Robotics,
Autonomous systems

Weekly Report N°9 for

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RubbleScout,

"Navigating Chaos, Saving Lives"

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Objectives:

- Integrate an ESP32 board into the robot's design for enhanced control and connectivity.
- Test individual LiDAR components with the new ESP32 setup.
- Approach the milestone of conducting the first complete 3D scan.
- Showcase RubbleScout's maneuverability through a custom-programmed joystick control during the Open Day.

Activities Undertaken:

1. Integration of ESP32 Board:
- Reconfigured the robot's underside structure to accommodate an ESP32 board, replacing the Arduino Uno for improved performance. A photo of the assembly is available [here], along with a wiring diagram.

2. LiDAR System Testing:
- Performed individual tests on each LiDAR component using the ESP32, ensuring compatibility and functionality within the new system framework.

3. Prototype Board Assembly for Enhanced Scanning Speed:
- Assembled a new prototype board designed to increase the stepper motor's torque, significantly boosting the LiDAR's scanning speed.
A video showcasing the new maximum speed of the lidar scan can be accessed by following this link : https://www.youtube.com/shorts/SZdtyYCt8Gc

4. Open Day Demonstration:
- Developed a unique control scheme allowing the robot to be maneuvered via a smartphone joystick, effectively demonstrating its capabilities to attendees.
A short video testing the robot's movement is available here :
https://www.youtube.com/watch?v=UmmO_adie_0

Results and Observations:

- ESP32 Integration: Successfully integrated the ESP32, laying a solid foundation for advanced control and communication features.

- LiDAR Testing: Individual component tests with the ESP32 confirmed the system's readiness for a full-scale 3D scanning trial.

- Scanning Speed Improvement: The new prototype board has markedly enhanced the LiDAR's operational efficiency, indicating a promising increase in scan speed.

- Community Engagement: The joystick control demonstration was well-received, highlighting RubbleScout's interactive potential and operational versatility.

Next Steps:

- Full-Scale 3D Scanning: Prepare to conduct the inaugural complete 3D scan, a critical test of the LiDAR's capabilities and the system's overall integration.

- System Optimization: Analyze the upcoming scan results to refine and optimize the robot's performance, focusing on scanning accuracy and speed.

- Continued Engagement: Build on the positive reception from the Open Day by planning further demonstrations and interactive sessions.

Reflections:

This session was pivotal in transitioning RubbleScout from individual component testing to a fully integrated system ready for real-world application. The enhancements to the LiDAR's scanning speed, coupled with the successful integration of the ESP32, mark significant progress in our project. Looking forward, the first complete 3D scan represents not just a technical milestone but a step closer to realizing our vision of a robot capable of navigating chaos to save lives.