Progress Presentation-I

e-Yantra Summer Intership-2016
Navigation In Indoor Environment Using AR Drone 2

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Mentor: Vamshi, Simranjeet

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Overview of Project

Overview of Project
Parrot AR Drone 2.0
Overview of Task
Task Accomplished
Challenges Faced
Future Plans
Thank You

Give following details:

- Project Name - Navigation In Indoor Environment Using AR Drone 2
- Objective - Given the map of the environment, make the drone navigate from one point to another. In simulation and in real world.
- Deliverables - Code and Documentation for each task, Video tutorial explaining each task.

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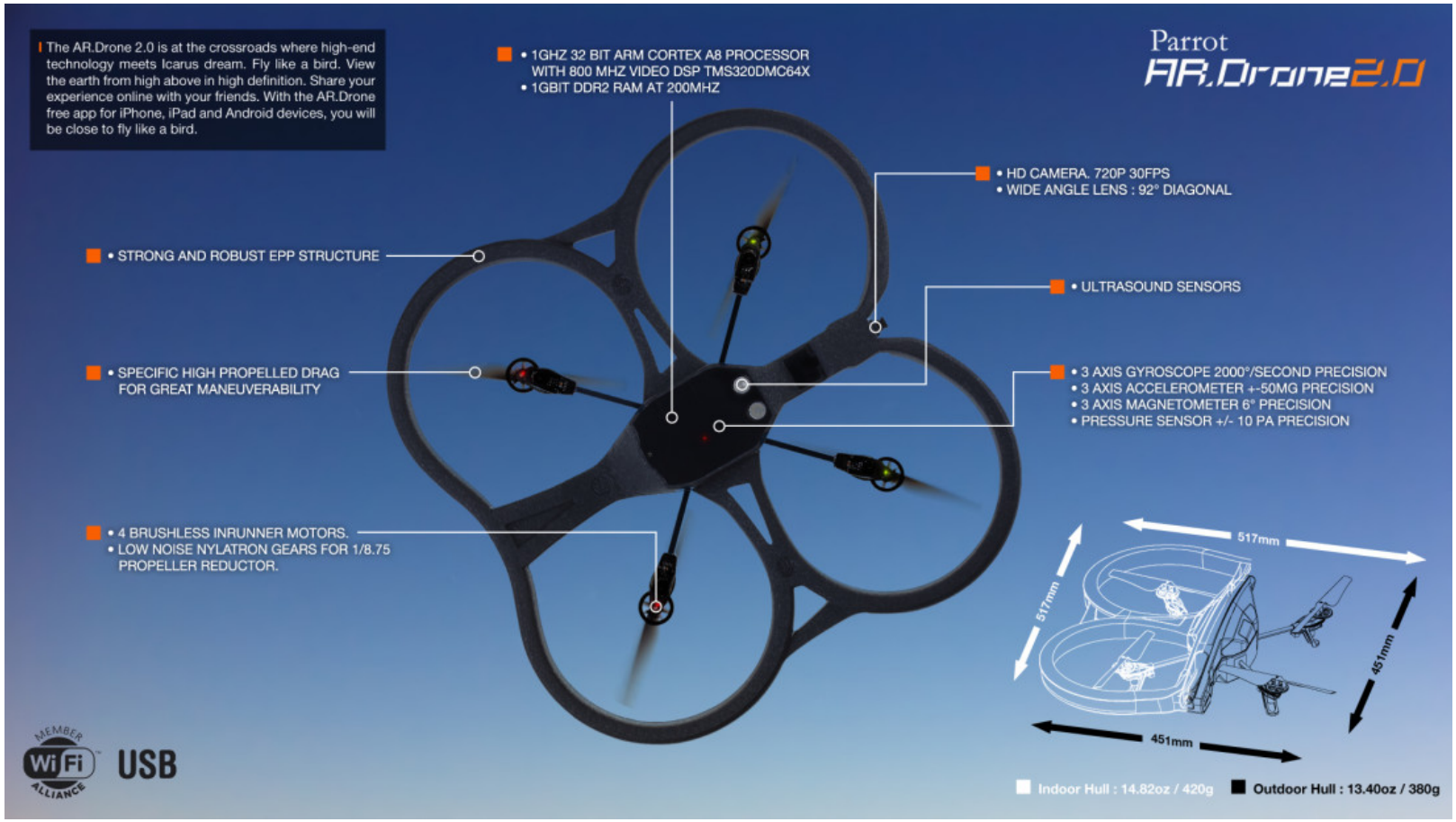

