The Poeticon Team

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Role in the project: Project Coordination, PRAXICON Development and Computational extension experiments, Cognitive Experiments, Dissemination

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Role in the project: Development of the language of visual object representations (visual object parser)

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Role in the project: Data Recordings, Development of the language of facial expressions

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Role in the project: Experimentation with a humanoid platform

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Role in the project: Neurophysiological Experiments

The "poetics" of everyday life:
Grounding resources & mechanisms for artificial agents
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To stay tuned to all latest developments in POETICON, visit the project website at: www.poeticon.eu
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poeticon

THE "POETICS" OF EVERYDAY LIFE:
Grounding resources & mechanisms for artificial agents

Objective

Poeticon's objective is the creation of the PRAXICON: a computational resource which associates symbolic representations (words/concepts) with corresponding sensorimotor representations, enriched with information on patterns among these representations for forming conceptual structures. It is envisaged that going bottom-up in the resource (from sensorimotor representations to concepts) one will get a hierarchical composition of human behaviour, while going top-down (from concepts to sensorimotor representations) one will get intentionality-laden interpretations of those structures.

What makes the resource unique is that it relies on: the development of innovative computational tools that analyse sensorimotor representations of everyday activities, the use of cognitive methods for establishing the associations of such representations with natural language and the development of a learning mechanism for extending the resource automatically. Furthermore, neurophysiological experiments and experimentation with a humanoid are the empirical basis and implementation tools, respectively, for the development of the PRAXICON.

What is Poeticon?

Poeticon explores the "poetics of everyday life", i.e. the synthesis of sensorimotor representations and natural language in everyday human interaction. This is related to an old problem in Artificial Intelligence on how meaning emerges.

The "poetics" of everyday life is a constant series of perception, understanding and generation transactions with the surrounding world and with other humans. It is an intentional use of sensorimotor means and natural language for everyday activities. It is the other end of what Aristotle called "poetics" in art: the intentional, sensorimotor enaction of important aspects of life with the use of fine natural language.

The quest for meaning

It is intuitively clear that we, humans, understand a sentence like "Jane ran after the dog" not by checking "ran" with the lexicon (dictionary) but because we have a sensorimotor experience of running. We know what it means to "run", we can "run" if we wish, we can think of "running". We have functional representations of running. While such ideas have been explored by many scientists and philosophers over the years, it has been difficult to implement them for two major reasons:

a) Even if we can measure sensorimotor experiences, how do we structure them?

b) It is only in the past few years that it has become possible to measure sensorimotor experiences

