Mobile Data Collection Backpack Setup Information

Parts List for One Mobile Data Collection Backpack

- Jetson TX2 Development Kit: https://www.amazon.com/NVIDIA-Jetson-TX2-Development-Kit/dp/B06XPFH939
- SD Card: https://www.amazon.com/SanDisk-256GB-Extreme-UHS-I-SDSDXXY-256G-GN4IN/dp/B07H9VX76D/
- RealSense D435i Depth Camera: https://www.intelrealsense.com/depth-camera-d435i/
- Logitech USB Webcam: https://www.amazon.com/Logitech-C930e-1080P-Video-Webcam/dp/B00CRJWW2G
- Backpack: https://www.amazon.com/Backpack-Breathable-Ventilation-Features-Traveling/dp/B07RQQYRQM/
- Battery Pack: https://www.amazon.com/dp/B01337QXMA
- USB Hub: https://www.amazon.com/RSHTECH-Splitter-Portable-Aluminum-Individual/dp/B07HMZSRS7
- 5V USB-to-Barrel-Jack Cable: https://www.amazon.com/CCYC-Barrel-Wireless-Router-Speakers/dp/B079K2DS3H
- Chest and Head mounts: https://www.amazon.com/VVHOOY-Universal-Compatible-Crosstour-Accessories/dp/B07L4T25JY
- Camera Screw Adapters: https://www.amazon.com/Sametop-Universal-Conversion-Adapter-Compatible/dp/B06ZYKXYQK
- Thalmic Labs Myo Band (Discontinued as of 2018)
- Zip Ties

Mobile Data Collection Backpack Setup Instructions

- Follow *Jetson TX2 Setup Instructions* (below). Once all of the software is installed, shut down the system, remove everything but the USB hub, and mount the TX2 against the back of the backpack with zip ties.
- Place the battery pack in the side pocket of the backpack and connect the 12V output to the TX2 and the 5V output to the USB hub.
- Secure the USB hub and any loose cables with zip ties.

Jetson TX2 Setup Instructions

- Connect the WiFi antennas and the USB hub to the TX2.
- Connect a monitor to the HDMI port on the TX2. Connect a keyboard and mouse to the TX2.
- Attach the power adapter to the barrel jack on the TX2 and press the power button (first button from the center) to boot up the TX2.
- Follow the on-screen instructions for running the provided OS installer, then reboot.
- Connect the TX2 to a host computer via the micro USB cable.

- Open the Nvidia SDK Manager on the host computer and install Jetpack 4.2.2.
    - Step 1:
        - Set the Hardware configuration to Host Machine and Jetson TX2.
        - Set the target operating system to Linux Jetpack 4.2.2.
    - Step 2
        - Select Jetson OS and Jetson SDK Components (Additional SDKs are optional but not necessary)
    - Step 3
        - Follow the instructions for the manual flash process.
            - You will have to put the TX2 in Force Recovery mode [power off, then hit the power button, hold the recovery button (2nd button from center), hit the reset button, and then release the recovery button].
            - The screen will prompt you to fill out some setup options on the TX2 (using the monitor, mouse, and keyboard connected to the TX2).
                - Choose a username, computer name, and password.
                - Choose automatic login.
            - Return to the host PC to complete the SDK install.
- Set up the TX2 to boot from the external SD card.
    - Insert SD card into slot
    - Follow the instructions here: https://www.jetsonhacks.com/2017/01/26/run-jetson-tx1-sd-card/
- Other setup
    - Add the username you specified earlier to the dialout group
        - sudo usermod -a -G dialout [username]
    - Create logs directory (bagfiles will automatically be created there)
        - mkdir ~/logs
- Install software.
    - Git
        - sudo apt-get install git
    - ROS melodic (http://wiki.ros.org/melodic/Installation/Ubuntu)
        - After installing ROS, navigate to home directory and create a catkin workspace, e.g.
            - mkdir -p ~/catkin_ws/src; cd ~/catkin_ws
            - catkin_make
    - ROS usb_cam package
        - sudo apt-get install ros-melodic-usb-cam
    - RealSense SDK
        - Follow the instructions here: https://github.com/IntelRealSense/librealsense/blob/development/doc/installation_jetson.md
    - RealSense ROS interface

        - Install ROS dynamic reconfigure
            - sudo apt-get install ros-melodic-ddynamic-reconfigure
        - Navigate to catkin_ws/src and follow the instructions here: https://github.com/IntelRealSense/realsense-ros
    - Myo ROS interface
        - Navigate to catkin_ws /src and clone the repo at https://github.com/intuitivecomputing/ros_myo
    - Sensor backpack
        - Navigate to catkin_ws/src and copy the package at https://github.com/intuitivecomputing/FACT/tree/main/mobile_data_collection_backpack_setup_and_software/sensor_backpack
    - Build all ROS packages
        - cd ~/catkin_ws; catkin_make; source devel/setup.bash
- Test whether RealSense camera software setup works.
    - Connect the RealSense camera, USB webcam, and Myo band bluetooth receiver to the USB hub.
    - From the command line, run realsense-viewer (using connected monitor).
    - Verify that the RealSense camera shows up with USB3 input (make sure to keep the RealSense on the same port).
    - Perform any necessary firmware upgrades.
    - Verify that the data streams work (see README in https://github.com/intuitivecomputing/FACT/tree/main/mobile_data_collection_backpack_setup_and_software/sensor_backpack). Close the data streams and exit.