

Weekly Report N°16 for

School year 2023-2024

RubbleScout,
"Navigating Chaos, Saving Lives"

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Objectives:

- Redesign the CAD assembly of the RubbleScout robot.
- Integrate new components and functionalities to enhance performance and aesthetics.

Activities Undertaken:

1. CAD Redesign Planning:

- Initiated a comprehensive redesign of the RubbleScout's CAD assembly to incorporate new components and functionalities.
- Mapped out the integration points and spatial arrangements for the new additions to ensure a seamless design transition.

2. Component Integration Planning:

- **NVIDIA Jetson Nano:** Designated as the new processing unit to enhance the robot's AI and computing capabilities.
- **80 mm Fan:** Integrated into the design for improved heat management, essential for maintaining optimal operation of the Jetson Nano and other electronics.
- **Battery Protection:** Developed a concept for a basic puncture protection system using PETG to safeguard the battery unit.
- **Robust Wiring Connections:** Planned enhancements to the electrical connections, specifically for the ESP, to prevent disconnections during operation.
- **Camera and Lamp Installation:** Outlined positions for a Logitech C505e camera and a 12V lamp, including a relay for controlling the lamp, enhancing the robot's vision and operational capabilities in low-light conditions.
- **Aesthetic Features:** Considered the addition of magnetic covers and other aesthetic elements to provide easy access to internal components while maintaining a sleek, functional appearance.

Results and Observations:

- **Clear Design Direction:** Although the physical CAD work is in its early stages, a solid plan is in place for the systematic integration of new components.
- **Enhanced Functionality and Safety:** The planned additions, such as the Jetson Nano and battery protection, are set to significantly boost the robot's performance and safety.
- **Aesthetics and Accessibility:** The incorporation of magnetic covers will not only enhance the robot's appearance but also improve accessibility for maintenance and upgrades.

Next Steps:

- **Detailed CAD Development:** Begin the detailed CAD work based on the initial plans, focusing on precise placement and mounting solutions for all new components.
- **Prototype Testing:** Once the CAD redesign is sufficiently advanced, prototype the new assembly to test fit, function, and the interaction of components.
- **Iterative Design Improvements:** Use feedback from initial prototyping to refine the CAD design, ensuring all new functionalities operate as intended and aesthetic elements align with practical requirements.

Reflections:

This session marked a pivotal shift towards a more robust and functional design of the RubbleScout robot, integrating cutting-edge technology and user-centric features. The thoughtful planning and initial redesign efforts lay a strong foundation for the next phase of development, promising a significantly enhanced robotic platform that is as practical as it is visually appealing. The upcoming CAD work and prototyping are anticipated with enthusiasm, as they will bring the conceptual improvements to tangible reality.