Overview of Task

Tasks	**Deadline**
Setup environment	2 days
Align drone to an ArUco marker in simulation and real world (PID for 4 axis)	6 days
Generate 3D environment using Octomap	2 days
Spawn the quadrotor model, 3D map in RVIZ and make it emulate a real one.	2 days
Literature Review on autonomous navigation	2 days
Autonomously navigate from 1 point to another	6 days
Generate a world in simulation in accordance to the room	2 days
Generate a map with the world in simulation	2 days
Make the physical drone go in sync with the simulated one in the shortest path. Reduce drift.	6 days
Project report	5 days

Table : overview of tasks

Task Accomplished

- Environment setup
  - Install Ubuntu 14.04 and setup ROS, ardrone drivers, simulators, etc.
- Align AR drone to an ArUco marker
  - Getting the robot pose from the ArUco marker.
  - PID tuning to keep the drone at a fixed location
- Generate 3D map using octomap.
  - Using octomap server to load a .ot/.bt file and visualize it in Rviz.
- Spawn quadrotor model, 3d map in Rviz and make it emulate a real one.
  - Visualizing the 3D map in Rviz.
  - Spawn the quadrotor and fix transforms to make it emulate the real drone.
  - Setup transforms between the map and the drone.
- Included images/demo of accomplished work

