

P15001: Software Code Functional Description

This document will outline the functions that are used in the P15001 Active ankle foot orthotic. Each class function that has been created will be outlined as well as the public functions that it contains.

Distance

This function interfaces with the distance sensor. The distance sensor is designed to detect the distance between the orthotic and an object. It is used on this AFO to detect stairs.

- Initialization - The code will set the ADC that is monitoring the sensor. In addition to this, serial prints enable was set.
- Record – this function takes no input but will return a float value of the output of the distance sensor scaled from 0 to 5 Volts.

EEPROMRead

This function interfaces with the EEPROM. The EEPROM records and updates the current gait cycle time, from heelstrike to heelstrike. The EEPROM Memory Mapping is seen below:

<i>EEPROM Memory Mapping</i>		
Address	Data Stored	Reason
0	Year	
1	Month	Sore the date the EEPROM was last cleared
2	Day	
3	Researched Gait Average	
4		Average gait used for startup.
5	Stored Gait Average	Gait that is updated throughout the program
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- Initialization - The code will set the address that is used for the gait information that will be updated. In addition to this, serial prints enable was set.
- GaitRead- This function inside the EEPROM class will read the gait location starting at the initialized address. It will take the two bytes of this address and create the integer that represents the milliseconds of the gait cycle. The function has no inputs and will return an integer.
- GaitWrite- This function will write an integer value to the initialized address in the EEPROM. This will split the integer into the two bytes that can be stored in EEPROM. The function has an integer input and will not return anything.

FlexiForce

This function interfaces with the pressure sensors. There are two on the AFO: one for heelstrike and one for toestrike. The tolerance levels for heelstrike and toestrike are set independently.

- Initialization - The code will set the ADC that is monitoring the sensor. The tolerance level that will decide if there has been a Heelstrike or not. In addition to this, serial prints enable was set.

- Strike - This function looks at the value of the ADC and returns a true or false of if there has been a Heelstrike. The function has no inputs and will return a Boolean.
- Record – this function will return the values of the ADC attached to the pressure sensor so that it can be recorded on the SD Card. The function has no inputs and will return a float value.

SDCard

This function will set up the SD card that is used to record data.

- Initialization - The code will set the pin that is connected to the SD card as chip select (CS). In addition to this, serial prints enable was set.
- Initialize - This will open communication with the SD card. It will also record the time that it was turned on. This function has no inputs and will return a Boolean value that will communicate if the card has been properly initialized.
- StartFile – this function will start a new log file. The filename is decided by taking the next incrimination of “LOG00.txt”. The function has no inputs and will not return a value.
- EndFile – this function will close the current log file. The filename is the same as was defined in the StartFile function. The function has no inputs and will not return a value.
- RecordData – this function will log the data during normal operation. The function will record the time, distance data, heelstrike data, toestirke data, and the muscle state. This data, with the exception of the time, is the input to the function as float values. There is not output to this function.

Solenoid

This function will interface with the solenoid that is used to articulate the muscles.

- Initialization – the code will set the two pins that are connected to the solenoid for control. In addition to this, serial prints enable was set.
- Contract- This function will contract the muscle used on the AFO. This function has no inputs and will not return a value.
- Vent- This function will vent the muscle used on the AFO. This function has no inputs and will not return a value.
- Hold- This function will hold the current state of the muscle used on the AFO. This should be used to make sure that the solenoid is not constantly actuating. This function has no inputs and will not return a value.