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Robots on a Mission: Safeguarding Animals from Wildfire Disasters

The Problem

Fires have been used by humans for millennia and play a critical role in many ecosystems. The use of fire for hunting, favoring preferred plants for food, fodder, clearing for agriculture and grazing, easing travel and controlling pests is well documented, historical and continues today. This is particularly the case in developing countries where people depend directly on forests and agriculture for their livelihood and food security. Fires maintain some ecosystems, such as savannas. (1);(2)

About 4 % of the global vegetated area is burnt every year by fires, natural, prescribed and wild. Wildfires have significant impacts on humans and on the natural environment. They affect human lives and livelihoods and result in high social and economic costs, associated not only with the damage, but also with the prevention and suppression measures put in place every year. Fires cause large increases of atmospheric emissions and pollutants, soil erosion, reduce the provision of goods and services by forests, and change land cover patterns and landscape ecosystem dynamics1. A review of extreme wildfire events between 2002 and 2020 identified that: • Wildfires can have disastrous impacts and extreme wildfire events can be ‘disasters’ (characterized by impacts including damage and loss to built assets and infrastructure and loss of life), are globally distributed and nearly all (96%) are associated with dangerous and unusual weather conditions such as high fire danger, high winds, high temperatures, anomalous climatic conditions such as drought or abundant precipitation stimulating vegetative growth in arid regions.(3);(4)

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• The influence of weather conditions in extreme wildfire events suggests increasing vulnerability to these events with climate change

PLAN

We propose the implementation of a cutting-edge initiative that employs robotics technology to rescue and reset animals affected by wildfires. The primary objective of this project is to enhance the efficiency and safety of animal rescue operations during wildfires, thereby mitigating the harm caused to wildlife and domestic animals.

Background: Wildfires pose a severe threat to the well-being of animals residing in forests, natural habitats, and even in residential areas. The conventional methods of animal rescue during wildfires often encounter limitations due to the dangers posed by the fire itself. Deploying specialized robots equipped with rescue capabilities can significantly improve the effectiveness of these operations.

Project Goals:

- Develop and deploy robotic systems for animal rescue in wildfire-affected areas.
- Enhance the safety of both animals and human responders during rescue operations.
- Collaborate with wildlife conservation organizations, fire departments, and relevant authorities.
- Promote public awareness and education regarding animal rescue during wildfires.

Robotic Technology:

- Acquire and adapt robotic platforms capable of traversing wildfire-affected terrain.

- Equip robots with cameras, sensors, and manipulator arms for locating and rescuing animals.
- Implement remote operation capabilities for human control and supervision.

Animal Detection and Rescue Algorithms:

- Develop algorithms for identifying and tracking animals in real-time using robotic sensors and cameras.
- Create algorithms for safely capturing and securing animals for transport to safety.
- Establish a communication network between robotic systems, human operators, and emergency responders.
- Collaborate with wildlife experts, veterinarians, and animal rescue organizations to ensure the well-being of rescued animals.
- Number of animals rescued and reset during wildfire incidents.
- Response time for robotic systems to reach and rescue animals.
- Effectiveness of robotic algorithms in animal detection and capture.
- Public engagement and awareness levels.

The utilization of robotics technology for animal rescue during wildfires represents a groundbreaking opportunity to safeguard the lives of animals affected by these disasters. We seek your support and partnership to bring this project to fruition and make a significant impact on wildlife conservation and disaster response efforts.

Thank you for considering our proposal. We look forward to discussing this initiative further and working together to protect and rescue animals during wildfire emergencies.

Description

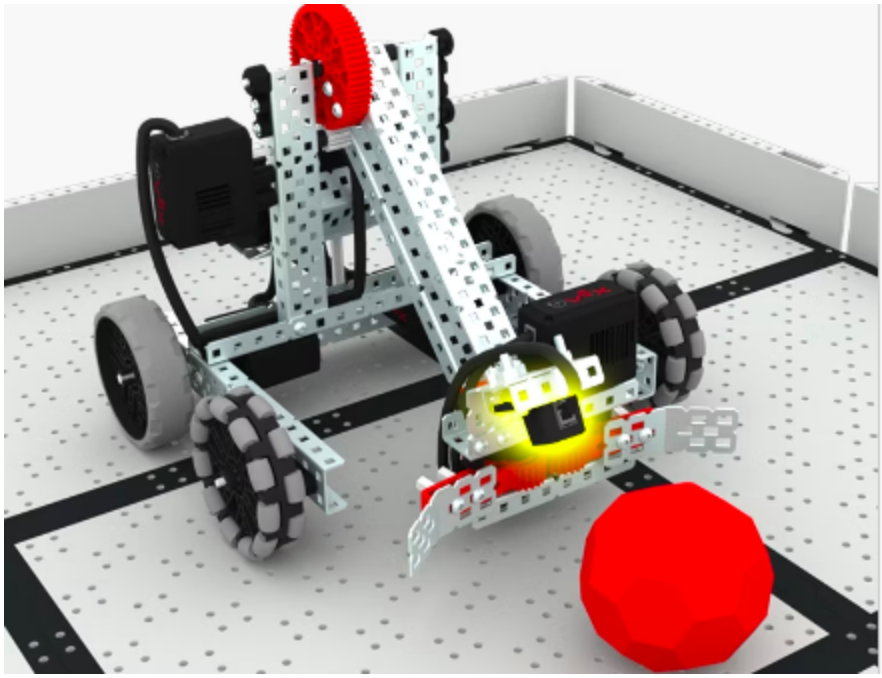
We will explore the application of the Optical Sensor in the context of a firefighting vex robot. Similar to its use with the Clawbot and the Buckyball, we will leverage the blocks in our project to enhance the robot's ability to respond to specific environmental cues. The goal is to create a robot that can assist in firefighting scenarios by detecting and navigating towards areas with higher heat intensity.

Firstly, we will understand how the Optical Sensor can be adapted to recognize variations in temperature. Instead of focusing on color, the sensor will be programmed to identify temperature changes, which can be crucial in identifying potential fire sources. This involves adjusting the sensor parameters and incorporating appropriate conditions.

Next, you will utilize the[Repeat blocks to enable the robot to continuously scan its surroundings for temperature anomalies. The robot should be capable of autonomously navigating through an environment and identifying areas with elevated temperatures, indicating potential fire hazards.

After mastering the basics, we will apply your knowledge to a practical scenario – the Firefighter Challenge. Our robot's task will be to locate and approach areas with high temperatures, simulating a fire, and potentially extinguishing it. The challenge will test your ability to program the robot efficiently and make real-time decisions based on the information gathered by the Optical Sensor.

We emphasis will be placed on the importance of precision and quick response times, as these qualities are critical in firefighting situations. By the end of our project , we should have a robot capable of autonomously identifying and responding to potential fire hazards, showcasing the practical application of the Optical Sensor in a crucial real-world scenario**.**



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