

## Emerging Technology Trends

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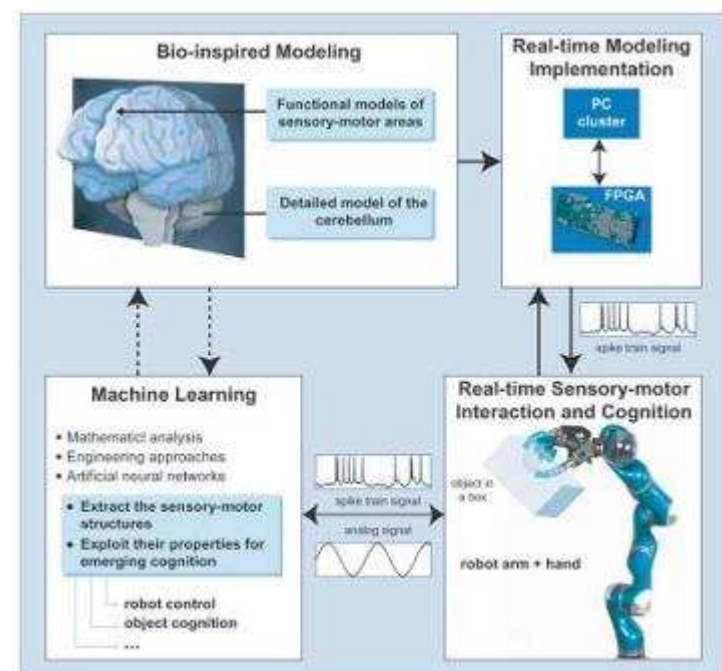
# Artificial brains for robots?

Posted by Roland Piquepaille @ 9:40 am

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An international team of European researchers has implanted an artificial cerebellum — the portion of the brain that controls motor functions — inside a robotic system. This EU-funded project is dubbed SENSOPAC, an acronym for 'SENSORimotor structuring of perception and action for emerging cognition.' One of the goals of this project is to design robots able to interact with humans in a natural way. This project, which should be completed at the end of 2009, also wants to produce robots which would act as home-helpers for disabled people, such as persons affected by neurological disorders, such as Parkinson's disease.



You can see above how a SENSOPAC robotic system with an artificial brain will learn (Credit: SENSOPAC flyer (PDF format, 2 pages, 520 KB). The European SENSOPAC project started on January 1, 2006 and will take 4 years to be completed. The 12 organizations participating to the project come from 9 different countries and have provided physicists, neuroscientists and electronic engineers.

The microchips which incorporate a full neuronal system have been designed at the University of Granada, Spain. "Implanting the man-made cerebellum in a robot will allow it to manipulate and interact with other objects with far greater effectiveness than previously managed. 'Although robots are increasingly more important to our society and have more advanced technology, they cannot yet do certain tasks like those carried out by mammals,' says Professor Eduardo Ros Vidal, who is coordinating the work at the University of Granada. 'We have been talking about humanoids for years but we do not yet see them on the street or use the unlimited possibilities they offer us,' the Professor added."

The SENSOPAC website gives more details about the project. "The SENSOPAC project will combine machine learning techniques and modelling of biological systems to develop a machine capable of abstracting cognitive notions from sensorimotor relationships during interactions with its environment, and of generalising this knowledge to novel situations. Through active sensing and exploratory actions the machine will discover the sensorimotor relationships and consequently learn the intrinsic structure of its interactions with the world and unravel predictive and causal relationships. Together with action policy formulation and decision making, this will underlie the machine's abilities to create abstractions, to suggest and test hypotheses, and develop self-awareness."

This very ambitious project has been divided into 5 modules.

- Active sensing
- Structure and statistics of sensorimotor interactions
- Movement and coordination for active perception
- Computation and learning in neural circuits for sensorimotor processing
- Towards an Artificial Haptic Cognitive System

It will certainly be interesting to see the progress of this EU project.

Sources: CORDIS News, August 27, 2007; and various websites

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Roland Piquepaille lives in Paris, France, and he spent most of his career in software, mainly for high performance computing and visualization companies. For disclosures on Roland's industry affiliations, click here.

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