

## Network Action Proposal

Title:	"Adaptive Mechanisms of the Perception-Action Cycle" Workshop in conjunction with the International Conference of Artificial Neural Networks (ICANN 2008)
Membership number(s)	
Member name(s)	Vassilis Cutsuridis <sup>1</sup> (member), John Taylor <sup>2</sup> (member), Amir Hussain <sup>1</sup> (non-member)
Member institute/company name(s)	<sup>1</sup> Department of Computing Science and Mathematics, University of Stirling, Stirling FK9 4LA, U.K. <sup>2</sup> Department of Mathematics, King's College, London, U.K.
Goals of the action	<p>The perception-action cycle has been described by many, especially in association with the notion of affordances of the psychologist JJ Gibson in 1979, being traceable back to the theoretical biologist JV Uexkull in 1936, but with important developments by the neuroscientist JM Fuster: "the circular flow of information that takes place between the organism and its environment in the course of a sensory-guided sequence of behaviour towards a goal. Each action in the sequence causes certain changes in the environment that are analyzed bottom-up through the perceptual hierarchy and lead to the processing of further action, top-down through the executive hierarchy, toward motor effectors. These cause new changes that are analyzed and lead to new action, and so on and so forth".</p> <p>The perception-action cycle and affordances have numerous important processing features still to be explored. Thus the mirror neurons of Rizzolatti and colleagues (looked at in the more modern view of internal simulation of the actions of others) play a role in learning the affordances of objects acted on by another, or of learning action strategies from the other (using already learnt actions). The full perception-action cycle itself thus involves these affordance components as well as a hierarchy of levels in the brain at which this cycle takes place (as the above quotation notes). Allied to this there is also the development of internal motor models to aid in the internal simulation of the action-perception cycle, so leading to the possibility of thinking and more specifically reasoning. As such this whole set of processing mechanisms is rich with possibilities of extracting, from increased understanding of how these process work, algorithms able to be inserted into machine systems.</p> <p>The goal of the workshop is to provide an international, interdisciplinary forum on the topic of adaptive mechanisms of the perception-action cycle, with the purpose to advance our understanding of the state-of-the-art on bottom-up and top-down approaches to artificial cognitive systems development. Presentations and papers on perception, attention, memory, learning, decision making, reasoning, conflict resolution, motivation and action are welcome. The manner in which attention is involved (initially to consciously guide the visual and motor processing and then to let it run on automatic until error signals bring attention focus back to the source of the problem and attempt its resolution) will also be considered a highly relevant topic for the workshop.</p> <p>The perception-action cycle is an important aspect by which to enter a larger domain associated with the</p>

	<p>construction of autonomous machines. The latter require the perception-action cycle as a basis for development of an embodied system able to learn (by trial and error or observational learning) how to be increasingly effective in the given environment of the machine.</p> <p><u>Specific aims:</u></p> <ul style="list-style-type: none"> <li>• To bring together a number of leading researchers in the interdisciplinary fields of cognitive systems, robotics, artificial intelligence and computational neuroscience;</li> <li>• To explore current trends on simulation models of autonomous systems with special focus on its implications for cognitive systems, and through discussion of implementations of the perception-action cycle, the related aspects of internal motor models and of internal simulation through mirror-neuron-like systems, or otherwise;</li> <li>• To explore the question as to how much knowledge should we take from brain science in implementing a cognitive system;</li> <li>• To evaluate levels of investigation, modelling methodologies and current formalisms regarding the origin and development of cognitive systems;</li> <li>• To review the main findings and conclusions of previous ICANN “Cognitive systems” workshops;</li> <li>• To define a future research agenda for autonomous systems research including various levels of fielded applications and implementations.</li> </ul>
<p>Principal activity to which it contributes</p> <ul style="list-style-type: none"> <li>○ Community Outreach</li> <li>○ Scientific Outlook</li> <li>○ Education &amp; Training</li> </ul>	<p>All three</p>
<p>Concrete outcomes of the action (at least one of which should be material suitable for publication on the euCognition website)</p>	<p>We will provide a summary of the individual talks at the end of the workshop. We will also ask the speakers to provide us with their slides which will be collected and put up on the EU-Cognition web-server.</p> <p>We also plan to host a special issue in a journal (e-Cognito/Springer, or Neurocomputing/Elsevier), which will host papers from all invited speakers as well as papers from other workshop participants.</p> <p>Dr. Amir Hussain (one of the organizers of our workshop) is the editor-in-chief of e-Cognito (Springer), whereas both Prof. John Taylor and Dr. Vassilis Cutsuridis are members of its editorial board.</p> <p>Furthermore, Prof. John Taylor is the co-editor-in-chief of the Neural Networks journal (Elsevier) as well as member of both advisory and editorial boards of a number of other related to the workshop journals (e.g. Neurocomputing, International Journal of Neural Systems, etc.)</p>
<p>Effort in person-days that will be charged to the Network Action (if any)</p>	<p>None</p>

Expected start and duration in months	A half-day workshop, starting in September 6 <sup>th</sup> , 2008 in Prague
<p>The requested funding, under the following headings:</p> <ul style="list-style-type: none"> <li>○ Travel Costs</li> <li>○ Other Costs (check with the Network Coordinator if you aren't sure about eligibility of these costs)</li> <li>○ Labour Costs (identify the number of person-days and the rate per day).</li> </ul>	<p>The goal of this specific action is to support the invited speakers to come to the workshop. We would like to offer them full support of their expenses, thus we request:</p> <p><b>Overall budget requested:</b></p> <p>An average/estimated cost <b>per speaker</b></p> <p><b>Travel:</b> 600 EUR  <b>Accommodation:</b> 450 EUR (2 nights)  <b>Registration:</b> 300 EUR</p> <p><b>Total:</b> 1350 EUR x 4 speakers = <b>5400 EUR</b></p>
Please identify any other sources of funding that contribute to this Action (actions to support events such as workshop and conferences should include an outline budget identifying the total cost)	None
Workshops: <i>official euCognition event</i> (yes/no & maximum number of members that can be accommodated)	Yes The workshop is open to all ICANN attendees