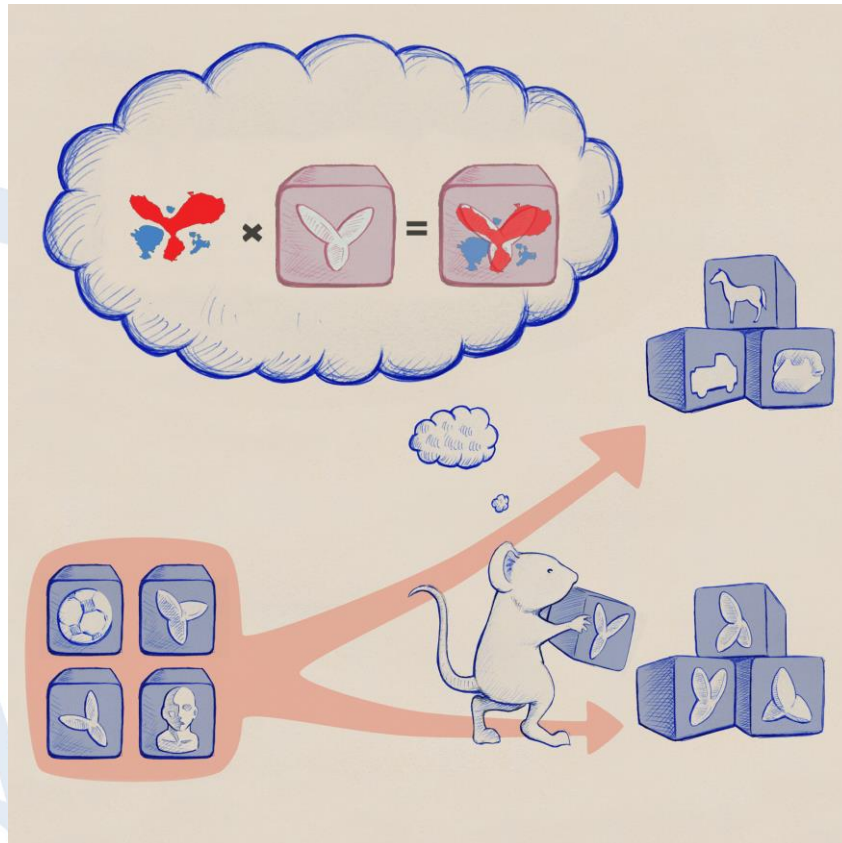




PRESS RELEASE

Visual recognition: seeing the world through the eyes of rodents



A SISSA study opens up new avenues for understanding the mechanisms of vision

19 March 2018

Man or woman, happy or sad. Sometimes a glance is enough to say it. Yet, the visual process that allows us to recognize the gender or emotional state of a person is very sophisticated. Until recently, only primates were deemed able to perform such complex operations as object recognition. A new study from the International School for Advanced Studies – SISSA, published in the journal *Current Biology*, shows that rodents also use advanced and diversified object recognition strategies. These results confirm the validity of this animal model for the study of object vision and offer new opportunities for the development of artificial vision systems and diagnostic approaches.



The identification of an object, a person or its emotional state are computations that we routinely carry out in our lives. Just a few tens of milliseconds are enough. Underneath, there is our ability to extract from the retinal image the specific features of an object or a face (such as, for example, the eyes and the mouth) and their spatial relationships (the relative position of the eyes compared to the mouth). New research conducted in the visual neuroscience laboratory directed by Davide Zoccolan and published in *Current Biology* has demonstrated the existence of similar object recognition strategies in rodents. Through a behavioural study, Vladimir Djurdjevic and co-authors investigated the ability of rats to discriminate a reference object (Y-shaped) from other 11 objects, more or less similar to the reference. The scientists observed different, rat-specific recognition strategies, based on the detection of the presence or absence of specific parts of the object in question, to which correspond, as in primates, different levels of performance in the visual discrimination task. Through the use of computational models, developed in collaboration with Jakob Macke of the Caesar Research Center in Bonn, the authors have also succeeded in demonstrating that the highest levels of performance are associated with the perceptual strategies that are more complex, in terms of number and variety of visual features extracted from the image.

"These results not only confirm the validity of rodent models for the study of vision but can also have interesting applications," comments Zoccolan, "The type of visual recognition strategies employed by rats seems to be quite advanced to be used as an inspiration for the improvement of artificial vision systems based on neural networks. Furthermore, measuring the complexity of perceptual strategies can be applied in studies using rodent models of psychiatric and neurological disorders, in which sensory perception is altered or distorted, as in autism spectrum disorders".

USEFUL LINKS:

Original paper: <https://goo.gl/dPBiXm>

IMAGE:

Credits: Marco Gigante

Courtesy of: *Current Biology*

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