

Group 27: Dribbling Robot

Final Report by Amaan Khan

Our project was to have a “robot” that would maintain a steady upwards bounce of a ping pong ball. Our mechanism consisted of two servos controlling the plate tilt correction based on the x and y position of the ball which is sampled from a camera using computer vision. Then we had two stepper motors controlling the linear actuation which was responsible for hitting the ball upwards.

In terms of my contribution I was primarily responsible for the software of the whole system:

- I primarily wrote all the openCV code used for tracking the ball and getting its x,y,z position.
- As well as the code we flashed onto the ESP32 which was responsible for receiving the data from the openCV via UART and then applying it to a PID algorithm where our setpoint was the x and y coordinates corresponding to the middle of the plate. The output of this PID was then translated to a PWM which was fed to the servos.
- Worked jointly on the code for the stepper and incorporated that with the rest of the code.
- I'd say I personally did 85% of all the software.

For the electronics:

- I handled wiring the servos and the wiring for our 3.3 to 5v logic shifters because our servos needed 5v for the logic and the esp32 only supplied 3.3
- Helped in wiring voltage steps down from 5v to 3.3v and 800mA for servos.

- Then jointly with the others we wired the steppers using these hefty DM542T drivers.
- Overall for electronics I'd say my contribution to electronics was 33.3%

Overall my team and I were satisfied with the end result and we enjoyed the time we had in ME102B.