The Rubble Robot: AI- Augmented Robot Snake for Terrain Classification, Hotspot Detection, and Autonomous Navigation

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A notable problem that needs to be solved is even to this day is searching for survivors in collapsed buildings. Building collapses often lead to unstable piles of rubble that could collapse at any moment, which complicates search and rescue efforts. We created an affordable and versatile robot capable of navigating through rubble for less than $300. This year the goal was to mechanically improve our robot by adding a bio-inspired skin layer that could be used for efficient travel through confined spaces in rubble using traction to have better grip on the rubble as it maneuvers to get to the survivor. To improve on the artificial intelligence and software of our robot, our goal was to use artificial intelligence to power our robot to be able to analyze vibration signatures in order to classify terrain type. Along with this, using AI software the robot would process low-resolution thermal data to detect survivors through body heat signature and obtain decision making in taking optimal routes based on intelligent path-planning algorithms. With the combined multi-modal sensor data in the fusion system, as the robot makes its way towards its target survivor, recorded data collected from each sensor can be sent back to the user. As the snake robot moves through the rubble, adjusting gait real time can allow it to move across uneven surfaces while still maintaining stability. With the ability to record data as it moves within the rubble, not only is it able to look and find survivors but also make reports to further the advancement of safe and quick search and rescue operations within local and undeveloped locations.

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