



Grasp Bot Navigator

SAI MANOJ KONIDANA

NITYA CHOWDARY MUMMANENI

SAI HARSHITH TANGUTURI

Introduction

“Grasp Bot Navigator” enables robots to autonomously navigate, identify, and manipulate household objects in a controlled grid environment.

Focuses on enhancing efficiency, reducing human intervention, and providing reliable, contactless delivery services, particularly beneficial in scenarios requiring consistent and timely access.

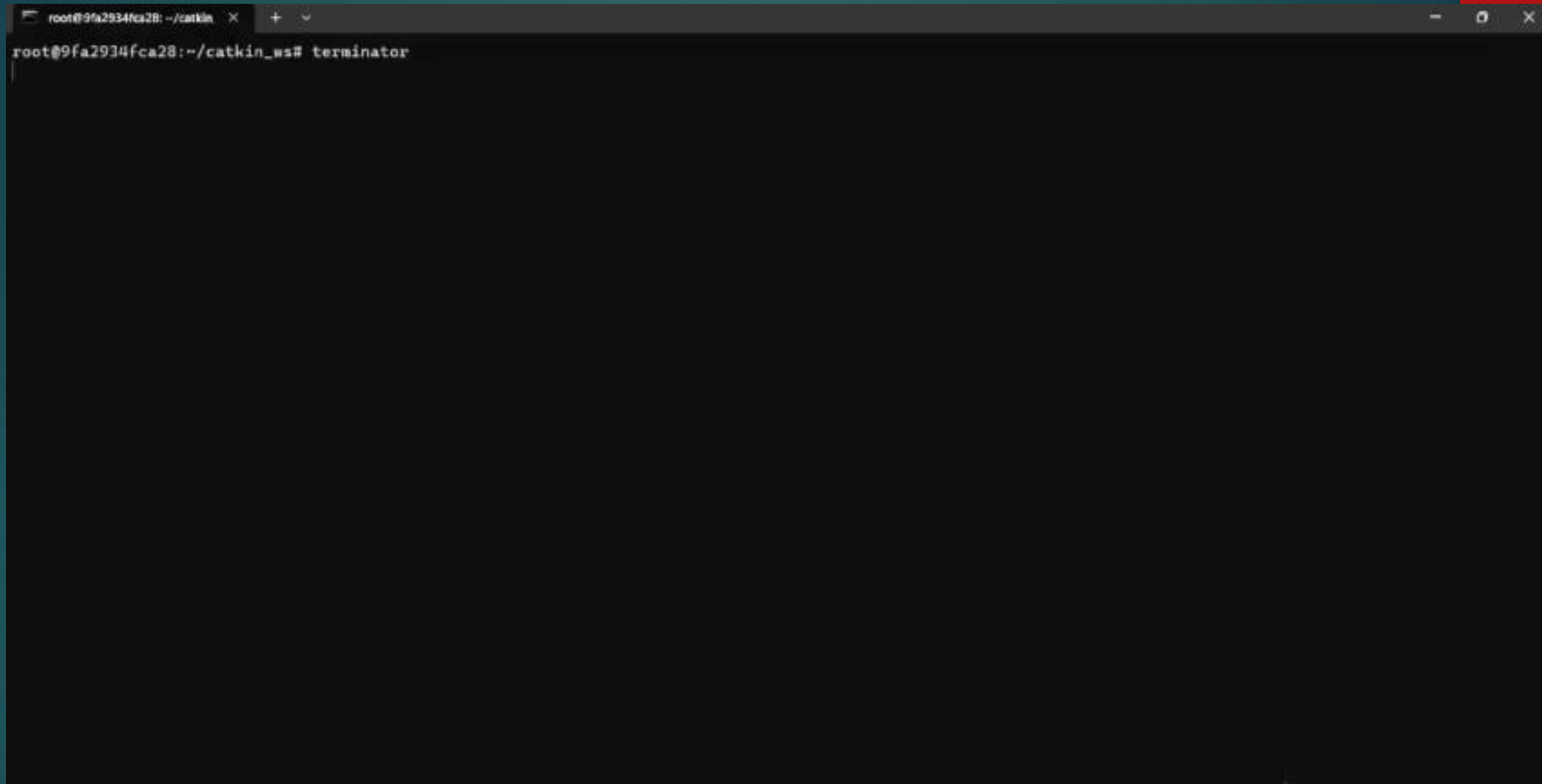
Applications

- **Autonomous Delivery Services** - Allows robots to navigate predefined grids for tasks like delivering food and medicines with precision and efficiency.
- **Industrial Automation** - Enabling robots to handle and transport objects effectively, contributing to increased efficiency in manufacturing and logistics operations.
- **Household Assistance** - Robots can assist with tasks such as fetching and delivering tools.

Implementation

- **Real-time Object Recognition** - Utilizing the Yolo v5 model, the system identifies and classifies household tools in the robot's environment.
- **Efficient Navigation** - The project employs the LIDAR sensing to search for optimal robot movement in a two-dimensional grid, ensuring obstacle avoidance.
- **Precision Manipulation** - The Grasp-Net framework facilitates accurate manipulation by understanding object geometry and determining optimal grasp points for tasks like picking and placing.

Demo

A terminal window with a dark background and light text. The window title bar shows 'root@9fa2934fca28: ~/catkin' and standard window control icons. The terminal content shows the command 'terminator' being executed in a shell.

```
root@9fa2934fca28:~/catkin
root@9fa2934fca28:~/catkin_ws# terminator
```

Future Work

- **Grasping Integration** - Improving the manipulation capabilities to enable the robot to grasp and manipulate identified household tools with much more precision.
- **Enhanced Perception** - Explore advanced perception networks like Dex-Net or GDR-Net to improve object recognition and classification in diverse environments.
- **Multiple Destinations in single environment** – The Robot needs to identify corresponding destinations for each of the objects being delivered. Also, After delivering tools, it needs to come back to its starting point without any human intervention.
- **Integrating both robot functionalities (Navigation and Manipulation) into one single robot.**

Thank You!