Xiaoxin Zhou Final Report

Human operator:

**Joystick:**when the user pushes the joystick to the corresponding area, the robot will: 0 stop, 1 forward, 2 backward, 3 turn\_left, 4 turn\_right, 5 forward\_left, 6 backward\_left, 7 forward\_right, 8 backward\_right, 9 stop.

Diagram, shape

Description automatically generated Joystick.

**Smooth action:**The robot has four-stage to approach the max speed. Start from Low speed (40), medium speed (60), high speed (80), max speed (100).

**Autonomous Override**: The robot should allow the human operator to cross over the edge when the operator needs to avoid object collision. We set two buttons to control the edge detection. In coding based: the signal 1 is ON, and 2 is OFF.

Shape

Description automatically generated

Robot sensors/ operator:

**Edge detect:** The line detector is located at the robot's front, and we are using the left and right one. When left/right sensor detected the black line the robot should autonomously and smoothly change its direction to the forward\_left/ forward\_right with no jerk.

**Objects detect:** The ultrasonic sensor is located at the front of the robot. When the sensor detected the object, Case 1: the robot should stop immediately and wait for the object to be cleared. Case 2: the robot should stop immediately, and the human operator should ably control the robot to avoid the obstacles.

Note: Only the sensor detects the object or black line, and the robot will be autonomous. Otherwise, the robot should be fully controlled by the human operator.

**Edge detect:**

Detected line:

Call forward\_left or forward\_right and avoid the black line with no jerk and human operator can control robot after or robot will keep moving forward.

**Objects detect:**Case 1

Detected object: Stop,

Remove object human operator can control robot.

**Objects detect:**Case 2

Detected object: Stop,

human operator can control robot only 2 backward, 3 turn\_left, 4 turn\_right, 5 forward\_left, 6 backward\_left, 7 forward\_right, 8 backward\_right, 9 stop. To clean out the object detect signal.