EE/CprE/SE 492 BIWEEKLY REPORT #5

Oct 26th 2022 – Nov 8th 2022

Group number: SDDEC22-12

Project title: Creating DNA from scratch for DNA-based data storage

Client &/Advisor: Meng Lu

Team Members/Role: Connor Larson/Software Engineer , Kyle Riggs/Software Engineer , Brandon Stark/Electrical Engineer , Nathan Armstrong/Electrical Engineer , & Lucas Heimer/Electrical Engineer

- **Weekly Summary**

  Tested Fluigent code with microfluidic system. Created new housing for the two subsystems. Tested the matrix array on the LCD screen. Determined what heatsink was needed in order to cool down the LCD screen.

- **Past week accomplishments**

  • Team Member 1 (Connor): Worked on Fluigent code and tested it. Was able to set pressure and set the valve. Continuing to integrate code to add in buffers between liquids. Will also work on creating a script to control the GPIO of our Arduino.

  • Team Member 2 (Kyle): Modified and tested code used for testing the display of matrices to be printed. Tweaked the dimensions of the matrices being printed as well as cell size and spacing. Debugging code for reading in and printing specific DNA sequences.

  • Team Member 3 (Brandon): Edited and changed LCD/LED housing. Needed to be lowered for higher power values. Tested multiple ideas for the LCD heatsink.

  • Team Member 4 (Nathan): Worked on a cooling system in order to prevent damage to the LCD screen.

  • Team Member 5 (Lucas): Modified a manifold for the microfluidic system to prevent pressure leakages. Also designed a housing for the components of the microfluidic system. Performed some testing with the created code and did some testing for timing purposes.

- **Pending issues**

  • Team Member 1 (Connor): Communicate to the GPIO of the Arduino

  • Team Member 2 (Kyle): Trying to read in and populate matrices of different sizes with DNA sequences of different sizes.

  • Team Member 3 (Brandon): Need to apply heatsink in a convenient way to cool down the LCD.

  • Team Member 4 (Nathan): Figure out a solution to get the mineral oil and glass piece used

in heat dissipation.

• Team Member 5 (Lucas): Refining of the housing needs to be done to secure the individual components. Further testing and integration of parts is required in order to get the entire system synchronized with the correct timing at each step.

- **Individual contributions**

NAME	Individual Contributions	Hours this week	HOURS cumulative
Member 1 (Connor)	Testing and debugged Fluigent controller code.	12	54
Member 2 (Kyle)	Wrote and tested matrix timing/display code. Debugged DNA sequence code.	12	54
Member 3 (Brandon)	Designed and printed lower LCD/LED housing. Tested water/glass heatsink,	12	54
Member 4 (Nathan)	Tested heat dissipation for the LCD screen	12	54
Member 5 (Lucas)	Designed housing for microfluidic components. Completed some initial testing of code for Fluigent components and overall timing of microfluidic system.	12	54

- **Plans for the upcoming week**

• Team Member 1 (Connor): Continue to improve on my code. I want to add the buffer for the water/mineral oil that is dispensed between layers. I also want to figure out how to implement the Arduinos GPIO into the code to control the display.

• Team Member 2 (Kyle): Code to read in and populate specific matrix with DNA sequence with the correct timing and dimensions to fit the flow cell while still being able to be printed.

• Team Member 3 (Brandon): Figure out a convenient way to cool down the LCD. Assemble new housing.

• Team Member 4 (Nathan): Finish the heat dissipation and start assembling all the different aspects of the project into one place.

• Team Member 5 (Lucas): I plan to get the housing printed and do a fit up with the components. Continue testing the microfluidic system to refine the timing and flow rate.