Computing with Neural Ensembles
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Le professeur Miguel Nicolelis a été invité par le Professeur Jean Rossier pour développer le BMI (Brain Machine Interface) au sein du laboratoire de Neurobiologie de l'ESPCI. Il a donné une série de 4 conférences en Octobre 2008 qui ont été enregistrées et sont disponibles sur le site web de l'ESPCI http://radium.net.espci.fr/esp/MNicolelis/
Le 2 novembre le professeur Miguel Nicolelis détaillera ses derniers travaux sur le BMBI (Brain Machine Brain Interface) qui viennent d'être publiés le 5 octobre sur le web de la revue Nature doi:10.1038/nature10489 Nature october 5 2011 .

Brain–machine interfaces use neuronal activity recorded from the brain to establish direct communication with external actuators, such as prosthetic arms. Iti s hoped that brain–machine interfaces can be used to restore the normal sensori-motor functions oft he limbs, but so far they have lacked tactile sensation. Here we reportt he operation of a brain–machine–brain interface (BMBI) that both controls the exploratory reaching movements of an actuator and allows signaling of artificial tactile feedback through intracortical microstimulation (ICMS) oft he primary somatosensory cortex. Monkeys performed an active exploration task in which an actuator (a computer cursor or a virtual-reality arm) was moved using a BMBI that derived motor commands from neuronal ensemble activity recorded in the primary motor cortex. ICMS feedback occurred whenever the actuator touched virtual objects. Temporal patterns of ICMS encoded the artificial tactile properties of each object. Neuronal recordings and ICMS epochs were temporally multiplexed to avoid interference. Two monkeys operated this BMBI to search for and distinguish one oft hree visually identical objects, using the virtual-reality arm to identify the unique artificial texture associated with each. These results suggestt hat clinical motor neuroprostheses might benefitf rom the addition of ICMS feedback to generate artificial somatic perceptions associated with mechanical, robotic or even virtual prostheses.

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