Network Action Proposal

Title:	Visit of Giovanni Pezzulo to the Department of Psychology, University of York, UK
Membership number(s)	119
Member name(s)	Giovanni Pezzulo
Member institute/company name(s)	Institute of Cognitive Sciences and Technology (ISTC – CNR), Rome
Goals of the action	The goal of this action is to enable a 6-week visit of **Giovanni Pezzulo** http://www.istc.cnr.it/createhtml.php?nbr=1 from the Institute of Cognitive Sciences and Technology (ISTC-CNR) in Rome, to the Department of Psychology, University of York, UK. The University of York is well known for the outstanding work on psychological models of memory (Baddeley and Hitch, 1974; Baddeley, 2000). Recently Burgess and Hitch (2005) reviewed computational models of working memory, proposing that: (1) working memory and long-term memory should be studied and modeled in the same framework; (2) working memory could emerge from the competition (for limited processing resources) among several processes and representations in long-term memory; (3) very basic mechanisms such as "competitive queuing" are responsible for the interaction of working memory with long-term memory; (4) although the authors only refer to research about memory for verbal sequences, the same mechanisms underly cognitive phenomena related to several areas, such as memory for objects, places, events, etc. There is thus the opportunity to design a cognitive architecture exploiting the same general principles for several cognitive tasks. This methodological approach has been adopted at ISTC-CNR in designing the computational architecture AKIRA (Pezzulo and Calvi, 2005b,a, 2007) in which principles such as competition among limited resources and cooperation between cognitive processes are directly embedded into the design of the system. For this reason, AKIRA permits to implement cognitive models that are based on the same underlying principles and re-use them in several fields. Models developed in AKIRA have been successfully applied to the design of autonomous systems in which several behavioral modules compete and cooperate for satisfying innate drives (Pezzulo and Calvi, 2006b,a) or achieving sophisticated goals, also performing means-ends analysis and practical reasoning (Pezzulo et al., 2007). AKIRA has been also used for developing a model of decision making under uncertainty and ignorance in the framework of (Pezzulo, 2006)'s PhD dissertation. Currently in AKIRA memory tasks are dealt with by using mechanisms of competition for limited resources. The system can manage several competing cognitive processes (that can be for example behaviors), and a variable amount of energetic resources is assigned to them depending on their contextual relevance. Accordingly, contextually relevant information is retrieved and processed at a very high speed, while other information can be considered 'unavailable'. These principles are highly related with mechanisms such as "competitive queuing" that are proposed by Burgess and Hitch (2005) as central for designing working memory in computational systems. We envisage thus the possibility to fill into AKIRA the general architectural principles of working memory developed by these authors (at the University of York), and to obtain a cognitive architecture supporting the design an implementation of several task-specific models (e.g. for recalling and recognizing faces, places, objects, etc.). The visit can also result in a more formal collaboration in the framework

	of the FP7 in the Cognitive Systems area.
Principal activity to which it contributes o Community Outreach o Scientific Outlook o Education & Training	Scientific outlook: survey paper, demonstrator, and open-source code Community Outreach (The university of York is not part of any EU Cognitive Systems consortium, while ISTC-CNR coordinates the CogSys STREP MindRACES.)
Concrete outcomes of the action (at least one of which should be material suitable for publication on the euCognition website)	The visit will result in: - establishing collaboration between ISTC-CNR and University of York, especially with respect to computational models of memory. - At least one state-of-the-art-survey/position paper on computational modeling of memory which will be submitted for journal/conference publication and can also be published at the euCognition website - a demonstration of the computational model hence developed will be provided in one task (involving transfer from long-term to working memory) in the framework of the guard-and-thieves scenarios of MindRACES (see http://www.mindraces.org/documents/deliverable/deliverable2/D2_1.pdf - pag. 31). The paper describing this task will be submitted for journal/conference publication and can also be published at the euCognition website. Also, some videos can be posted in the euCognition website. Lastly, the code of the application will be open-source.
Effort in person-days that will be charged to the Network Action (if any)	n/a
Expected start and duration in months	Start date: March, 1 (if possible). Duration: 6 weeks
The requested funding, under the following headings: o Travel Costs o Other Costs (check with the Network Coordinator if you aren't sure about eligibility of these costs) o Labour Costs (identify the number of person-days and the rate per day).	Travel costs (flights, trains, etc.): 500 Euros Contribution to subsistence and accommodation (according to http://www.eucognition.org/exchanges.htm, corresponding to 42 days): 3900 Euros **Total: 4400 Euros**
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. The costs cannot be covered by the MindRACES contract since Univerity of York in not involved in it, and modeling working memory is not an issue addressed in the project.