Train and Go Operating Procedure

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Purpose

Train and go is a training device designed to help users master the skills required to maneuver a wheelchair. This Device uses virtual reality simulation coupled with a separate operation detection system to help the user achieve this goal. Below is a detailed guide of how to install/operate Train and Go.

Key Terms/Definitions

Virtual Reality: A virtual environment uploaded to the Meta Quest Pro headset.

Ultrasonic Sensors: Sensors to be placed along the base of the chair to detect obstacles.

Microcontroller: An integrated circuit device that governs a specific operation in an embedded system.

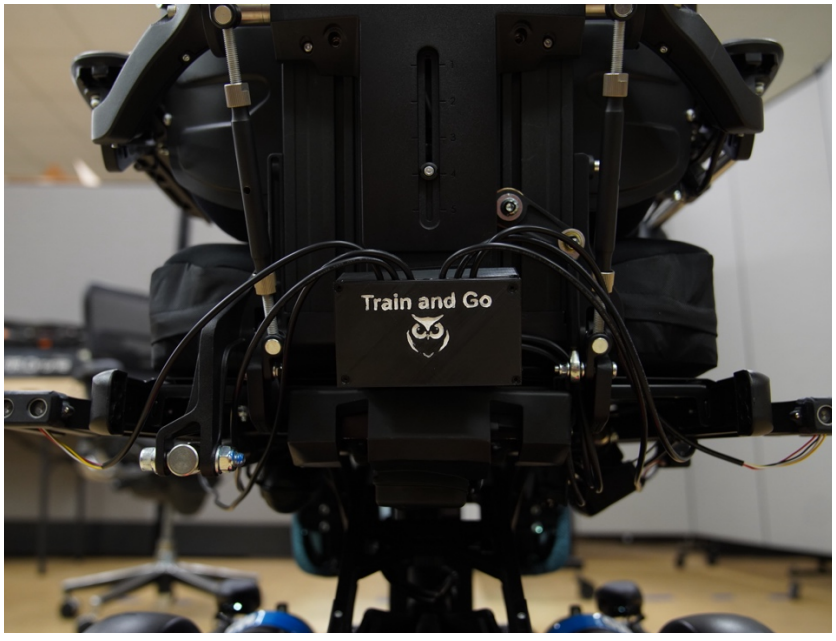
Printed Circuit Board (PCB): Circuit board with all the necessary connections for the microcontroller and ultrasonic sensors to operate.

Inertial Measurement Unit (IMU): A device that can measure and report specific gravity and angular rate of an object to which it is attached.

Rumble Motor: Mechanical device that generates vibrations.

Installation

1) Using the Velcro straps, secure the housing box containing the microcontroller, PCB, and battery to the back of the chair.
    a. This location should allow easy charging access for the battery.



2) Using the Velcro Straps, secure the Meta Quest Pro controller mount to the back of the head rest of the chair.
3) Using the provided nuts, secure the ultrasonic sensor mounts along the rail on the sides of the chair.
    a. There are 6 sensors and 6 sensor mounts. Each mount is designed to face a specific direction (Forward, Adjacent, Backward) on each side of the chair.

4) Place the ultrasonic sensors in each sensor mount.

5) Connect each wire from the housing box to the corresponding sensor.
    a. Wires can be secured to the siding of the chair.

6) Secure rumble motor inside the back cushion.
    a. This should be secured in the upper portion of the chair to ensure the user will feel the intended vibration.
    b. Wiring can be secured to the chair once the rumble motor is set in place.
7) Make sure all connections are secured and flip the switch on the housing box.
    a. Test that each sensor is properly triggering the rumble motor to vibrate at the specified distances in the table below.

Sensor	Detection Range Start (mm)	Detection Range End (mm)
Forward-Left	10	20
Adjacent-Left	10	20
Backward-Left	10	20
Forward-Right	10	20
Adjacent-Right	10	20
Backward-Right	10	20

Virtual Reality Installation/Setup

Sideload the file TrainandGo.apk onto a VR headset. It is designed for use on Meta Quest Pro. Sideloading instructions for a Meta Quest device are as follows:

1) Install SideQuest or any sideloading software to a source computer.
    a. This computer does not need to be powerful enough for VR: it will just transfer files.
    b. See https://sidequestvr.com/setup-howto for installation instructions. Use the "Advanced Installer."
2) Enable developer mode on Meta Quest device. https://help.arborxr.com/en/articles/6333136-developer-mode-usb-debugging-on-meta-quest-devices
3) Connect Meta Quest Pro to the source computer.
4) Download TrainandGo.apk to the source computer.
5) Load TrainandGo.apk onto the Meta Quest device using SideQuest.
    a. Drag TrainandGo.apk onto the green bubble in the SideQuest window.
6) When SideQuest informs you that the transfer is complete, disconnect the headset.

The remaining VR Instructions are as follows:

7) Using the VR Headset, map the boundaries of the room.
8) Place the right-hand VR controller in the controller mount that was installed on the back of the wheelchair.

9) Use the left-hand VR controller to navigate to the Unknown Sources section of the Apps menu.
10) Open TrainandGo.apk.
11) Press the trigger on the previously mounted right-hand controller to ensure the controller is "awake" and track the wheelchair movement properly.
12) (Optional) Screen share the headset display to a screen for viewing.
    a. This can be done through SideQuest or Meta's screen share service. See Links Below: