Cognitive Science
FACULTY OF PSYCHOLOGY UW
INSTITUTE OF PHILOSOPHY UW

Human Interactivity and Language Lab

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Lab description:

Our lab gathers people interested in the importance of interactivity for human cognition. We study basic and natural (physical, situated, embodied and value-laden) interactions of people with each other and with the world, seeking in them both sources and motivations for cognitive processes and structures.

As the most important, fascinating and difficult problem we consider how from such interactions structured patterns, such as language, emerge, stabilize and change, making cognition collective in many ways and over many time-scales: evolutionary, cultural, developmental, 'social' & on-line.

Our main theoretical and methodological inspirations come from dynamical systems approaches to living systems and cognition, ecological and enactive psychology, and semiotics, as a pragmatic frame helpful for discovering meaningful relations that form the infrastructure for symbolic systems.

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Projects/topics:

1.Developmentally informed agent-based modeling of symbolic constraints in interaction:

See hill.psych.uw.edu.pl/research.

- prerequisites:
  - good programming skills in Python and/or Julia
  - theoretical interest in the origins of meaning and language evolution
- available activities:
  - studying effects of social structure on compositionality properties of communication protocols evolved within Lewis's signalling game setting
  - developing simulated environment for e-puck robots within Webots simulator
  - building artificial life simulation using genetic programming techniques in Julia
- learning outcomes:
  - good practices of software development in research setting
  - knowledge of agent-based modeling
  - experience of working in an interdisciplinary group

2.Ecological models of categorization:

How the structure of basic categories in which we conceptualize the world depend on our experiences, values, needs, and pragmatic contexts?

- prerequisites:
  - familiarity with experimental designs in cognitive psychology
  - ability to perform statistical analyses of experimental data
  - basic knowledge of HTML+CSS+JavaScript

- available activities:
  - experimental study of gender-related effects on the structure of preferences towards visual stimuli representing everyday objects (preparing stimuli, performing experiments, data analysis)
- learning outcomes:
  - development of online experiments using JSPsych library
  - applications of multidimensional scaling (MDS) techniques in perceptual space reconstruction

3.Computer-augmented human-human communication:

For humans it is often difficult to agree on the most basic things, but much of the disagreement stems from individual differences in vocabulary and language use. Can communication effectiveness be improved using computer as a smart mediator/translator?

- prerequisites:
  - familiarity with experimental designs in cognitive psychology
  - ability to perform statistical analyses of experimental data
  - basic knowledge of HTML+CSS+JavaScript
- available activities:
  - preparing and performing online experimental study in which two participants communicate to each other properties of observed stimuli, while their communication is augmented by statistical model of their individual biases
- learning outcomes:
  - development of online experiments using JSPsych library
  - statistical modeling of individual perceptual and communication biases

4.Early dialogicity development:

Do mothers talk to their babies in dialogue or monologue?

- prerequisites:
  - interest in developmental psychology
  - ability to perform statistical analyses of experimental data
  - some experience in speech processing may come handy
- available activities:
  - coding experimental data from video recording
  - analyses of acoustic signal of mother and baby vocalizations
- learning outcomes:
  - character-building experience of behavioral coding of interactions
  - familiarity with audio/video transcription software (ELAN, Praat)
  - knowledge of qualitative and quantitative methods

5.Uhura — enriching communication of larynx amputees:

The aim of the project is to study interactions of larynx amputees in order to find a way to enrich the rehabilitation process and to better understand their communication.

- prerequisites:
  - motivation to engage in value-driven research
  - background in engineering/design/UX (for the second activity)
- available activities:
  - developing procedures for individualized assessment of interaction and communication needs
  - participation in development of wearable audio interface
- learning outcomes:
  - raised awareness of special communication needs of individual people
  - experience with qualitative ethnographic methods
  - experience in designing devices for actual use