POETICON

The "poetics" of everyday life:

Grounding resources & mechanisms for artificial agents

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POETICON

contract data

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EC-Contribution:	3,250,000 €

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 PRAXICON, 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 PRAXICON, 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

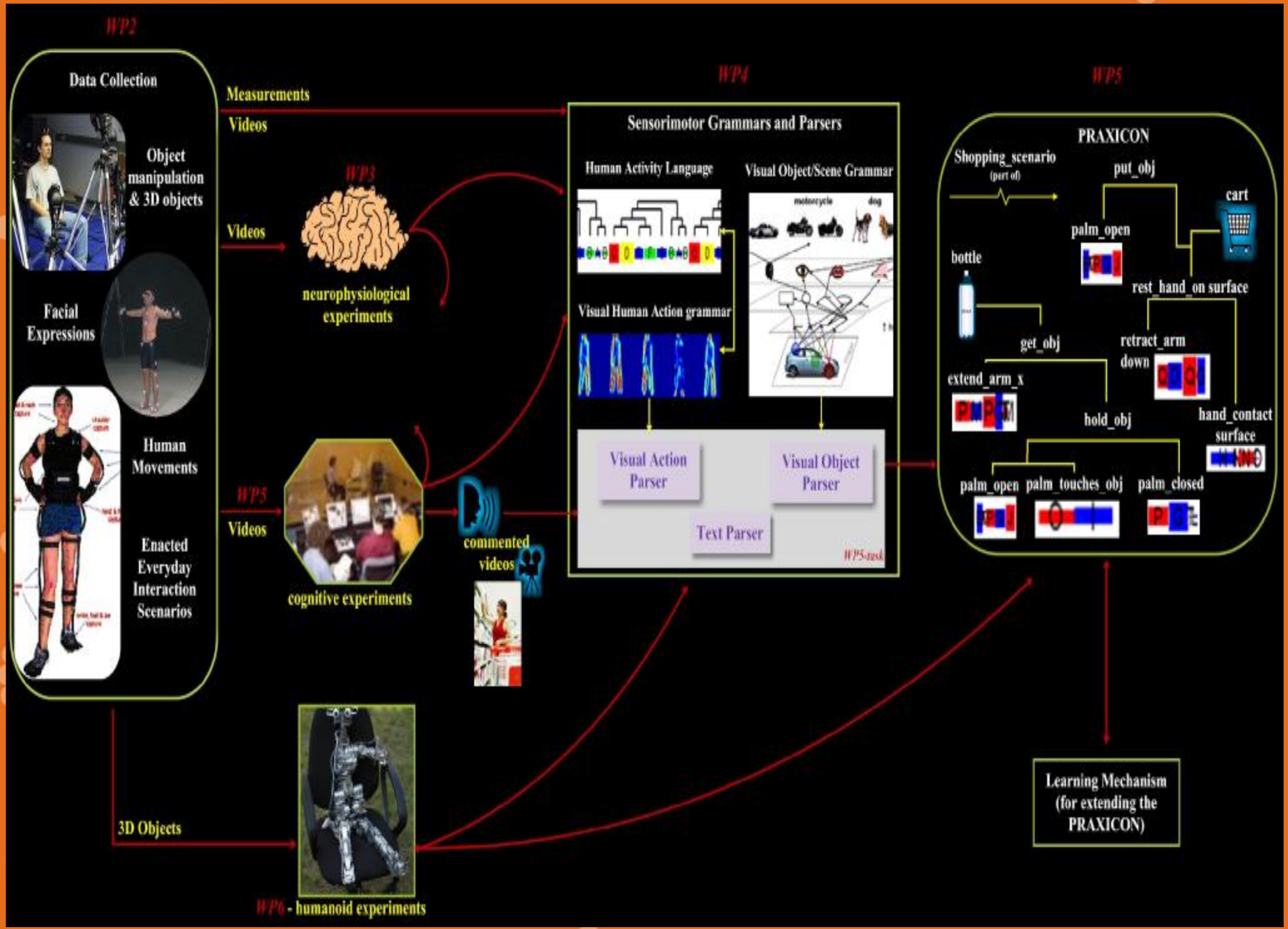
Objectives (in detail cont.)

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
&
DEPENDENCI ES


WP2
Data Collection
Object manipulation & 3D objects
Facial Expressions
Human Movements
Enacted Everyday Interaction Scenarios
Measurements
Videos
WP3
Videos
neurophysiological experiments
WP5
Videos
cognitive experiments
commented videos
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
Shopping_scenario
(part of)
put_obj
cart
palm_open
bottle
rest_hand_on surface
get_obj
retract_arm down
extend_arm_x
hold_obj
hand_contact surface
palm_open
palm_touches_obj
palm_closed
3D Objects
WP6 - humanoid experiments
Learning Mechanism (for extending the PRAXICON)

Consortium-Roles

ILSP Project Coordination
Cognitive Experiments for naming
PRAXICON Development
Experimentation with PRAXICON
Dissemination

IIT

Robotic tactile skin
Manipulation & mobility
Integrated Demo

USMF Human Activity Language
Visual Human Filters

UL Visual Object
Representation Language

MPG Data Recordings
Facial Expressions Language
Multisensory Integration

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	UNIFE	M1	M36
WP4	Computational Analysis of Sensorimotor Representations	UMCP	M1	M36
WP5	PRAXICON development	ILSP	M1	M36
WP6	Experimentation with a Humanoid	IIT	M1	M36
WP7	Dissemination	ILSP	M1	M36

Contacts

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