A Bio-Inspired Robot With Visual Perception of Affordances
How can we engineer a robot which interacts with its visual environment similar to a real bee?
Insect brains are million times smaller than ours and yet they can learn through symbolic language and develop spatial abilities.
The proposed neural controller
Isolated Learning

To learn and recognize a pattern (odor) no counter examples are needed.
Isolated Learning: An autocritical Agent

Rule 2: Do not fire with noise

Rule 1: fire with object

TSS code

noise

ITA

Variable Target

Backpropagation

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Prof. Dr. Oscar Chang
http://www.ogchang.com/
Isolated Learning. The effects of a Reward

The space-time diagram of one reward

Rule 1: Fire with object
Rule 2: Don't fire with noise

Error decay for object training

Error decay for noise training
The proposed Affordance driven Robot

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2014
Experiment 1:

The emergence of affordance perception

Experiment 1: Exploring the World

The emergence of affordance perception
Experiment 2: Exploring Caltech Database

A non easily distractible eye
Results: An affordance Driven Robot

Affordance Perception

- Isolated learning
- Prolonged learning time
- Chain-released learning resources
- Exposition to abundant learning examples