Task Accomplished

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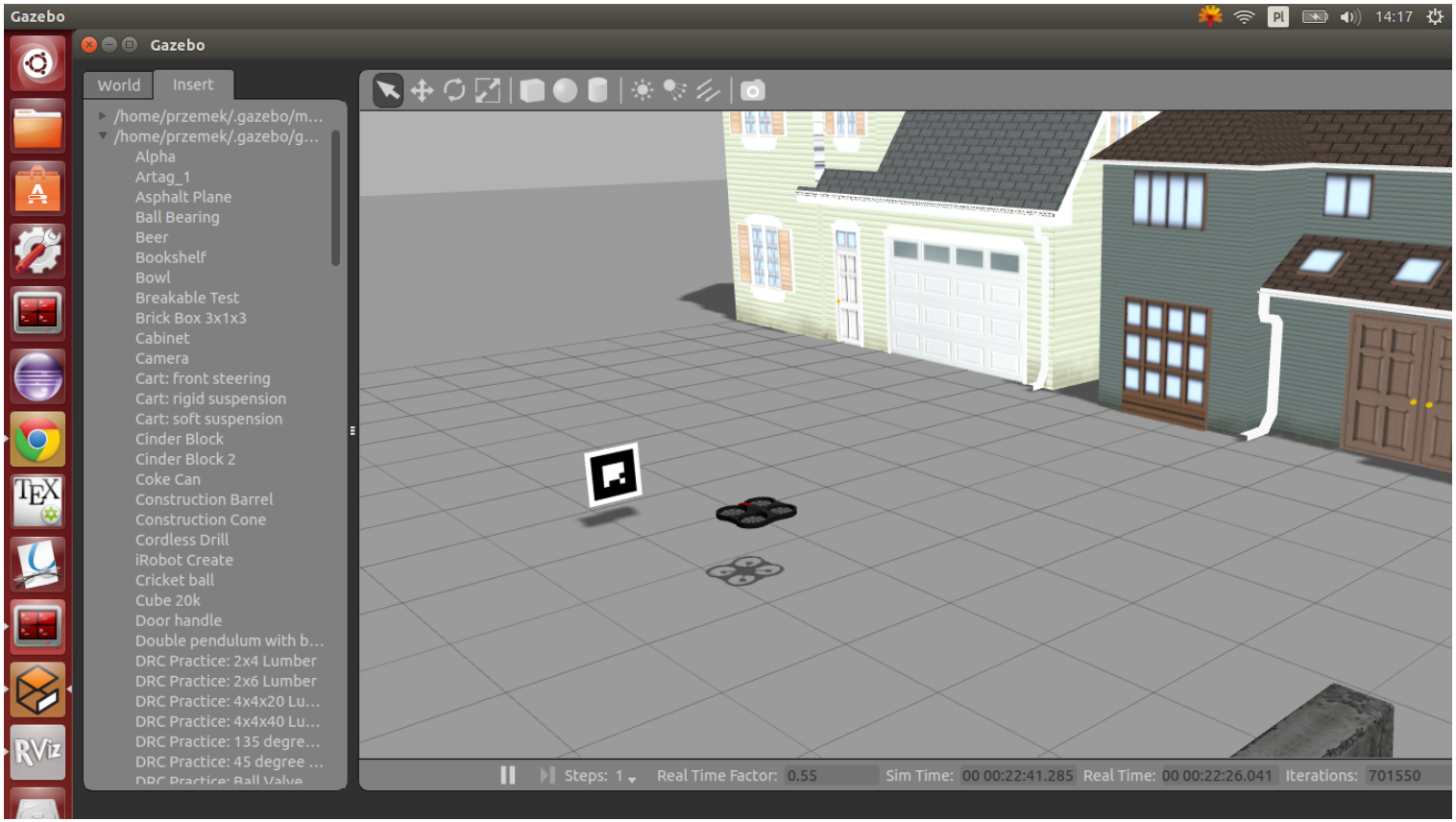
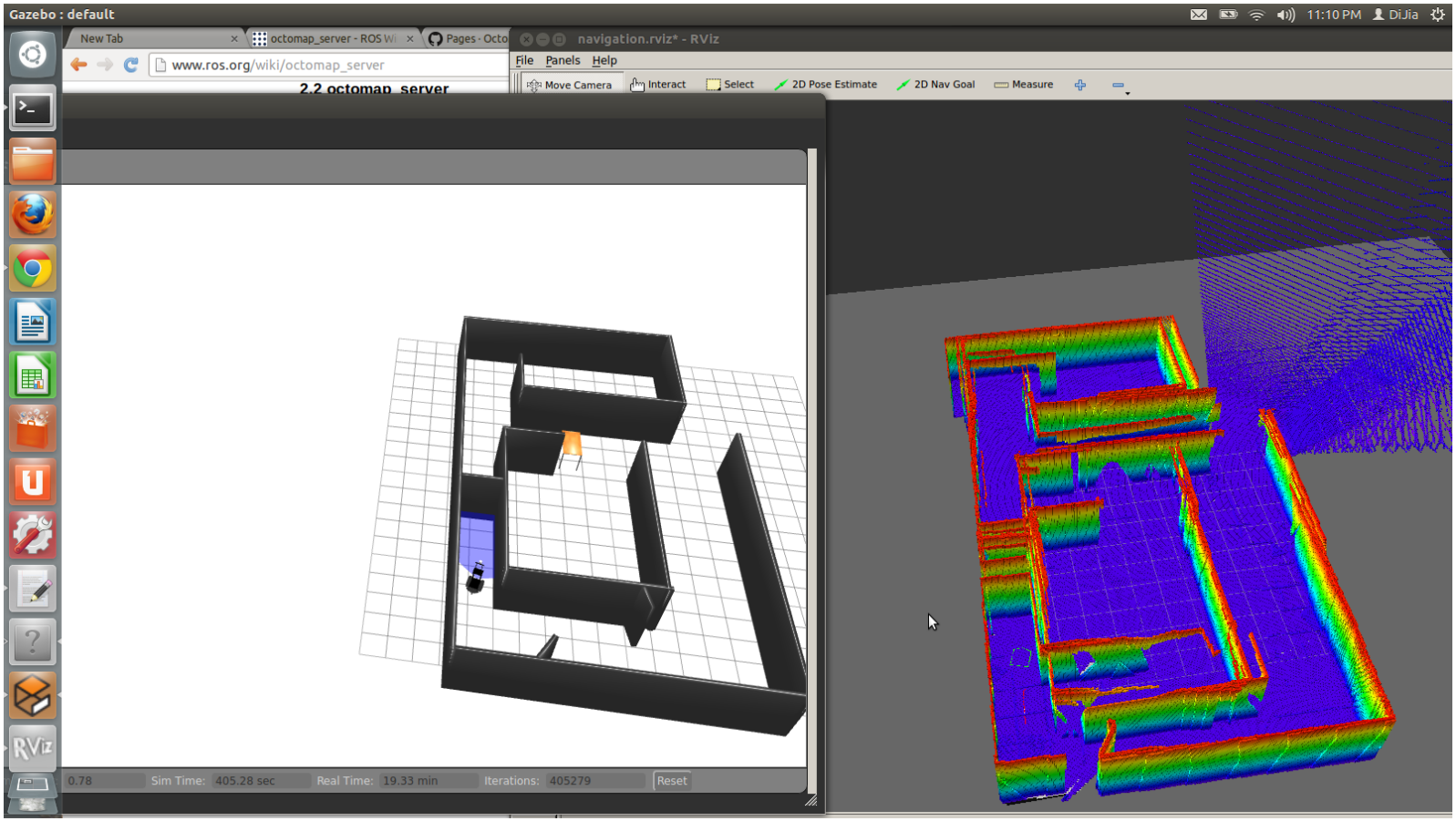


