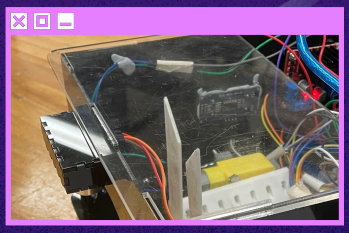
Robots 2 Rescue

TEAM 6

Robustness of Build



The robot is constructed from 2mm acrylic, which is securely and accurately joined together using adhesive and finger slot joints. Additionally, the motors are appropriately supported with 3D printed motor mounts.

Material Selection:
- The use of 2mm acrylic provides a balance between strength and weight, ensuring that the robot remains durable without compromising its agility.
- Acrylic is known for its resilience and ability to withstand external forces, making it a suitable material for a robot designed for rescue scenarios.

Construction Technique:
- The secure and accurate joining of acrylic components using adhesive and finger slot joints suggests a meticulous construction process.
- Precision in assembly is crucial for maintaining structural integrity, especially in challenging environments where the robot may encounter obstacles or rough terrain.

Motor Mounts:
- The 3D printed motor mounts demonstrate a commitment to providing additional support for critical components, namely the motors.
- Proper motor support is essential to prevent misalignment or damage during the robot's operations, contributing to the overall reliability of the robot.

Ball Lifrting Mechanism:
- The 3D-printed ball lifting mechanism can be tailored to provide adequate structural integrity while lifting and transporting the tennis ball, simulating the delicacy required in real-world rescue scenarios.
- The choice of 3D printing for the lifting mechanism allows for the selection of materials that balance resilience and flexibility.

Engineering Quality

The robot's engineering quality exemplifies meticulous attention to detail, adhering precisely to specified size and weight restrictions(25cm x 25cm x 16 cm and 1002 grams).

Precision Construction:
- Laser-cutting techniques are employed with exacting accuracy, ensuring that each component fits seamlessly together. This precision not only meets size specifications but also contributes to the overall robustness of the structure. The use of 2mm black acrylic, was chosen for its balance of strength and weight

Structural Integrity:
- The use of lasercut finger slot joints, combined with the use of 3D-printed motor mounts, enhance stability and support critical components. This focus on structural soundness ensures the robot can withstand the rigors of rescue operations, contributing to its reliability in challenging environments.

User Interface Efficiency:
- The engineering quality extends to the user interface, with a focus on ease of operation. The use of single-key or button activation of functions, and some level of automation demonstrate an understanding of user needs. This not only meets engineering standards for usability but also enhances the overall effectiveness of the rescue robot in the field.

Aesthetic Appeal

Black Acrylic Construction:
- The choice of black acrylic as the primary construction material adds a sleek and professional aesthetic to the robot. The color black often conveys a sense of seriousness and reliability, which aligns well with the gravity of rescue operations

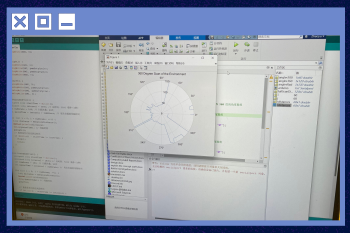
Laser Cut Precision:
- The precision achieved through laser cutting not only ensures accuracy in the construction process but also contributes to the robot's visual appeal enhancing the sleak and polished look of the robot. This impression can instill confidence in both rescuers and those being assisted, emphasizing the seriousness and capability of the robotic rescue tool.

Finger Slot Joints:
- The use of adhesive and finger slot joints not only reinforces structural integrity but also creates a seamless and visually pleasing exterior. The absence of visible screws or bulky connectors contributes to a streamlined and modern appearance

Clear Acrylic Top:
- The incorporation of a clear acrylic top serves a dual purpose. Firstly, it allows for visibility into the internal components of the robot, showcasing the sophisticated technology within. Secondly, it enables the rescuer to observe the victim within the lifting mechanism, adding a layer of transparency and user engagement.

3D Printed Components:
- The strategic use of 3D-printed components introduces a dynamic and innovative dimension to the robot's appearance. These intricately designed components not only serve crucial functional roles, such as motor mounts and the ball lifting mechanism, but also contribute to the overall aesthetic appeal.

