

TASK 2

Robotics and Control

Control Systems



PROBLEM STATEMENT:

You are a commander on a Mars mission in charge of commanding a land rover. The mission control has sent you a fax with the course for the rover mission path followed by a sequence of letters. Your task is to maneuver the rover through the way points depending on the letters.

Links:

- [Image](#)

GUIDELINES:

An image with arbitrary points of 3 different colors (RGB) will be given. You will need to find a way to traverse the points of a particular color in an optimized manner by using a bot. The color to be chosen will depend on the alphabet shown to the webcam by you i.e., if the letter R is shown then the bot should traverse the red points. The bot can be represented by a point whose velocity is controlled by a PID controller.

EVALUATION METRICS:

- Plagiarism will lead to direct disqualification.
- Approach to solving the problem.
- Optimization of path
- Accuracy of detection of letter
- Neatness of the code and comments explaining steps

COMPONENTS REQUIRED:

- Python 3.x
- OpenCV

SUBMISSION:

- Python code file.
- Video recording of the code running.
- All the files are to be uploaded on to a google drive and the link to the drive is to be submitted.

RESOURCES:

- Python
 - https://www.w3schools.com/python/python_intro.asp
- PID Control
 - <https://youtube.com/playlist?list=PLn8PRpmsu08pQBjxYFXSsODEF3Jqmm-y>
 - https://www.tutorialspoint.com/control_systems/control_systems_controllers.htm
- OpenCV
 - https://docs.opencv.org/4.5.2/d9/df8/tutorial_root.html
 - <https://www.geeksforgeeks.org/opencv-python-tutorial/>