

Figure 1. circuit diagram of the hardware system

Figure 1 shows the circuit of hardware system. The MAX30100 is connected to two resistors in parallel. The VDD operating voltage of MAX30100 must be within 2.2V and for low power consumption design, this module is designed to work at 1.8V. Thus, to work with Arduino uno whose operating voltage is larger than 1.8V, the SDA/SCL lines are pulled up by 4.7kOhm or less resistors.

This time all 4 signals are measured at the same time in different conditions: 1) hotter; 2) colder; 3) same temperature but after doing some exercises. In the first two conditions, all 4 signals are collected in the same environment but with different temperatures (32°C and 23°C separately) for 30 minutes. In third condition, the participant sits near the desk in the first and third 10-minute slots and does some exercises in the second 10-minute slot. The heart rate and GSR has significant change during exercising period which can be shown in figure 2 and 3.

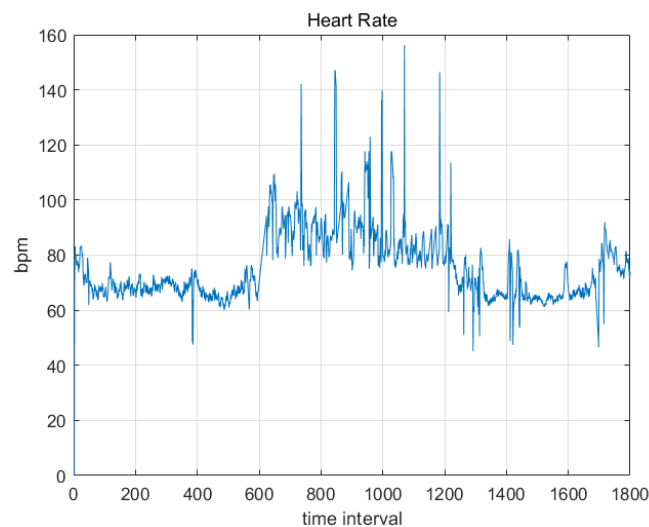


Figure 2. heart rate diagram of doing some exercises

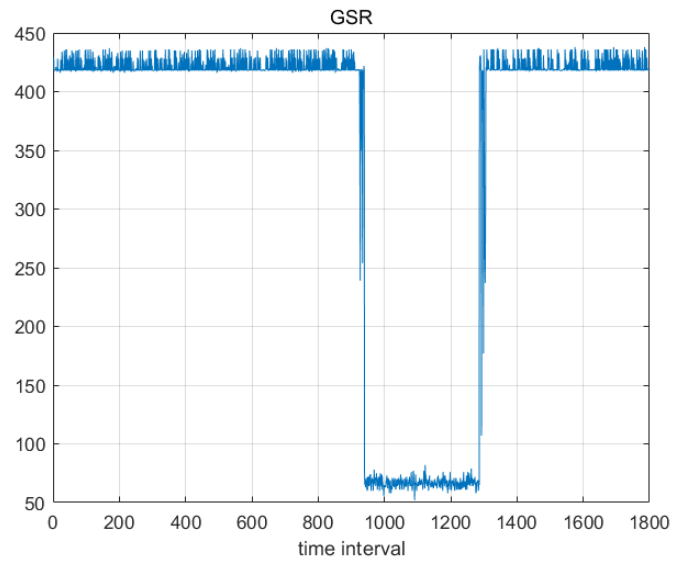


Figure 3. GSR diagram of doing some exercises

In the last experiment, there is internal interference among devices which influences the performance of temperature sensors. Due to different sampling rate, the accuracy of temperature sensors become worse than working separately. After synchronizing all sensors to the same sampling rate, the error of temperature sensors has become much smaller than before.