The Institute for Cognitive Studies at the Ecole Normale Supérieure in Paris is proposing research internships to students with an engineering/maths/computer science background in the Cognitive Machine Learning team.

The general aim of this project is to understand how babies spontaneously learn their first language by applying a 'reverse engineering' approach, i.e., by constructing an artificial language learner that mimics the learning stages of the infant.

The internship will focus on one specific subproblem, for instance: how do infants extract words from speech, how do they construct phoneme categories, how do they figure out the meaning of words? (see detailed list below). To address this problem, the student will apply algorithms, to large corpora of child-adult verbal interactions in several languages and compare the results with behavioral and/or neural recording data. In particular, the student will work with tools selected from:

- signal processing (speech, video, brain imaging features)
- deep neural networks (optimized on GPUs)
- sparse dictionary methods
- hierarchical non parametric Bayesian models
- other tools from Natural Language Processing (Finite State Transducers, MaxEnt models, parsers, etc)

The student will work in a multidisciplinary team composed of researchers with various backgrounds (neuroscience, psycholinguistics, machine learning, etc) located at the Ecole Normale Supérieure in the quartier latin in Paris, and will have access to high performance computing resources (CPU/GPU cluster), large language databases, and cutting edge expertise in the cognitive (neuro)science of language as well as machine learning algorithms for speech and language applications. Some of the projects will involve a collaboration with other teams in France (INRIA) or abroad (J. Hopkins, MIT, Facebook AI Research, Google DeepMind, etc).

The student will ideally combine:
- a strong background in statistical modeling or linear algebra,
- knowledge of scientific computer programming (Matlab, python, etc).
- a strong interest in cognition and/or language,
- enthusiasm for interdisciplinary and team-based research,

Candidates should send a CV, paragraph of motivation, contact information of one referee to syntheticlearner@gmail.com. Women are encouraged to apply. Further information about the project can be found at: http://www.syntheticlearner.net
Examples of possible internships

- Deep language learning from scratch
- Learning the laws of physics with a deep recurrent network
- Time invariance in speech perception.
- The role of prosody in language bootstrapping.
- Rules and meaning
- Multimodal language learning
- Massive baby home data collection
- Cracking the neural code for speech

*This list is not limitative
Visit us and discuss about other possible internships!*
Bibliography


