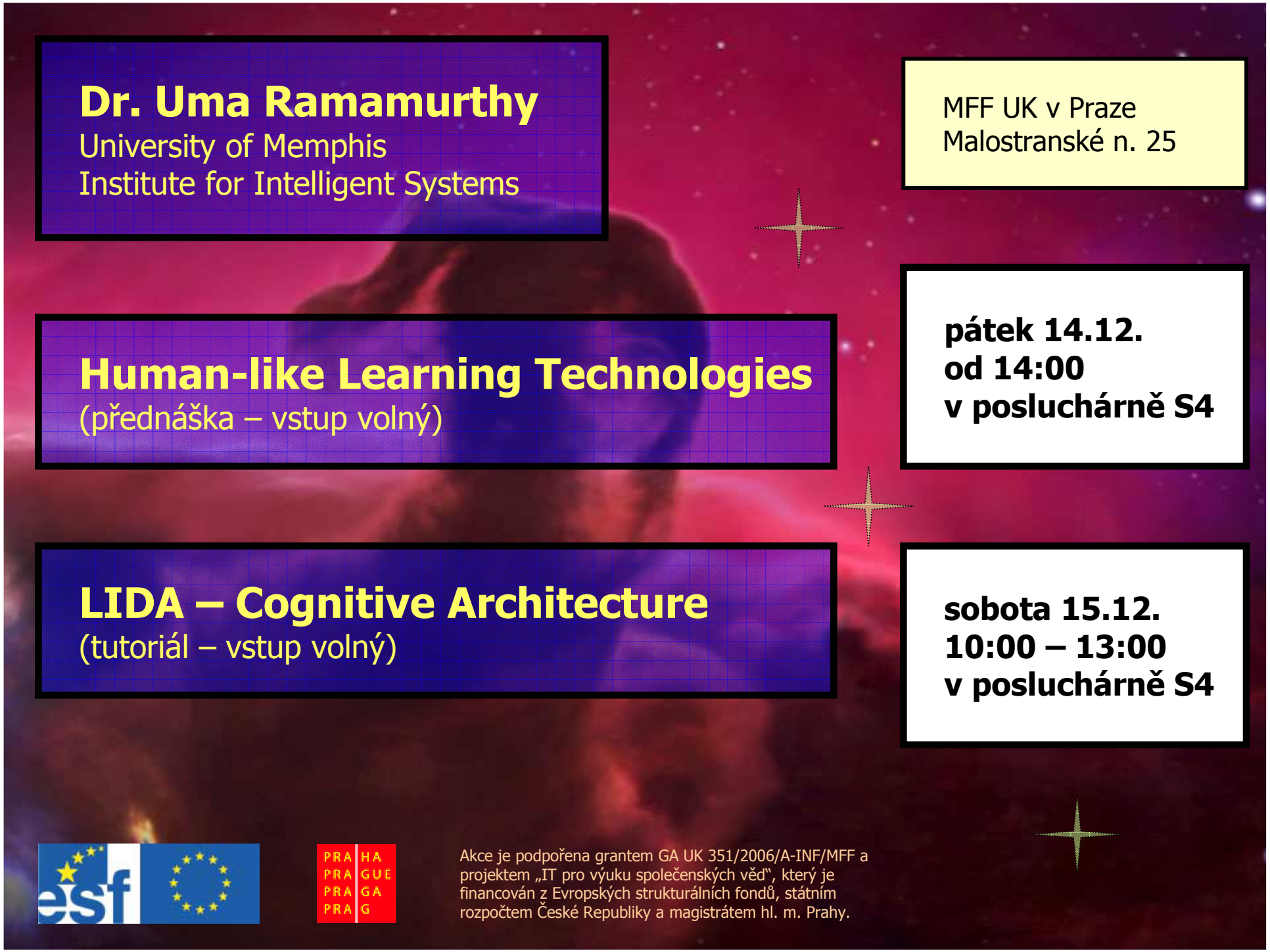
Dr. Uma Ramamurthy
University of Memphis
Institute for Intelligent Systems
MFF UK v Praze
Malostranské n. 25
Human-like Learning Technologies
(přednáška – vstup volný)
pátek 14.12.
od 14:00
v posluchárně S4
LIDA – Cognitive Architecture
(tutoriál – vstup volný)
sobota 15.12.
10:00 – 13:00
v posluchárně S4
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Akce je podpořena grantem GA UK 351/2006/A-INF/MFF a projektem „IT pro výuku společenských věd", který je financován z Evropských strukturálních fondů, státním rozpočtem České Republiky a magistrátem hl. m. Prahy.

