Novelty Search of Soft Robot Morphologies for Space Exploration

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ABSTRACT

don't worry about this, we gonna write it at the end

Categories and Subject Descriptors

H.4 [**Information Systems Applications**]: Miscellaneous

General Terms

Theory

Keywords

soft robotics, novilty search, CPPN, HyperNEAT, VoxCAD

1. INTRODUCTION

Motivation, space, small bodies, passive actuation, story of Rosetta/Philae - stupid rigid probe without locomotion, we can do better!

2. BACKGROUND

- gaits at different gravity levels (Ariadna Space Gaits); fixed morphology, rigid body dynamics
- soft robots
- unshackling evolution paper

3. METHODOLOGY

3.1 VoxCAD simulator

3.2 HyperNEAT + CPPN + Novelty

behaviours

3.3 Novelty + Fitness-based

3.4 Experimental setup

parameters, gravity

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4. RESULTS

novelty (+ fitness) better than fitness examples of cool creatures taxonomy of the evolved creatures at different gravity levels (hoppers, 2-3-4 legs, crawler, tumbleweed)

5. DISCUSSION

what's the use of this? getting inspiration for soft robotic probe / landers (tumbleweed) come back to asteroid scenario (passime motion), would it have saved Philae?

6. CONCLUSIONS

our setup better than results from "unshackling evoltion" methodology is suitable to design diverse gaits of soft robots at various gravity levels future work: ensamble of behaviors, very low gravity environments and rotational parameters of small body linked to actuation frequency