



POETICON

The “poetics” of everyday life:
Grounding resources & mechanisms
for artificial agents



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POETICON

contract data

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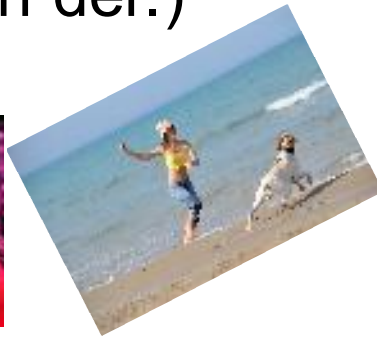
Consortium

Participant organisation name	Country
Institute for Language and Speech Processing / "Athena" Research Centre	ILSP  Greece
University System of Maryland Foundation, University of Maryland College Park - Institute for Advanced Computer Studies	USMF  USA
Univerza v Ljubljani – Visual Cognitive Systems Laboratory	UL  Slovenia
Max Planck Society – Max Planck Institute for Biological Cybernetics	MPG  Germany
Istituto Italiano di Tecnologia – Department of Robotics, Behaviour & Cognitive Science	IIT  Italy
University of Ferrara – Department of Neuroscience	UNIFE  Italy



The “poetics” of everyday life
Everyday human interaction involves a constant series of **perception**, **understanding** and **generation** transactions with the world & with others, **through sensorimotor means & natural language.**

Poetics of everyday life **vs.** Poetics in art
(Aristotelian def.)



POETICON explores the **synthesis of sensorimotor & symbolic representations in everyday human interaction**: this relates to the long AI quest for meaning.

POETICON solution: **capture & structure human behaviour.**



Theoretical Premises

Meaning emerges also from the *integration* of sensorimotor & symbolic representations, i.e. from

- a) the integration of different types of representations that refer to the *same* entity, event, property;
- b) the integration of representations that refer to *different* entities, events, properties but collaborate in forming concepts at different levels of abstraction

POETICON goes *beyond traditional Symbol Grounding* in that:

- It considers grounding to be a bi-directional process
- It does not consider all symbols able/suitable for grounding

Hypotheses

- a) **Sensorimotor representations have a grammatical structure** analogous to that of natural language. Discovering their structure (computationally + neurophysiologically) & exploring the cognitive aspects of categorization (natural language) will reveal appropriate “entry points” for integration with the conceptual system.
- b) Results from (a), i.e. computational tools and a multimedia resource capturing sensorimotor-symbolic associations at different levels of abstraction, can form the **basis for automatic meaning extraction/generation in computational and robotic applications.**

Objectives

- The creation of the PRAXI CON, a computational resource which associates symbolic representations (words/concepts) with corresponding sensorimotor representations at different levels of abstraction.
- The exploration of the association of symbolic and sensorimotor representations through cognitive and neurophysiological experiments and experimentation with a humanoid as driving forces and implementation tools for the development of the PRAXI CON, respectively.

Objectives (in detail)

A **computational analysis of the language of action**, i.e. an innovative structural analysis of action into primitive units and combination rules for formulating more or less complex actions;

A **computational analysis of the language of vision**, i.e. a structural analysis of vision into primitive units and combination rules for formulating more or less complex visual objects;

A **computational analysis of the language of facial expressions**, i.e. a structural analysis of facial expressions as a special kind of action

The study of **cognitive aspects of the integration** of symbolic and sensorimotor representations through **experiments** that will reveal for the first time:

the association level at which concepts, action and vision are being integrated in the human mind, and

patterns of association among such representations for forming higher-level, complex concepts

Objectives (in detail cont.)

The study of the neuroscience of action and vision through experiments that will give –for the first time– evidence for/against the existence of a “grammar” of action, a “grammar” of vision and their correlations with language (speech)

Experimentation with a humanoid, for exploring the representation needs of a humanoid for everyday interaction and guiding the development of the PRAXICON and the related computational analyses accordingly

The creation of a corpus of human movements, visual objects and facial expressions and a **corpus of enacted everyday scenarios**, in which actions, visual objects/scenes and facial expressions interact in forming meaning in human to human interaction



WORK-FLOW & DEPENDENCIES

WP2

Data Collection



Object manipulation & 3D objects

Facial Expressions



Human Movements



Enacted Everyday Interaction Scenarios

Measurements

Videos

Videos

WP5

Videos

3D Objects



neurophysiological experiments



cognitive experiments

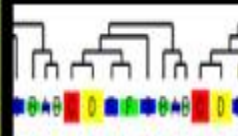


WP6 - humanoid experiments

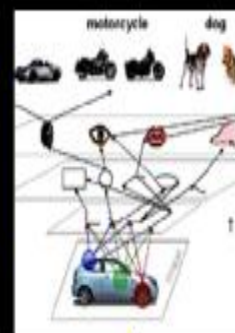
WP4

Sensorimotor Grammars and Parsers

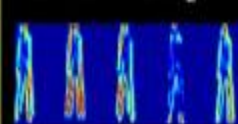
Human Activity Language



Visual Object/Scene Grammar



Visual Human Action grammar



Visual Action Parser

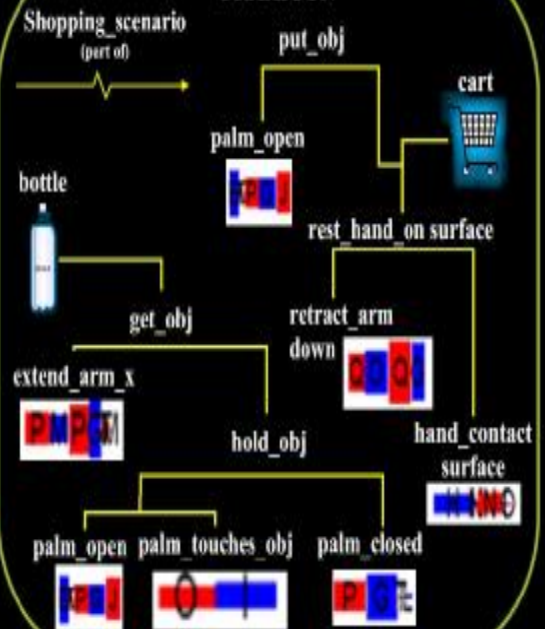
Visual Object Parser

Text Parser

WP5-task

WP5

PRAXICON



Learning Mechanism (for extending the PRAXICON)



Consortium-Roles

ILSP Project Coordination
Cognitive Experiments for naming
IEA PRAXI CON Development
ILSP Experimentation with PRAXI CON
Dissemination

USMF Human Activity Language
Visual Human Filters



Università di Urbino



UL Visual Object
Representation Language

MPG Data Recordings
Facial Expressions Language
Multisensory Integration



IIT



Robotic tactile skin
Manipulation & mobility
Integrated Demo

UNIFE



Neurophysiological
Experiments

Work Packages

Work Package Title		Lead	Start	End
WP1	Management	ILSP	M1	M36
WP2	Data Collection	MPS	M1	M18
WP3	Neurophysiological Experiments	UNI FE	M1	M36
WP4	Computational Analysis of Sensorimotor Representations	UMCP	M1	M36
WP5	PRAXI CON development	ILSP	M1	M36
WP6	Experimentation with a Humanoid	IIT	M1	M36
WP7	Dissemination	ILSP	M1	M36



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