A transparent heater based on open-source software and hardware

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Temperature control is one of the key elements for experiments in biophysics and molecular biology. While proprietary electronics and software existing for experiment based on closed-sourced design and often require expensive license (such as LabVIEW or MATLAB), sometimes the logged data are difficult to be reused by another piece of software or be integrated into automation.

We used an indium-tin-oxide coated glass as the transparent heater and used MOSFET electronics, thermocouple amplifier, and the Arduino UNO open-source hardware to create a heating platform where readout of temperature and control of heating are mastered by the Arduino board. Control of temperature is done using a graphical user interface software written in Python with open-source libraries. In future we are developing the heating platform into the heating module for a microfluidic automation platform.

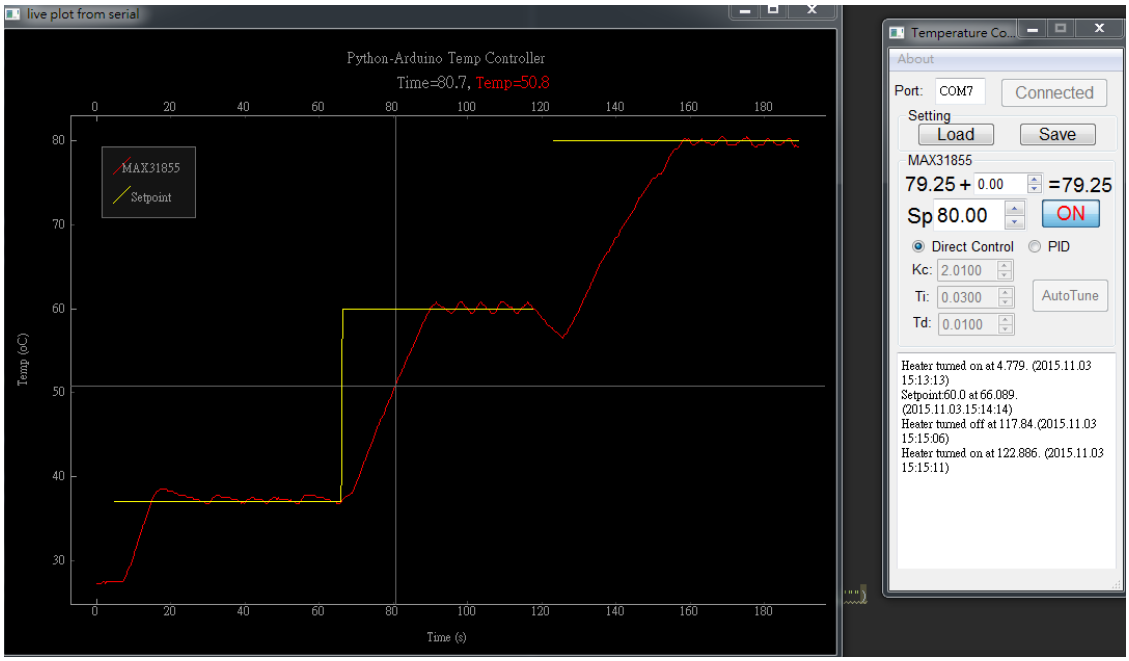

Figure. A snapshot of the graphical user interface written using Python.