Learning for Control of Synthetic and Cyborg Insects in Uncertain Dynamic Environments

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Cyborg beetle **Synthetic crawler**

Objective

Development of learning and adaptation capabilities that will enable operation of synthetic and cyborg insects in complicated environments, such as collapsed buildings.

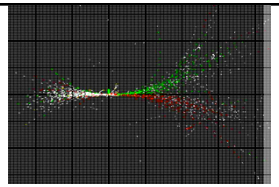
Technical Approach

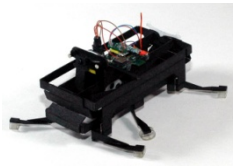
(i) Online performance improvement from minimal experience.

(ii)Learn control policies and dynamics models through sharing across platforms and environments.

(iii) Control learning algorithms on low-cost, low-power platforms.

Year 1 Results





Cyborg beetle:
Hardware/software setup, initial flight data

Synthetic crawler:
On-board electronics: video, gyro, accel.

Learning and adaptation:
Model-free policy gradient like method that leverages past experience for improved learning performance.