

Progress Presentation-I

e-Yantra Summer Internship-2018

A System for Solving Jigsaw Puzzle using Multiple Robots

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Overview of Project

- Project Name: A System for Solving Jigsaw Puzzle using Multiple Robots
- Objective:
 - To develop an autonomous system that can solve any Jigsaw Puzzle given its image using multiple robots.
- Deliverables:
 - ① Go-to-Goal controller for robot in a given frame
 - ② Autonomous solving of any Jigsaw Puzzle given just its image
 - ③ Proper documentation and report on the system.

Overview of Task

Task No.	Task	Deadline (in Days)
1	Python, OpenCV, Firebird V Intro, Xbee Communication	3
2	Pose and orientation calculation of 2 Firebird robots using color/Aruco markers	4
3	Programming the Go-To-Goal Controller for single Firebird V robot. Tuning the PID values to perfection	4
4	Implementing path planning with Firebird V where obstacles have been placed in arena	3
5	Detection of jigsaw puzzle blocks using Template Matching	2
6	Pick and place of blocks - gripper mechanism building	4
7	Implementing the entire solution for a given jigsaw puzzle	5
8	Documentation and reporting results	4

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- Created the data packets to be sent, received and parsed correctly

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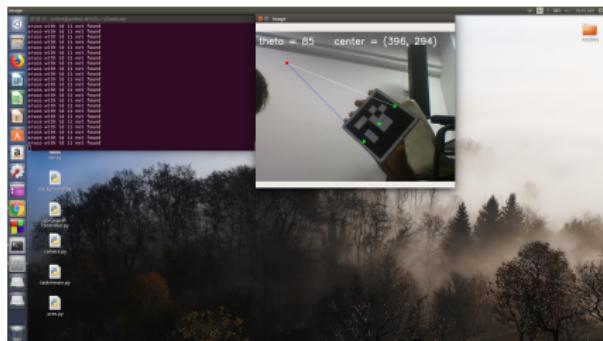
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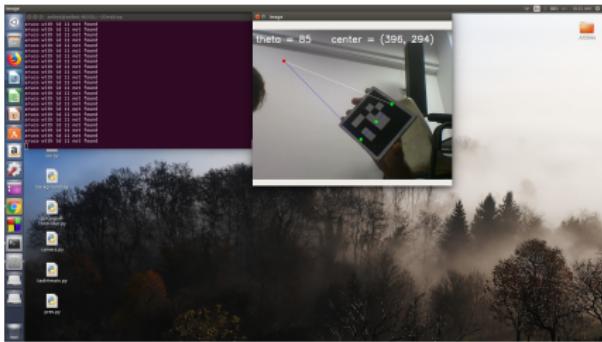
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```
<T90|200|F200|0|0|R90|195|102|220|A185>
```

The data packet is formed by the following values

T - task | R - robot ID | F - frame ID | M - message ID | A - angle | L - length

Overview of Project

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Overview of Task

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Task Accomplished

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Videos

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Challenges Faced

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Future Plans

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Thank You

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Demo



Challenges Faced

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- Determining the angle of ArUco Marker in the frame with proper resolution.
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- Understanding the parameters of Xbee('MY')
- Displaying the received data on LCD of firebird
- Creating data packets to hold the information about robot(its orientation, position, etc...) and parsing it once received by the robot.

Future Plans

- Path Planning of Robot.

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- Designing and building Gripper Mechanism to pick and place puzzle pieces and implementing the entire solution.
- Solve a Multi-Robot Cooperative Box-pushing problem.

Thank You

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