BIO-INSPIRED ROBOTIC NAVIGATION ON VARIED TERRAIN

Computer Science and Artificial Intelligence BSc
Final Year Project

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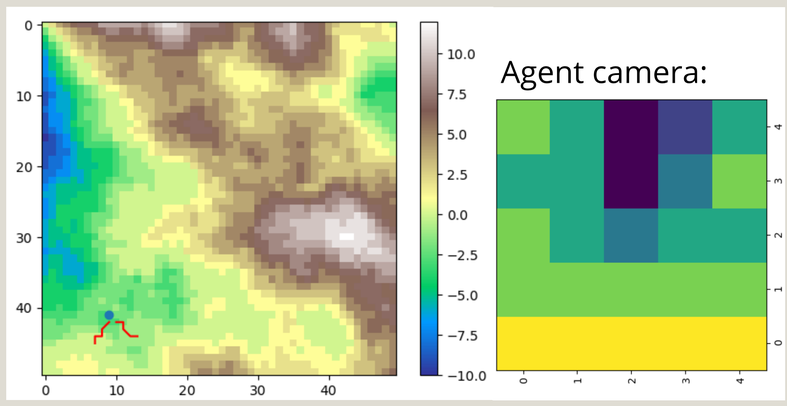
INTRODUCTION

In this project, I have investigated autonomous robotic navigation through localized decisions based on previous experience. Self-preservation is key in biological and computational agents for survival. For example, if the mars rover gets stuck, there is no one to fix it. An autonomous robot will need to know its own limitations and avoid potentially hazardous environments.

SIMULATION

A simulation environment was generated using Perlin noise. This made a 3D world of different terrains, stored within a 2D array. The agent was deployed using evolutionary strategies to evolve a multi-layer perception. The input was a stereo disparity map generated..



THE WHEG

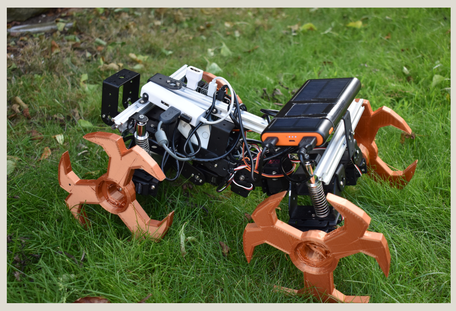
The Wheg is a mix between a wheel and a leg. Wheels use a single axis rotation which makes them energy efficient. Wheels have terrain limitations due to the cyclic design. Legs are much better at overcoming terrain, however use high energy and complex mathematical control. Whegs are an energy-efficient hybrid that improves climb while keeping the cyclic efficiency of a wheel.

BIOLOGY

In this section, state what is the purpose of your study.

PHYSICAL ROBOT

The chassis used



RESULTS

...TODO

ANALYSIS

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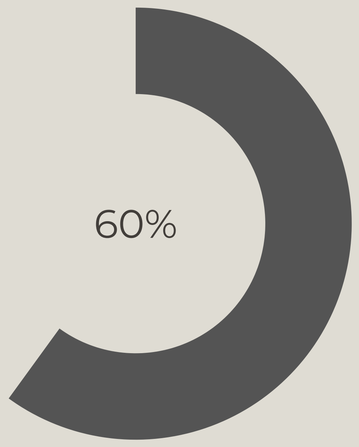
Illustrations are also great aids to help your research poster.



CONCLUSION

TODO

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RELATED LITERATURE

Comparing cock-roach and whegs robot body motions. IEEE International Conference on Robotics and Automation, 2004

Interspecific evaluation of octopus escape behaviour.Journal of Applied Animal Welfare Science

Rough terrain intelligent robots through reinforcement learning, 2020