Final written proposal

For this final embedded system project, I decided to do a weight server. This weight server has two functions. The first function is to help people who need to challenge heavy weights. When people want to build larger muscle, people need to put on more weight than usual. But it is dangerous to put larger weights and most of the times after putting on larger weights, people will need help on the beginning of the motion to finish the whole motion. For the people who are already very strong and still want to try to build more muscle, they are hard to find a partner who is as same strong as them or stronger than them. Therefore, this servo can work as a coach or a partner to help people build muscle without finding a partner or a coach. The second function is to protect people from the weight fall on the body when losing control or being too tired. Many news has reported people hurt when trying heavy weights because of losing control. This weight server will protect people by detecting the distance from the weight to the body all the time. Then servo will keep working as a helper and once the distance is too small, the servo will stop help and just lift a little bit to keep the weight away from all on the body.

To achieve these two function, ultrasonic sensor and muscle sensor will be used. The muscle sensor will detect the motion of the muscle. When I move my muscle, the analog value of the muscle sensor will increase and when I put my muscle back to initial position, the value will decrease linearly. I also tried lifting different weight to test whether the value of muscle sensor will change. The result shows that the muscle sensor can only detect the muscle motion and cannot detect how many weights I have put on. Therefore, I decided to let the servo work at when the muscle start to work. I need to choose a value at around half from the maximum and minimum. That will be the best time to get help. For the protection function, the ultrasonic sensor will detect the distance all the time. To avoid this function, influence the other function’s work, I decided to let the servo just lift a little to just lift the weight a little above the body then the helping function can continue working.

The cost will just depend on how much the Arduino board and the two sensors are. Also, if I want to use the muscle sensor, I need some electrode to tape on my arm. I estimated the cost will be around 80 dollars.

Above all, I named this project weight server. This weight server can help people build big muscle and protect people from losing control when trying larger weight than normal time. Two sensors and Arduino board will be used to achieve these goals. If using in the gym, people will benefit from this machine and avoid bad hurts.