Robot Builder's Night Virtual

April 1st, 2025

Introduction

Key highlights include demonstrations of AI-driven email archive search, real-time robot vision processing, and advanced ROS navigation applications.

Main Discussion Points

1. AI Email Archive Search

- **Steve Edwards** showcased his project involving the use of Retrieval-Augmented Generation (RAG) AI to facilitate searches through the DPRG email archives.
- Discussion on the benefits of dense vs sparse indexing, with improvements in metadata usage for better search results.
- A proposed plan for integrating the search into a web interface, offering a potentially valuable tool for members.
- The project is available for public access on GitHub, promising further enhancements.

2. Robot Vision Processing

- **Pat Caron** demonstrated his progress on a robot vision system using OpenCV on a Raspberry Pi. His system successfully identifies and tracks cans and identifies the closest can.

3. ROS2 Navigation and Simulation

- **Mike Williamson** presented advancements in using ROS2 Nav2 for robot navigation in simulation.
- Demonstrated the creation of a '6-can world' in Gazebo simulation software and navigation among obstacles.
- Highlighted challenges with localization and sensor fusion using LIDAR and Time-of-Flight sensors for real-world application.

- Mike is progressing through a Udemy online course in ROS2, furthering his expertise in robotic navigation systems.

4. Line Following Robot

- **Tom C** showed his robot following a line, until it came to a right-angle turn, when it lost track of the line.

Conclusions and Insights

- The session highlighted innovative uses of AI and simulation in robotics development, showcasing practical tools and techniques for problem-solving within the Dallas Personal Robotics Group.
- The AI-powered search tool presents a significant enhancement in archival research capabilities for group members.
- Practical demonstrations of robot navigation emphasize real-world challenges and iterative development to enhance system robustness.

Referenced Links

- **Steve Edwards** shared his GitHub repository containing the DPRG Archive Agent code.

Recognition

- **Black Star** awarded to Steve Edwards for his significant technical contributions with the AI mailing list search.
- **Gold Stars** awarded to Tom Crawford for demonstrating a line-following robot, and Mike Williamson for showing a ROS-based robot navigation in simulation.