Innovation



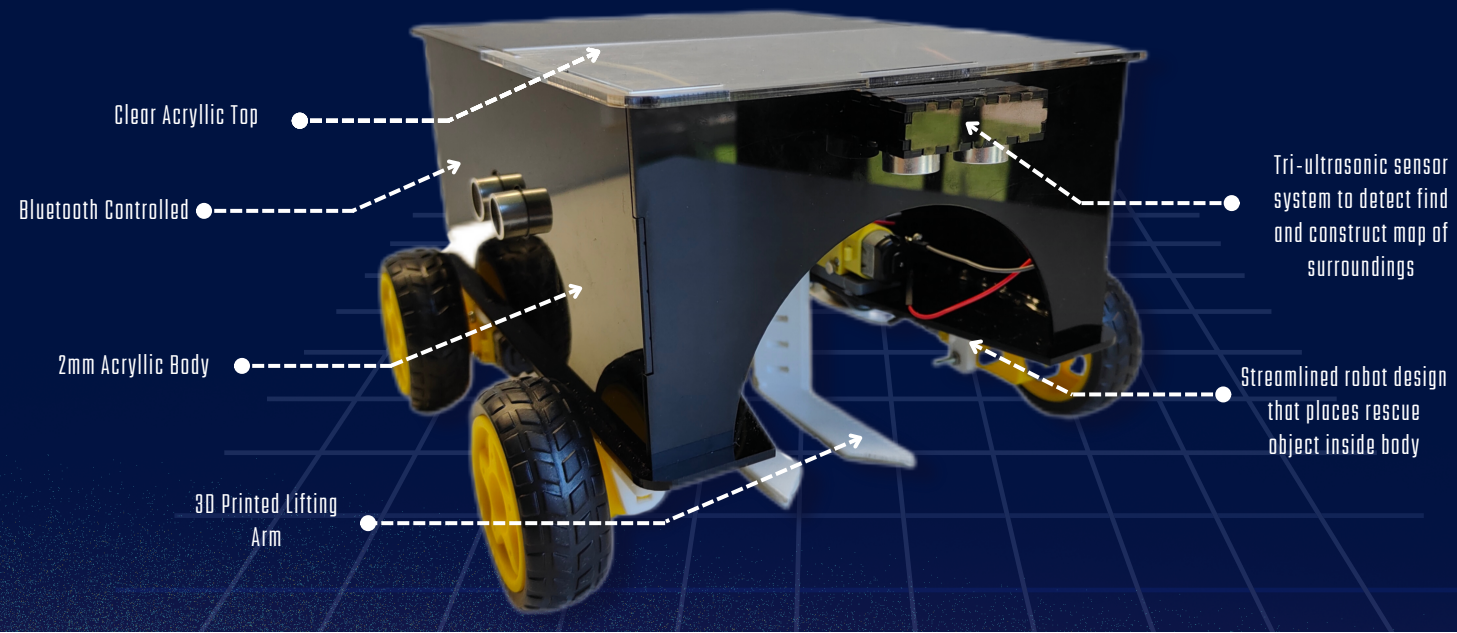
MATLAB Interface
- The rescue robot utilizes an innovative approach by integrating an Arduino-powered ultrasonic sensor system with MATLAB. This synergy allows real-time data from the sensor to be transformed into a visual representation, creating a dynamic image of the robot's surroundings.

Innovative Rescue Object Protection Mechanism
- The lifting mechanism places the rescue object inside the robot's body, ensuring not only protection but also a significant reduction in the space required for transportation. This innovative approach maximizes the efficiency of the rescue mission, minimizes the risk of external damage to the rescue object, and optimizes spatial utilization within confined or challenging environments.

Ultrasonic Sensor System
- Innovative ultrasonic sensors provide precise distance measurements, enabling real-time mapping of the environment and enhancing the robot's spatial awareness for effective navigation.

Lifting Mechanism
- The unique shape of the robot's base ingeniously guides the rescue object towards the lift in a seamless motion, minimizing unnecessary movements.
- The design not only ensures the swift and secure placement of the rescue object but also significantly reduces the risk of injury or damage to rescue object during the lifting process.

Bluetooth Control
- **The** robot employs Bluetooth technology for wireless precision, real-time responsiveness with remote control, and enhanced operator safety.
- Proovides a wireless and efficient means of controlling the robot to enhance maneuverability and reduces the risk of entanglement in complex rescue scenarios.



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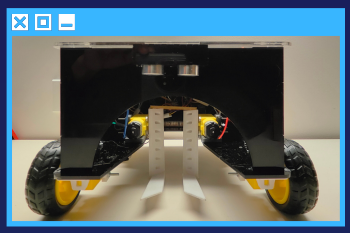

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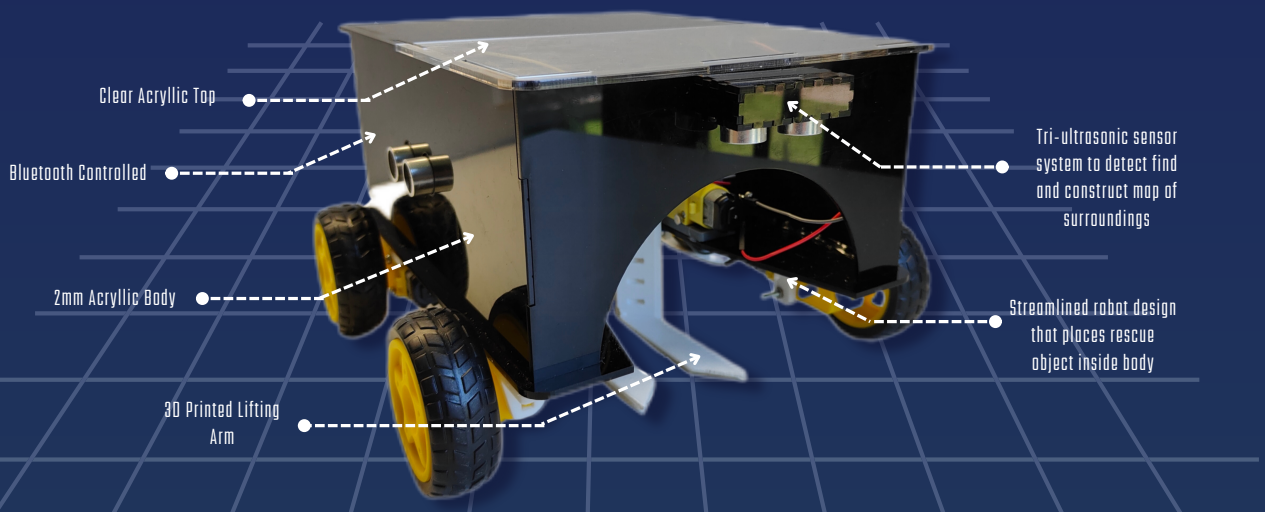

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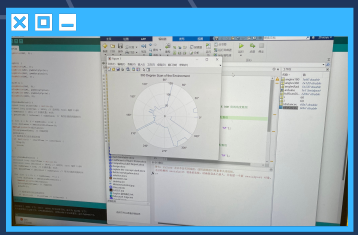

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