JetBot Track Racing

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Task One - Manual Control Racing: Completed

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I. Project Background

JetBot is an open-source robot platform based on NVIDIA Jetson Nano, supporting a variety of functions ranging from basic motion control to artificial intelligence training. This project aims to complete a "track racing" competition through the JetBot platform, which is divided into manual control and automatic control parts.

II. Manual Control Based on Buttons

We used Python in Jupyter Notebook to build five control buttons (forward, backward, left turn, right turn, and stop). By clicking these buttons, we called the control methods of JetBot to achieve manual driving of JetBot on the track. This method was based on the Basic Motion example of JetBot and combined with ipywidgets to create an interactive button interface, making the operation more intuitive and visual.

Control Method Description: Create forward, backward, left turn, right turn and stop buttons using ipywidgets.Button; Bind each button to the corresponding control function, such as robot.forward(), robot.left(), etc. After clicking the button, the corresponding action is immediately executed to control the left and right motors of JetBot, achieving navigation control in the racetrack.

III. Performance of the Cart Movement

Control method: Screen buttons

Total time for three laps: approximately 4 minutes

Two consecutive black lines: 0 times

Hit obstacles: 0 times

Manual movement of JetBot: 0 times

IV. Major Challenges and Solutions

The JetBot experienced connectivity issues, prompting me to utilize my mobile phone's hotspot as an alternative to the campus Eduroam WiFi. To address the delay in button response, I streamlined the vehicle's movement by employing only four operational modules. Additionally, to enhance the flexibility of turning control, I fine-tuned the speed differential between the left and right motors, thereby achieving smoother turns.

V. Project Outcomes

Through this project, we have understood the control logic of JetBot, learned to use Python and ipywidgets to build a human-machine interaction interface, and achieved basic button control. Although the autonomous driving part was not completed, it has laid a foundation for the subsequent module training and integration.