The Poeticon approach

Poeticon suggests a new solution to the problem of meaning, which involves measuring and structuring sensorimotor experiences and associating them with symbolic representations. Poeticon views (part of) a cognitive system as a set of different languages, such as the natural language, the motor language and the vision language; integration in such system is a matter of parsing and generating these languages and translating among them. Starting from such hypothesis, Poeticon develops the computational tools for parsing among these different "languages", it explores the cognitive and neurophysiological aspects of this integration process, and develops an extensible computational resource that captures associations between visual, motoric and symbolic representations for use in both computational and robotic applications.
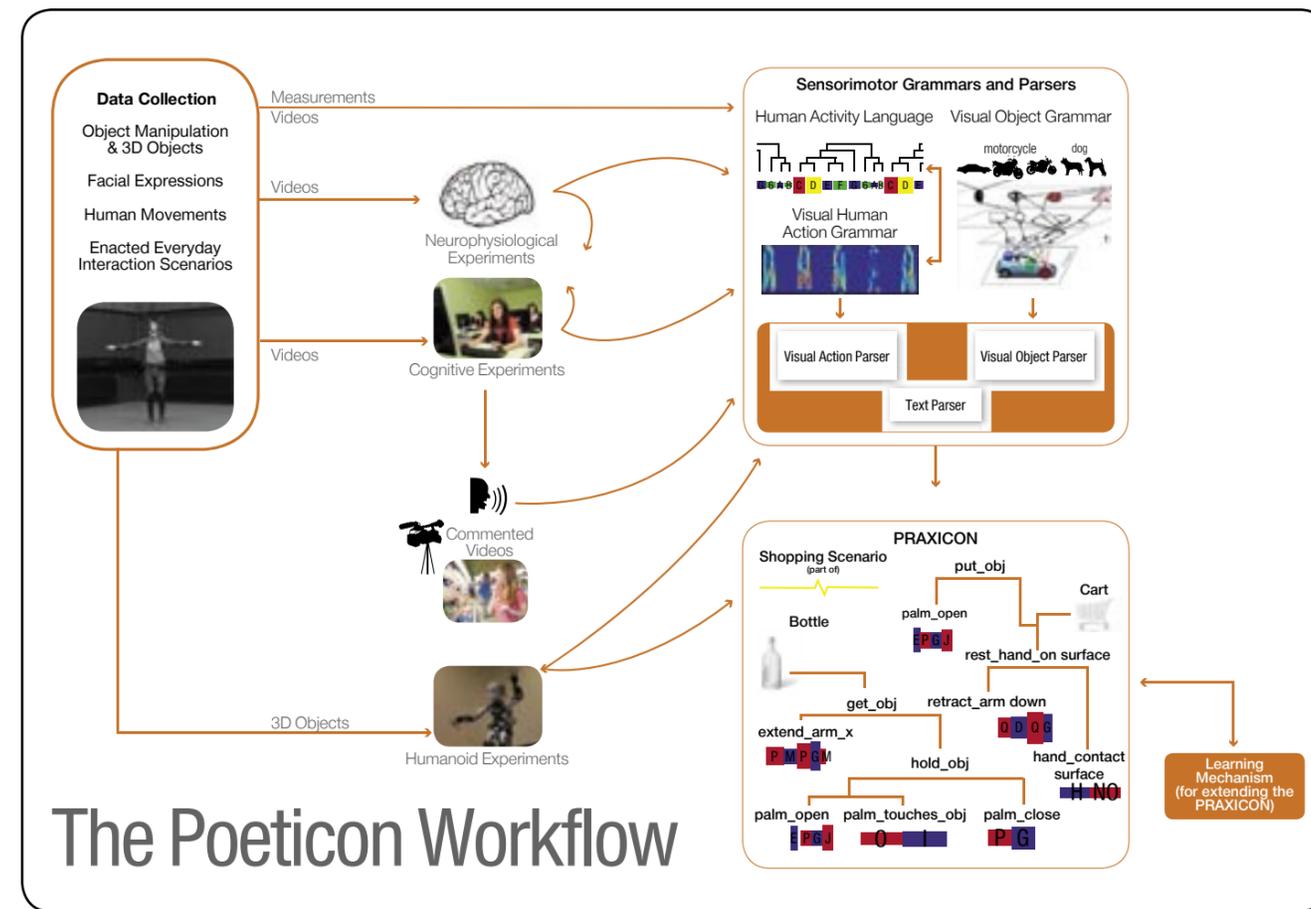
Theoretical Premises

Poeticon relies on the theoretical premise that –among other ways- meaning emerges from the integration of sensorimotor and symbolic representations and, in particular, it emerges 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, and properties but collaborate in forming concepts at different levels of abstraction

The development of the PRAXICON relies on innovative scientific findings and technological achievements that will come out of the following:

The Poeticon corpus: a corpus of four distinct – though interrelated – multisensory recordings of human movements, visual objects and facial expressions and a corpus of enacted everyday scenarios, in which human body movements, facial expressions, objects and natural language interact in forming meaning in human to human interaction

The Human Activity Language (HAL): a structural analysis of motoric representations into primitive units and production rules for formulating more or less complex actions

The Language of Facial Expressions: analysis of the perception of facial expressions providing information about the vocabulary and grammar of facial expressions

The Language of Visual Object Representations: a structural analysis of visual representations into primitive units and production rules for large-scale representation of visual object categories

Cognitive Experiments: human subjects are asked to describe verbally the contents of the videos of the Poeticon everyday scenarios

PRAXICON use and extensibility: experiments that explore the extent to which PRAXICON could be used in audiovisual data processing for associating visual action and visual object representations with natural language and how the resource could be expanded automatically

Neurophysiological experiments: exploration of how motor synergies, thought to be in common between motor and linguistic domains, develop and how syntactically meaningful chains of movements are organized to achieve an action goal

Experimentation with a humanoid: the iCub humanoid platform is extended with a tactile skin for reaching, grasping and manipulation activities, with integration abilities of proprioceptive and visual information for learning and recognition of multisensory object representations, and with well-grounded, empirical representations of perception and action

The Poeticon Workflow