Test case for AVC project – completion

* For the completion part of the project the robot should follow the white line to reach the finish position. There are 2 dead ends that the robot should not go to.
* The areas where the white line splits into the two paths, one with dead end other with correct path, the robot must decide which path to take.
* If the robot reaches dead ends, it should be able to turn back to the correct path.
* The robot must turn in the bends.
* The robot must not collide with any laid-out objects.

The code- (our team has same code for core and completion and challenge)

* The “loadImageToMatrix” function in the code first loads the image into matrix that the robot can view through its camera.
* The “compressImage” compresses the image into 4 colors. The only colors that the image contains are White, Green, Yellow and Red, hence it is compressed to these colors.
* For each individual pixel, the ratio of red to green and ratio of red to blue are taken.
* The “findWhiteError” function in the code calculates the error of the path or how centered the white line is in the image.
* The function “hasPath” checks if there is a path to continue or should the robot start turning.
* The function “pathBlocked” inspects if the path is being blocked by any obstacle or wall.
* The function “turnControl” determines which way the robot will turn depending upon the white line that it should follow.
* The “main” function in the code determines the speed and turns the robot depending on the calculated “error”.

Table for test cases

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| --- | --- | --- | --- | --- |
| Speed | Turn | Turn | Turn | Turn |
| Right– 5.0  Left– 5.0 | 1.0 - follows white line, reaches finish line, inefficient as robot moves very slow, turn taken are very slow. | 5.0 – follows white line, reaches finish line, inefficient as robot moves very slow, turn taken are very slow. | 10.0 –follows white line, reaches finish line, inefficient as robot moves very slow, turn taken are very slow. | 15.0 – follows white line, reaches finish line, inefficient as robot moves very slow, turn taken are very slow. |
| Right– 10.0  Left– 10.0 | 1.0 – does not strictly follow white line, reaches finish line, but time taken is still high. | 5.0 - follows white line, reaches finish line, but time taken is still high. | 10.0 - follows white line, reaches finish line, but time taken is still high. | 15.0 - follows white line, reaches finish line, but time taken is still high. |
| Right– 15.0  Left-15.0 | 1.0 - does not strictly follow white line, reaches finish line, time taken is moderate. | 5.0 - follows white line, reaches finish line, time taken is moderate. | 10.0 - follows white line, reaches finish line, time taken is moderate. | 15 - follows white line imperfectly, reaches finish line, time taken is moderate. |
| Right– 20.0  Left– 20.0 | 1.0 - does not strictly follow white line, reaches finish line, time taken is adequate. | 5.0 - follows white line, reaches finish line, time taken is adequate. | 10.0 - follows white line, reaches finish line, time taken is adequate. | 15.0 - follows white line imperfectly, reaches finish line, time taken is adequate. |
| Right– 30.0  Left– 30.0 | 1.0 – does not follow white line, does not reach finish line, takes incorrect paths. | 5.0 - does not follow white line, does not reach finish line, takes incorrect paths. | 10.0 - does not follow white line, does not reach finish line, takes incorrect path. | 15.0 - does not follow white line, reaches finish line but takes incorrect path. |
| Right– 40.0  Left– 40.0 | 1.0 – does not follow white line, does not reach finish line, takes incorrect paths. | 5.0 - does not follow white line, reaches finish line but takes incorrect paths. | 10.0 - does not follow white line, reaches finish line | 15.0 - does not follow white line, does not reach finish line |
| Right– 50.0  Left– 50.0 | 1.0 – does not follow white line, does not reach finish line, reaches near the finish line, turns, and starts going back. | 5.0 - does not follow white line, reaches finish line but takes incorrect paths. | 10.0 - does not follow white line, reaches finish line but takes incorrect paths. | 15.0 - does not follow white line, does not reach finish line |

Using 20.0 for “vRight”, 20.0 for “vLeft ” and 5.0 for “turn” value lets the robot follow white line, the robot reaches finish line and adequate amount of time is taken for the completion part of the project.