Testing and Evaluation Instructions — Group Bernie

Participants will control the Go2 Edu robotic dog, Bernie, in a simulated search-and-rescue mission. The dog will navigate a classroom arranged as a grid, controlled by the participant's movement mapped from the Virtuix platform in the first test, and by joystick control in the second test, while observing the environment through a VR headset.

Goal: Find as many hidden people in the room, rescue them by allowing them to take a plaster from the dog's barrel, and get back to Base within 20 minutes. Users will get an accuracy score out of 5 as well as a time score.

Set-up (excluding test time) will take 15 minutes. The test itself will take a maximum of 20 minutes. The questionnaire can be filled out in under 5 minutes. Please arrive on time as allocated in the timetable (Table 1).

- **Location:** Participant will walk on the platform in the Personal Robotics Lab, Floor 10 (please knock to enter). Dog will navigate the grid in Room 403
- **Test Environment:** The room is configured into a grid with 7 vertical corridors (columns) and 5 horizontal rows defining possible hidden person locations.
- **Starting/Finishing Point:** The room's door (marked with a blue circle labelled `Base`) is the designated start and finish location. The dog will be placed here to start with, but participants must navigate to Base to finish the time on their course.
- **Hidden People:** Five hidden people (HP) are placed at predetermined grid positions, which are unknown to the test participant (see an example Map Key below), with two idle corridors where no HP will be present. By locating these HP, Bernie has 'searched'. By seeing the HP take a plaster, and thereby providing aid, it has 'rescued', to the extent a robotic dog can do so.
- **Time Limit:** Each trial is limited to 20 minutes.
- **Control Methods:** Two interfaces (a Virtuix platform and joystick controllers) will be compared during separate tests. HPs will be different for test A and test B so that the user doesn't have existing knowledge of their locations.
- **Evaluation:** Alongside numerical (accuracy and time) scores, participants will take questionnaires after both tests to comment on their user experience, including level of tiredness and motion sickness for both qualitative and quantitative measure.

User Instructions

VR Headset

- Once inside the platform, place the headset over your head and adjust tightness.
- Locate your surroundings, you are looking through the eyes of Bernie the Robotic Dog!

Joystick Controllers

- Two handheld controllers, **your dominant hand** will be used for movement (intuitively, click and hold the corresponding direction to move forward/backward (N/S), or orientate yourself to the left or right (W/E), the diagonal (e.g. NW, SE) will move the dog both forward and alter the direction of view.
- Both hands can be used to register haptic feedback. This will be triggered when joystick comes close to the LiDAR boxes which detect any object too close to the robot.
- When registering haptic feedback, **please stop pressing the buttons**, and step away from the registered obstacle(s).

Virtuix Platform

- Place Omni shoes on top of regular shoes, buckle the strap and turn Omni shoe connectors on.
- Release the lock on the harness and carefullt step in. **The platform is very slippery, hold on to the harness sides.**
- Turn around and strap yourself in using the belt and velcro. Adjust the height if necessary.
- To walk, lean into the harness and step naturally. Let your feet slide behind you. Have your arms outside and relaxed, holding the joysticks to register haptic feedback.
- When registering haptic feedback, **please stop walking**, and step away from the registered obstacle(s).

Timetable

Test A: Handheld controller, Test B: Virtuix controller. Each slot is the start time.

	Tuesday 18/03	**Wednesday 19/03**
11:00		Setup in lab
11:15		
11:30		
11:45		
12:00	Setup	Irene (Test B)
12:15		
12:30		Irene (Questionnaire)
12:45		Bastian (Test B)
13:00	Krishaan (Test A)	
13:15		Bastian (Questionnaire)
13:30	Krishaan (Questionnaire)	Noor (Test B)
13:45	Bastian (Test A)	

14:00		Noor (Questionnaire)
14:15	Bastian (Questionnaire)	Melik (Test A)
14:30	Noor (Test A)	
14:45		Melik (Questionnaire)
15:00	Noor (Questionnaire)	Zeynep (Test A)
15:15	Melik (Test B)	
15:30		Zeynep (Questionnaire)
15:45	Melik (Questionnaire)	Irene (Test A)
16:00	Zeynep (Test B)	
16:15		Irene (Questionnaire)
16:30	Zeynep (Questionnaire)	
16:45	Krishaan (Test B)	
17:00		
17:15	Krishaan (Questionnaire)	
17:30	Pack up	Pack up
17:45 - 18:00		

Table 1: Time slots for each participant.

Questionnaires

Each participant will be given the Trust Perception Scale - Human Robot Interaction (HRI) questionnaire to fill out before their test to see if they have any previous experience with robots, and after their test to assess trust of the robotic system. The Trust Perception Scale - HRI questionnaire will also be given before the test to note whether the participant has any previous experience with robots. The NASA Task Load Index(TLX) and Augmented Reality Immersion (ARI) or Virtual Reality Immersion (VRI) questionnaires will be given to the participants after their tests to assess strain on the operator as well as measure perceived immersion.

Points of Contact

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Fire extinguishers and first aid kits are available on both lab and classroom floors of the EE building.