Alignment of AR Drone with ArUco marker

Task Accomplished



3D map generated using octomap

Task Accomplished

- 3D mapping in simulation
  - Using a turtlebot and octomap to create a 3D map of a world in simulation.
  - Real time visualization of mapping in Rviz.
- Literature Review of Autonomous navigation
  - Go through various research papers on autonomous navigation and decide what to use.
- Documentation completed for tasks accomplished.
- Included images/demo of accomplished work

Task Accomplished

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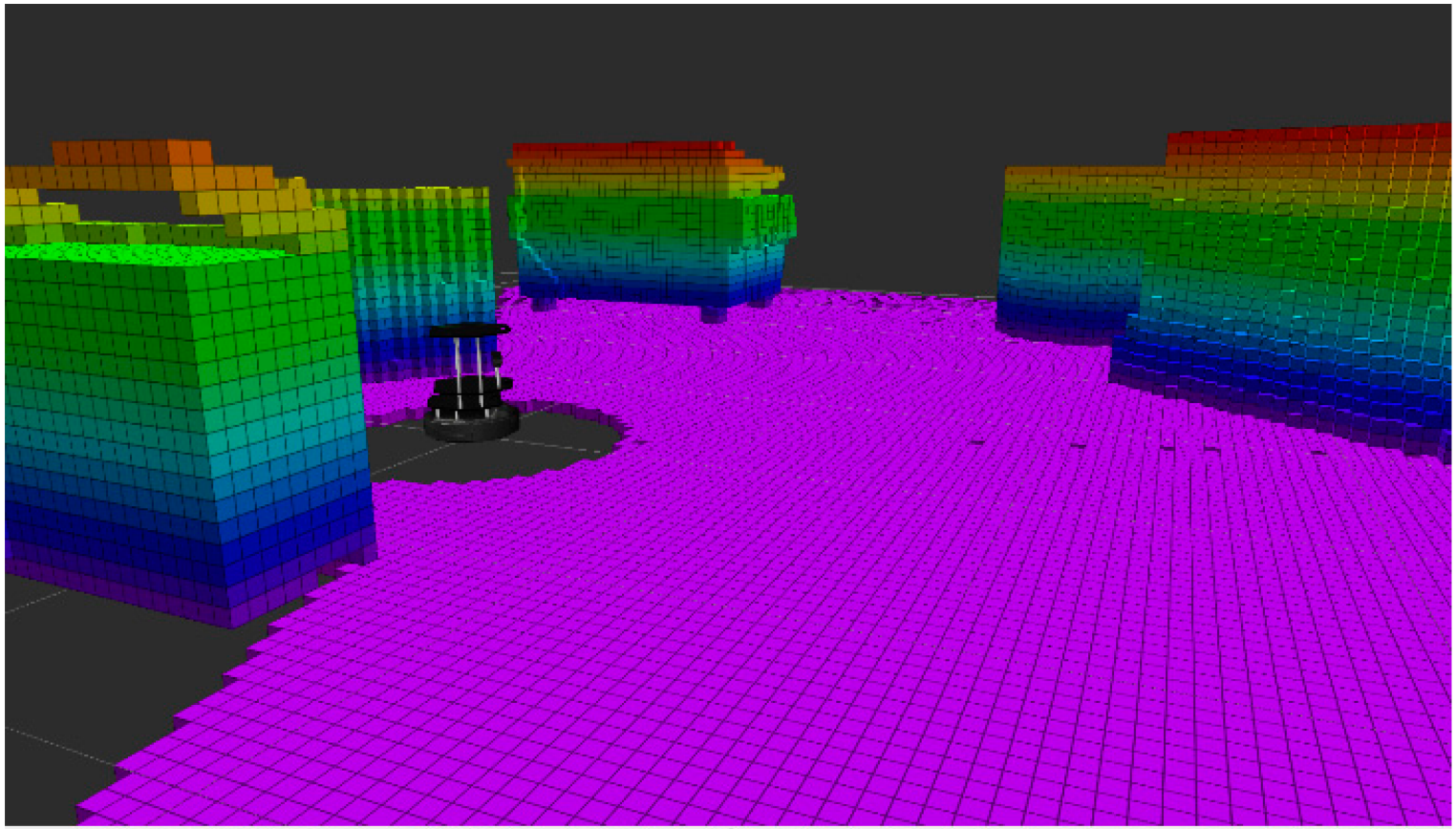

