Demo Setup Manual

Demo description:

This demo simulates the connected and automated driving that can be achieved by communication between vehicles on the road. Such communication is performed by vehicles - they let each other know their speed, location, and environmental conditions.
In this setup, computer vision on an iPhone is used to simulate gps system, so the bots (vehicles) know their position (by bluetooth communication between an iPhone and bots) and can communicate it to the other bots, thus, they can adjust their speed to prevent colliding on the intersection without the need of external movement regulations like traffic lights.

Technical note

- Please make sure that the iPhone is charging at all times
- Make sure that there is no objects on the table except the bots (especially white objects)
- Do not use pink and orange bots - they are not operational
- Make sure that the bots run in the exact direction of the yellow arrows on the screenshot

Setting up the iPhone

- Unlock the iPhone by pressing the home button (no password required)
- If the iPhone was just restarted, it will require to enter SIM PIN, which is 0000
- Go the second screen and open the app called “ImageProcessingOpenCV”
- Now you should see the camera feed detecting different objects

Calibrating the iPhone camera

Adjust the relative camera/table position in a way that:

- The top of the iPhone (side with the camera) corresponds to the side of the table where the most water is located (like it is on the screenshot)
- The whole 8-shape fits into the screen
- iPhone screen is parallel to the table
- The 8-shape is either oriented straight | or tilted to the right /
- The 8-shape is enclosed in a frame (blue frame on the screenshot)
- The colours of the bots are detectible by the camera on any point of the 8-shape
- Please never press “start” and “stop” buttons

Setting up the bots

- Turn all the bots you want to use on (with a switch on the bottom)
- Put each bot on the white line
- Press the button (next to the bot's screen under the coloured plastic cover)
- Wait for the bots to complete 2 rotations for calibrating
- Make sure the bots are about to drive in the direction of the yellow line (follow the river). Note - tu/e logo on the bots is placed on the rear side
- After bots stop spinning around (calibrating), press the same button again to make the bot follow the line

If all the steps are performed correctly, the setup is complete

What should you see then?

- Bots are following the line
- They are constantly changing speed
- They do not collide at the intersection

If the bots are not functioning as expected

- Try to reboot (not working) bots again - repeat the "Setting up the bots" section
- Make sure that everything is set up exactly as described above
- If (some of) the bots do not seem to be fast or working at all, try to change batteries in a way described in the "Changing batteries" section below
- If the bots do not seem to change speed after performing the above actions, it is possible that the **environment interferes with the bluetooth connection** between the iPhone and the bots. If this is the case, unfortunately, there is nothing that can be done about it - just let bots follow the line in the "dumb" mode, and physically resolve collision on the intersection

Changing batteries

- Turn the bot upside down
- Unscrew the golden screws
- Carefully lift the bottom side of the bot without breaking the wire connection
- Remove old batteries
- Insert new batteries
- Put the bot back together
- Charge the old batteries

In case of any questions or problems at all about the demo or the setup, please contact any of us:

Sander Steeghs	**+31 6 28 16 61 78**
	s.w.m.steeghs@student.tue.nl
Mariia Turchina	**+31 6 43 85 00 97**
	m.turchina@student.tue.nl