Robotic Knee Joint PE

IMT2018523
Shubhayu Das, under Prof. Madhav Rao

16th February, 2021

Progress update

1. Studied BLDC motor control - Field Oriented Control(FOC), Park-Clarke transforms, Inverse transforms, a little of PI control.
2. Started gear design, but software kept crashing because it can’t render it quickly.
3. Started with MCU(STM32), have USB communication(data logging), ADC sampling(position sensing) and basic I2C communication(Rx only as of now), up and working.

Upcoming work

1. Learn PI control and SVM/SVPWM
2. Check feasibility of 10:1 gearbox reduction, might be possible to get away with 40:1 reduction overall?
3. Set up USART and CAN bus communication
4. Work on custom design of gearbox, possibly after some test prints

Problems

1. Effective time to get things working
2. Might have to purchase CAN transceiver, even with this MCU, need to test(another USB mini-B cable needed)
3. Gearbox design and Fusion 360