3D map generated using octomap and turtlebot

Task Accomplished

Link for the video demonstartion of Emulating AR Drone 2.0 in Rviz
Link for the video demonstartion of Aligning AR Drone 2.0 to ArUco marker

Challenges Faced

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- Balaji Gorantla
  - Understanding Linux, Python, ROS.
  - Understanding the octomap library.
  - Tuning 4 sets of PID for aligning the drone to an ArUco marker.
- Ridhwan Luthra
  - Tuning 4 sets of PID for aligning the drone to an ArUco marker.

Future Plans

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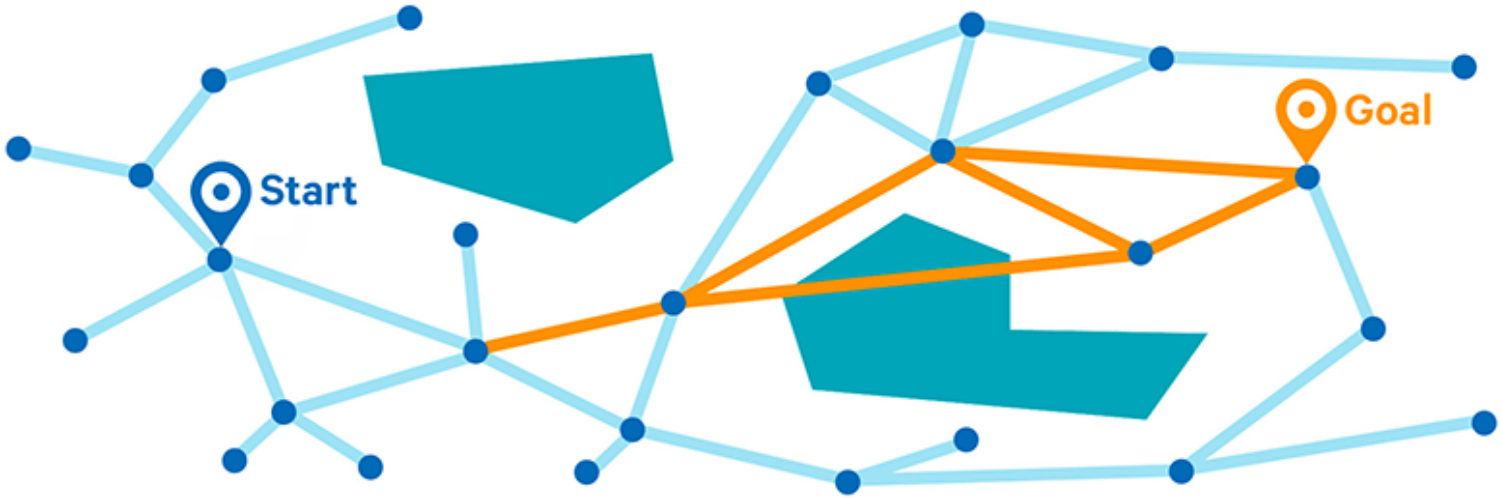

Autonomously Navigate the drone from one point to another

Thank You

THANK YOU !!!