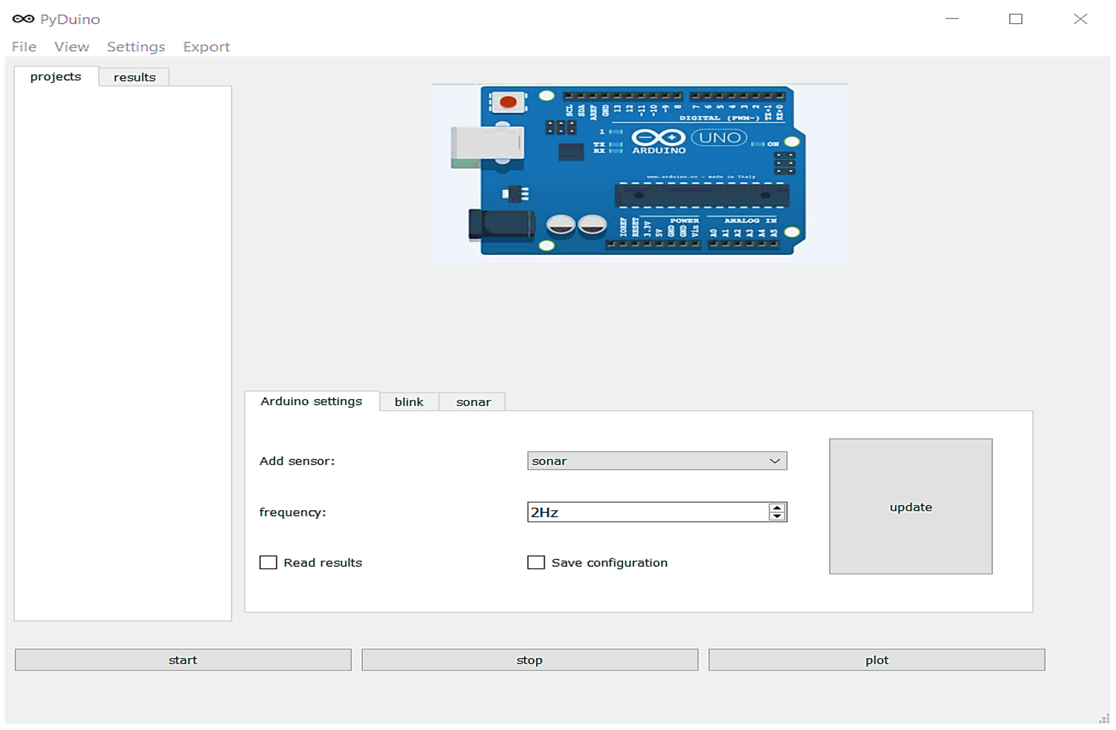
Front end

1. Create a graphic interface using PyQt5 to support:
   - Loading and display of current and past projects.
   - Changing project and sensor attributes
2. Add a Text editor to enable quick access to sensor/project code for non-trivial changes.
3. Add an interface for plotting results and manipulating data using matplotlib and PyQt5
4. A dedicated option for adding new sensor code/project from the PC

Arduino IDE



Experiment builder interface



Result plotter