Mirror Neurons based Object Recognition

LIRA-Lab, DIST, University of Genova - **Italy**:
Giulio Sandini, Giorgio Metta, Lorenzo Natale
Dept. of Biomedical Sciences University of Ferrara - **Italy**:
Luciano Fadiga, Laila Craighero
Instituto Superior Técnico, Lisbon - **Portugal**:
Josè Santos-Victor, Alex Bernardino, Manuel Cabido-Lopes
Dept. of Psychology, University of Uppsala - **Sweden**:
Claes Von Hofsten, Kerstin Rosander

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The project investigates the association of visual information and motor commands in the learning, representation and understanding of complex manipulative gestures (grasping). Mirror combines physiology, psychology, and computer science in building a realistic model of **"Mirror Neurons"**

Mirror neurons are visuomotor neurons that are active when the monkey acts on an object **and** when it observes another monkey, or the experimenter, making a similar goal-directed action

within A's brain...

B doing — object

A doing — object — goal
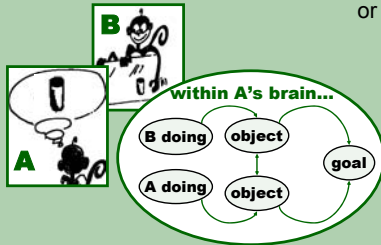
We formulated a probabilistic model of the functioning of the mirror system that includes the interaction between two populations of neurons. Mirror neurons are the results of learning first how to execute certain actions and then reusing this knowledge to interpret someone else's actions.
This association is possible since the two situations share a common goal of acting onto the same object.

Modeling mirror neurons in artificial systems

Studying the development of manual control in infants

Analyzing mirror neurons in behaving primates

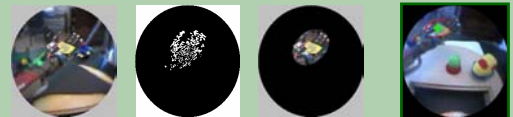LIRA-Lab and IST

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Self-generated motor information provides a more effective way to cluster visual information and improve the recognition of grasping action performed by others

1
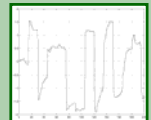
Learning how to represent (and segment) the objects of interest in the scene and robot's own hand in a cluttered environment

2

Investigate how infants can perceive properties of objects such as their shape and their orientation in relation to the goal of inserting it into an aperture, and elaborate an action plan

3