

Workshop preliminary program

8:40 Welcome and Introduction

8:45 Invited talk:

- *Multimodal anchoring for robust perception and attention in robot companions* by Gerhard Sagerer

9:30 – 10:30 Technical session

- *Identifying Perceptually Indistinguishable Objects* (John F. Santore and Stuart C. Shapiro)
- *Associating words to visually recognized objects* (Andreas Knoblauch, Rebecca Fay, Ulrich Kaufmann, Heiner Markert, Günther Palm)

Coffee break

11:00 – 12:30 Technical session

- *Autonomous learning for a cognitive agent using continuous models and inductive logic programming from audio-visual input* (D. Magee, C.J. Needham, P. Santos, A.G. Cohn and D.C. Hogg)
- *Towards Bootstrap Learning for Object Discovery* (Joseph Modayil and Benjamin Kuipers)
- *Anchoring Symbols by Mapping Sequences of Distance Measurements: Experimental Results* (Erik Hoertnagl, Erich Prem, Patrick M. Poelz)

Lunch

13:45 Invited talk:

- *Stochastic Spatio-Temporal Grammars for Images and Video* by Jeffrey Mark Siskind

14:30 – 15:30 Technical session

- *Perceptual Anchoring via Conceptual Spaces* (A. Chella, S. Coradeschi, M. Frixione, A. Saffiotti)
- *A Biosemiotic Framework for Artificial Autonomous Sign Users* (Erich Prem)

Coffee break

16:00 – 17:30 Technical session

- *Managing Dynamic Object Structures using Hypothesis Generation and Validation* (Fredrik Heintz and Patrick Doherty)
- *Have another look - On Failures and Recovery Planning in Perceptual Anchoring* (Mathias Broxvall, Silvia Coradeschi, Lars Karlsson, Alessandro Saffiotti)
- *Objects, Actions and Physical Interactions* (A.P. del Pobil, E. Cervera, E. Chinellato)

Foreword

Anchoring is the problem of how to create, and to maintain in time, the connection between the symbol- and the signal-level representations of the same physical object.

The anchoring problem is an important aspect of the connection between symbolic and sensory based processes in autonomous robotic systems. Anchoring must in fact necessarily occur in any physically embedded system that comprises a symbolic reasoning component. One of the main difficulties with using symbolic representations for reasoning in embedded systems is how to link these representations to the real world. A typical example is the problem of connecting, inside an autonomous robot, the symbol used by a planner to refer to a particular room, say ‘room-21’, to the vision or laser data that correspond to that specific room. This connection is necessary, among other things, to exploit linguistic knowledge provided by humans, e.g., regarding rooms and doors in a map. Another example is the problem of connecting the symbol used by a planner to refer to an object needed for an action, say ‘ball-1’, to the data that correspond to that object in the sensori-motoric system. This connection must be dynamic since the same symbol must be associated to new entities in the perceptual stream in order to track the object over time or to reacquire it at a later moment.

Anchoring must also occur in a multiple robot system, since the robots must agree about the meaning of the symbols used to refer to perceived objects in the environment. A typical example is the problem of establishing the correspondence between the symbols used by two different robots embedded in the same physical environment to refer to the same physical object, e.g., a room. This correspondence is also needed for efficient human-robot interaction.

This workshop is the third event on this subject. In 2001 we organized a AAAI Fall Symposium on “Anchoring Symbols to Sensor Data in Single and Multiple Robot Systems”(<http://aass.oru.se/Agora/FSS01/>). The aim of this Symposium was to create an inter-disciplinary community interested in the development of general theories of anchoring. Having such a theory will greatly advance our ability to build intelligent embedded systems, and to transfer techniques and results across different systems. We have then edited a special issue in the Robotics and Autonomous Systems Journal (Volume 43, number 2-3) where a selection of 8 papers and 2 book reviews were published in May 2003. Given the success of the previous events we are looking forward to this current workshop and we expect that it will represent a new step toward a better understanding of the anchoring problem.

Silvia Coradeschi and Alessandro Saffiotti
Workshop chairs
Örebro, Sweden, May 2004

Workshop program committee

- Silvia Coradeschi (chair), Örebro University, Sweden
- Alessandro Saffiotti (chair), Örebro University, Sweden
- Antonio Chella, University of Palermo, Italy
- R. James Firby, I/NET Inc, MI, USA
- Marcello Frixione, University of Salerno, Italy
- Frans C. A. Groen, University of Amsterdam, The Netherlands
- Ian Horswill, Northwestern University, IL, USA
- Yves Lespérance, York University, Canada
- Angel P. del Pobil, University of Jaume-I, Spain
- Gerhard Sagerer, University of Bielefeld, Germany
- Stuart C. Shapiro, University at Buffalo, NY, USA
- John K. Tsotsos, York University, Canada.