Salamander Foot Design

Midterm semester project presentation

Laura Paez
Outline

- Motivation
- Previous work
- Purpose
- Design methodology (Niches in Taxonomy)
- Hardware design concept
- Future work
- Questions
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Animal Aquatic Stepping

https://www.youtube.com/watch?v=lNcuZmugX5w
Pleurobot Aquatic Stepping
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Previous works on design leg

Reconstruct Leg Kinematics
Student: Reza Safai

Student: Patrick Shwizer
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Purpose

Develop a **methodology for generic foot design**, in sprawling posture undulatory-spine-based robots.

Lizard locomotion 1:
High-speed quadrupedal and bipedal running
Zebra-tailed lizard (*Cailisaurus draconoides*)

Dr. Bruce C. Jayne
Department of Biological Sciences
University of Cincinnati
Project components

Develop a **methodology for generic foot design**, in sprawling posture undulatory-spine-based robots.

- Design methodology (Niches in Taxonomy)
- Hardware design concept
- Experimentation, analysis and conclusions
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Biological classification (sprawling posture)

Investigate systematically inside animal taxonomy

- Animalia
  - Chordata
  - Arthropoda
    - Tetrapododa
      - Reptilia
      - Aves
      - Mammalia
      - Amphibian

- Kingdom
  - Phylum
  - Superclass
    - Class
Biological classification (sprawling posture)

Representative animals
Biological classification (sprawling posture)
Biological classification (sprawling posture)
Biological classification (sprawling posture)

Animals with similar locomotion characteristics:
- Length
- Mass
- Speed
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Hillberry joint

- Pair of cylinders in rolling contact on each other
- Low friction and abrasive wear.
- Elastic ligaments

Adapted

(a) Perspective view

(b) Side view and movement

Pisa/IIT SoftHand

- The joint can withstand severe disarticulations and violent impacts
Finger Design
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*Ground Reaction forces*

**Legend:**
- H = Humerus
- U = Ulna
- R = Radius
- CMP = Carpals, Metacarpals and Phalanges

2. http://a-z-animals.com/animals/dwarf-crocodile/


References


13. http://a-z-animals.com/animals/tiger-salamander/
Questions?