

“Skypebot” Manual: Contents

Designed for the healthtech workshop on Sep. 23 2014: a robot with a mobile base, Skype screen, and arm which can be controlled manually/automatically by a healthcare worker to communicate and investigate emergencies.

Used: “Moritz” (Turtlebot robot), “mrdev” (desktop), router, turtlebot-Latitude-E4310 for base control GUI, IDE10654 (Martin’s computer) for robot arm control GUI, student computer and smartphone (for Skype)

Ensure all devices are charged

Important: you need passwords for Turtlebot and the desktop (ask Roland, Anita, or Martin if you don’t know)

Turn on power

-Ensure that the Turtlebot cables are connected properly:

*two black USB cables connect the white ASUS notebook to the Turtlebot base and Kinect like in Fig. 1

*the back of the Turtlebot looks like in Fig. 2

-Flick the power switch on one side of the Turtlebot base shown in Fig. 3 to “on”

The light on the other side of the base should be green like Fig. 4

-Turn on the ASUS notebook

When the ASUS notebook starts up (text appears), you can close the lid

-Turn on the desktop and login with user id “user2” and the password (ask Roland, Anita, or Martin)

-Turn on the wireless router next to the desktop (it has a power button to press on its lower backside)

-Ensure that the robot arm has batteries connected to power logic (single cell 3.7V lithium polymer to the JST connector) and motors (double cell 7.4V, with wires red to white, black to green), as in Fig. 5, and tuck them inside the box

Lift up the silver box behind the arm and flick the two power switches at the bottom, as in Fig. 6 (a light will flash red when power is turned on to Bluetooth)

-Insert the black wireless camera USB dongle into IDE10654. Press and hold for a few seconds the power button on the back of the wireless web camera on top of the arm as in Fig. 7. It will flash blue.

-Place the three laptops on table(s)

-Insert smartphone into holder, if not already there

-Attach headphone for Skype to avoid howling

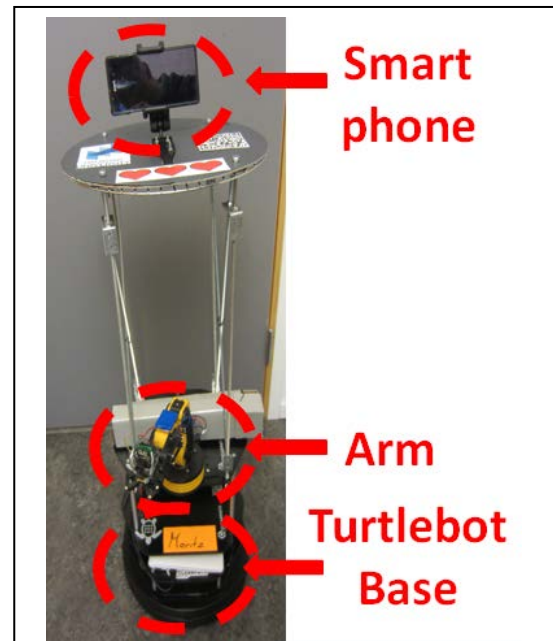


Fig. 1 Moritz should look like this.



Fig. 2 Back of Turtlebot.



Fig. 3 Turtlebot power button (off).



Fig. 4 Light shows battery level.

Start Software

On desktop, open 5 terminals, ssh on 3 into Moritz (Asus) at 192.168.10.102.

Start Turtlebot. On Asus terminal, type in "roslaunch turtlebot_bringup minimal.launch".

Start following capability. On Asus terminal, type in "roslaunch turtlebot_follower off_follower.launch".

Start speech generation. On Asus terminal, type in "roslaunch sound_play soundplay_node.py".

Set up GUIs.

Start Skype on SMARTPHONE and turtlebot-Latitude-E4310

You will need two accounts for this.

I used "turtlebot_hh" and "live:martin.daniel.cooney"

Start up arm_gui on IDE10654 (double-click arm_gui/arm_gui.sln then F5). Press Connect button.

Start main gui on turtlebot-Latitude-E4310 in /home/turtlebot/catkin_ws_martin/devel/lib/turtle_gui/skypebot. (source is /home/turtlebot/catkin_ws_martin/src/opencv_db_ros/src/skypebot.cpp)

Test

Click arrows. Does robot speak and move forward/backward/turn, without too much slosh?

Press the Follow button. Does the robot follow?

Try Skype. Are video and sound okay?

Push in the robot's bumper. Does the robot speak?

Does the arm move correctly?

Troubleshooting:

Software: Restart node which is having problems, or all.

Hardware: Tighten bolts.

Motors don't move or hang limply: the housing on the affected motor has probably become loose: push together both sides (and tighten the screw if possible)

Shut down

-After demo, press Ctrl-C in the black windows on the desktop in reverse order to turn off the robot's programs. You will hear a little song again.

If you are not going to perform any other demos, type in "sudo shutdown -P now" then the password to turn off the notebook, then turn off the robot's power, desktop and router.

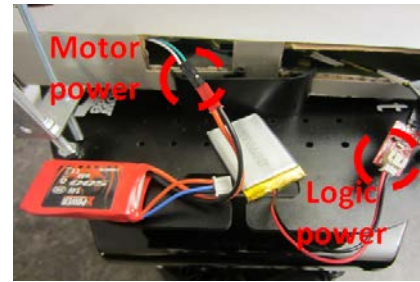


Fig. 5 robot arm batteries

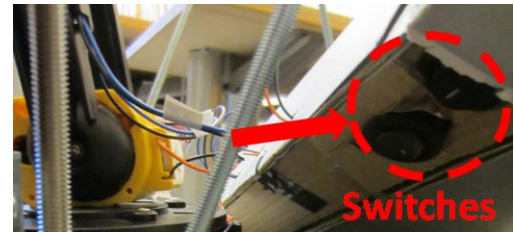


Fig. 6 robot arm power switches.

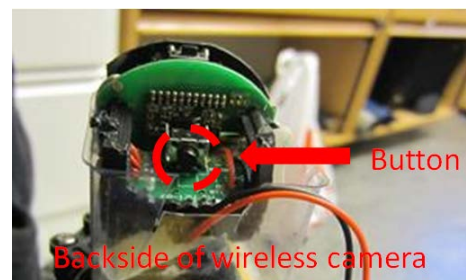


Fig. 7 Wireless camera power button