Run Instructions for Automated Gait Optimization System

Last updated on 8/6/2019 by Barrett Werner (bwerner@andrew.cmu.edu)

1. Plug in Optitrack camera power (computer must be off)
2. Turn on main computer
3. Plug in Minitaur Power Supply
4. Turn on treadmill power supply (Bertec)
5. Check Minitaur safety system is in place and functions properly
6. Login to main computer (password: cmueblers)
7. Open Motive Minitaur Project (can be found on Desktop)
8. Setup Motive (this might already be done, but good to check)
   1. Mask extra ‘markers’, calibrate Cameras and set ground Plane
   2. Create rigid body from Minitaur’s markers
9. Start Treadmill Control Panel (treadmill symbol on taskbar)
10. Turn off treadmill e-stop and press flashing Start button (This will turn on the treadmill)
    1. If this is done before Treadmill Control Panel is open then it will not start properly
    2. Treadmill is on when Start light is solid and Motor light on the power supply is green
11. In Treadmill Control Panel, turn on remote control
    1. Click ‘Settings …’
    2. Check the Remote TCP/IP Control box
    3. Press ok to warning message
    4. Press ok to exit menu
    5. Click Enable Remote Control
12. Open 3 separate Matlab 2017b Sessions and add ‘MoCapTreadmillSystem’ to path for each session
    1. This can be found under C:\Users\cmuebler\Documents\RML
    2. See Matlab shortcut button ‘RML MoCap System’ to easily add path (must be done for each session)
13. In the first Matlab Session, open ‘OptirackMatlabConnection.m’ and run
    1. Found in MoCapTreadmillSystem\OptitrackConnection
14. In the second Matlab Session, open ‘TreadmillControl.m’ and run
    1. This will usually fail on first startup, press ‘Start’, then press ‘Stop’, then press ‘Close TCP’ and close GUI before running again (this initializes treadmill communication)
    2. Run TreadmillControl.m, if working you should see values for X,Y,Z position that are coming from Motive and should be able to control the treadmill
    3. USER TIP: If you do not press ‘Close TCP’ before closing GUI, you must restart the Treadmill Control Panel and repeat these instructions for the GUI to work
    4. Found in MoCapTreadmillSystem\TreadmillControl
15. In the third Matlab Session, open ‘MinitaurOptimizationControl.m’
    1. Do NOT run yet
16. Compile and upload ‘ClarkTrotTreadmillOpt’ to Minitaur
    1. Found in Found in MinitaurSDKOld/examples on Github
17. Turn on Minitaur power supply using e-stop (just pull up on it)
18. Set Minitaur on the treadmill and remove stand
19. Open Putty and SSH into ElliePi (takes ~30-60 secs for Pi to turn on)
    1. ElliePi’s IP address is not static and may change from time to time
       1. If this changes, you can look it up on ElliePi by connecting a monitor and keyboard to the Pi and use ifconfig in the terminal to get its new IP address
       2. Change the IP address for Putty and in MinitaurOptimizationControl.m (variable: serverAddress) and save the changes
    2. Login as ‘pi’ with password ‘ellie’
20. Once in Ellie Pi, navigate to Minitaur\_Scripts/treadmillOptScripts/Minitaur\_RasPi and run ‘python3 elliePi\_wifiComm\_powerMonitor’
21. Now run ‘MinitaurOptimizationControl.m’ to connect to Minitaur
22. Use MinitaurOptimizationControl GUI to run Minitaur
    1. Test Optitrack Steering Control using Control Mode: Optitrack Angular Control
    2. set Forward Velocity between 0-1 (1 is current max speed)
    3. change gait params using Parameters 1-7
    4. Start a New Optimization using Control Mode: Gait Optimization
    5. Continue an optimization (by inputting simplex) by using Control Mode: Cont. Gait Optimization