Myoelectric Hand Project Documentation

Includes documentation for the entire project shown on the documentation landing page.

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Introduction

Our driver is used to help in the creation of a myoelectric hand project. The hand is able to open and close from signals it gets from myosensors. The thumb of the hand is able to move from either the thumb in or thumb out position when a user presses a button. All the code for this project was created in a single file and all the functions in the file are explained in detail.

Sensor Task

Purpose

The purpose of this task is to read the myosensors and signal to the motor task what to do.

Usage

To use the task the following format is used:

void TaskSensor(void *pvParameters **attribute**((unused)))

No parameters needed for this task.

Testing

To test if this task worked properly, we used the serial task to see if a variable that was in the sensor task was outputting the correct state. For example, if it should be outputting state 1 which meant closed, the serial output would give a 1.

Bugs and Limitations

Some limitations to the myosensors that we used was that they were a bit finicky to use. They were very sensitive to movement which made it difficult to control the movement for the hand. They would take some time to notice that you were not flexing before it would shut off.

Motor Task

Purpose

The purpose of this task is to read the signal received from the myosensor task and then either turn the motors off or turn the motors on in the clockwise(Close) or counterclockwise direction (Open).

Usage

To use the task the following format is used:

void TaskMotor(void *pvParameters **attribute**((unused)))

No parameters needed for this task.

Testing

To test if this task worked properly, we used the serial task to signal whenever it was in a certain state when it was suppose to. For example, if the first myosensor was over the threshold the motor task should be in state 1, which means the serial task should output a 1.

Bugs and Limitations

Some limitations to the motors we used was that they were not fast enough when opening the hand which resulting in the hand not opening fully.

User Interface Task

Purpose

The purpose of this task is to read a signal that the task receives from a button that the user can press and sends the signal to the servo task to use.

Usage

To use the task the following format is used:

void TaskUser(void *pvParameters **attribute**((unused)))

No parameters needed for this task.

Testing

To test if this task worked properly, we used the serial task to see if a variable that was in the user task was outputting the correct state. For example, if it should be outputting state 1 which meant thumb in, the serial output would give a 1.

Bugs and Limitations

One limitation was that the motors did not have encoders. It would have been beneficial to know the position and speed of the motors.

Servo Task

Purpose

The purpose of this task was to use the servo to move the thumb either in the in (100 degrees) or out(0 degrees) position using the signal that it received from the user task.

Usage

To use the task the following format is used:

void TaskServo(void *pvParameters **attribute**((unused)))

No parameters needed for this task.

Testing

To test if this task worked properly, we used the serial task to signal whenever it was in a certain state when it was suppose to. For example, if the button was pressed for the first time the servo task should be in state 1, which means the serial task should output a 1.

Bugs and Limitations

A limitation that we had with the servo was that it didn't have enough torque to overcome gravity or the load of the thumb motor which would resulted in some instability and shaking.

Serial Task

Purpose

The purpose of this task was get output from the other tasks for testing and debugging.

Usage

To use the task the following format is used:

void TaskSerial(void *pvParameters **attribute**((unused)))

No parameters needed for this task.

Testing

To test if this task worked properly, we used the sensor task to see if we could get readings onto the serial monitor. For example, if the the hand was flexing then you would get a value of around 900 on the serial monitor.

Bugs and Limitations

No limitations did as it was suppose to.

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