DITI 3513 AI IN ROBOTICS & AUTOMATION

Group Assignment (10%)

Wall-Following Behavior

CLO3: Demonstrate orally or in written form the solution steps in solving robotics problems using Artificial Intelligence techniques. (A3, PLO4, LOD-C3C)

Based on the materials in the course and others that you may find, in your group, write and submit a short report on analyzing and designing a Wall-Following Behavior in the Turtlebot3 robotics platform

Referring to the Cockroach Hide behavior as in the Lecture slides and labs, esp. the Innate Releasing Mechanisms (IRM), design the Wall-Following behavior using related design tools:

1. Analyze the requirements and behaviors of the robot.
2. Decide on a suitable design tool for a reactive robot system.
3. Design the required behaviors to achieve the full Wall-Following Behavior (use related behavior design tool(s) in your work).

Hint: try to do any sub-behavior one-by-one and integrate them afterward.

Once your robot has the required the Wall-Following Behavior, please SUBMIT these (in a single PDF format report):

1. 15 MARKS: A short report consisting of the design stage, flowchart of the program & any challenges or limitations of your design/program. Attach a *SIGNED Honour's Pledge* in your group short report.

2. The short report (PDF-format, max: 4-pages; ~ 1,800 words) should consist of:

- YOUR group understanding & analysis of the problem;
- YOUR design steps involved;
- YOUR design & limitations of YOUR group's approach/design tools(s);
- A link to a short *video* (in any video sharing platform) of your robot behavior and *several* related figures; and
- *a short* list of other related references (including any <u>Generative AI tools</u> used in assisting the work).

It should take you around 7.5 to 10 hours as a group to complete this project (~2.5 hours per team member). Ensure that you arrange discussion time with your team members & revise your drafts before the final submission, etc.

<u>Submission instructions:</u>
1. Submit only ONE (1) Softcopy Report per group.
2. Report file format: PDF.
3. Report file size max limit: 100MB.
4. Submit onto the ULearn platform.
5. <u>Due date:</u> Thursday, 12 June 2024 - 12:00 PM
6. By submitting, you agree & acknowledge that you are bounded by Part XV & Part XVII of UTeM Academic Regulations about *Academic Misconduct and Penalty*, and Part 8 of UTeM Guidelines for the Academic Regulation Systems on *Academic Misconduct*.

<u>Submission platform/system/method:</u>
1. Short report (ALL team members MUST <u>live sign</u> the final report copy): submit the soft- copy report.
2. Short video of the robot: in the report, provide a link(s) to video(s) of your robot's behavior(s) – use

any video-sharing platform, and provide the URL in the final report.

<u>Example videos of related behaviors:</u>
1. EV3 Simple Wall Follower using Ultrasonic, Touch, and Color Sensors: https://youtu.be/PEDdOkCkxBo
2. Wall Follower using the Lego Mindstorm EV3 software: https://youtu.be/UcPEJ2Z0yFA

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