Human-like Learning Technologies

LIDA Technology is an application of cognitive science principles to hard AI problems in machine learning. LIDA is a cognitive science based architecture capable of more human-like learning. A LIDA based software agent or cognitive robot will be capable of the following continuously active, learning mechanisms. They are (1) perceptual learning - the learning of new objects, categories, relations, etc., (2) episodic learning of events - the what, where, and when, (3) procedural learning - the learning of new actions and action sequences with which to accomplish new tasks and (4) attentional learning - what to attend to.
With the design of these continually active, incremental learning mechanisms, a foundation exists for a cognitive architecture capable of human like learning. Integrating these four types of learning mechanisms modulated by feelings and emotions in machines is an example of how cognitive science principles can be applied towards the hard problems of AI. No large training sets would be required. New knowledge would be integrated into old. Several tasks could be learned concurrently with transfer of knowledge to new tasks. A number of the old, hard AI problems would potentially be solved.

LIDA tutorial

The LIDA computational model provides an ontology for the role of consciousness in cognition. Global Workspace Theory (GWT) offers a theoretical model of the role played by consciousness in cognitive processing. LIDA, the learning, intelligent agent fleshes out GWT with a computational model. The LIDA model is partly symbolic and partly connectionist with all symbols being grounded in the physical world in the sense of Rodney Brooks' Subsumption architecture. Thus the LIDA model is a hybrid model, bringing together symbolic as well as connectionist principles. There are no explicit rules and no traditional neural networks in the model, yet the model has many symbolic data structures and has networks passing activation similar to neural networks. The architecture is partly composed of entities at a relatively high level of abstraction, such as behaviors, message-type nodes, emotions, etc., and partly of low-level codelets.
This tutorial will present a brief history of the LIDA model, and discuss the computational modules and mechanisms of the LIDA model. The LIDA computational model includes modules for perception, various types of memory including perceptual memory, transient episodic memory, autobiographical memory and procedural memory, "consciousness", and action selection. The mechanisms of these modules are derived from several different "new AI" sources. This will be followed by a detailed look at the Cognitive Cycle of the LIDA model and the various learning technologies in the model. In conclusion, the multi-cyclic, higher level cognitive processes such as volition, deliberation and non-routine problem solving will be discussed in the context of the LIDA model.
The goal for this tutorial is for participants to learn the LIDA model and to use the model to produce analyses and explanations for cognitive processes in the service of producing systems displaying a more human-like intelligence.

Uma Ramamurthy

A post-doctoral fellow at the Institute for Intelligent Systems, University of Memphis, Uma Ramamurthy started as an Electrical Engineer, and continued with graduate work in Computer Science at University of Alabama in Birmingham (for her Master's) and at University of Memphis (for her doctorate). She is the Director of Computing in the Pediatric Brain Tumor Consortium and in the Department of Biostatistics at St Jude Children's Research Hospital, Memphis. Her research focus has been in (1) memory systems - episodic and autobiographical memory systems, the decay mechanisms and the consolidation process; (2) perception and perceptual learning; (3) self-preservation processes for cognitive software agents. Her doctoral work was based on a design of memory architecture for transient episodic memory in cognitive software agents. She has published several conference papers and co-authored two book chapters.

Akce se koná v rámci Semináře z umělých bytostí. Další informace: http://artemis.ms.mff.cuni.cz/seminar.html
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