Post-doctoral position:
Analysis of dialogues in psychosis or severe mental illness

One postdoc position (1 year) is open in the Semagramme at LORIA and at ATILF. The position will be in Natural Language Processing / Machine Learning or Psychology and linguistic. It will be funded by the project OLKi (Open Language and Knowledge for Citizens) from Université de Lorraine.

Information
— Starting date : fall 2020
— Duration : 1 year
— The call is open while the position is available
— Location : Nancy [1], France
— Salary : around 2,000 euros per month net income
— Application : CV, motivation letter, PhD evaluation, master TOR and support letter(s) to maxime.amblard@loria.fr

Supervisors
— Maxime Amblard, MCF HDR Univ. de Lorraine, Loria UMR 7503 - Team Sémagramme
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— Chloé Braud, CR CNRS, Irit UMR 5505 - Team Melodi
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— Michel Musiol, Pr Univ. de Lorraine, ATILF UMR 7118 - Team Discours
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Scientific environment
The project is part of an interdisciplinary work. It is integrated into the INRIA Exploratory Action ODiM project on the formal modeling of interviews of patients with schizophrenia.

ODiM is an interdisciplinary project, at the interface of psychiatry-psychopathology, linguistics, formal semantics and digital sciences. It tends to replace the paradigm of Language and Thought Disorders (LTD) as used in the Mental Health sector with a semantic-formal and cognitive model of Discourse Disorders (DD). These disorders are translated into pathognomonic signs, making them complementary diagnostic tools as well as screening for vulnerable people before the psychosis's trigger. The project has three main components.

The work is based on real data from interviews with patients with schizophrenia. A data collection phase in partner hospitals and with a control group, consisting of interviews and neuropsychological and cognitive tests, is therefore necessary.

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1. https://www.nancy.fr/nancy-in-english/discover/living-in-nancy-1218.html

The data collection will allow the development of the theoretical model, both in psycholinguistic and semantic-formal formalization for the identification of diagnostic signs. The success of such a project requires the extension of the analysis methodology in order to increase the model's ability to identify sequences with symptomatic discontinuities.

If the general objective of the project is to propose a methodological framework for defining and understanding diagnostic clues associated with psychosis, we also wish to equip these approaches by developing software to automatically identify these clues, both in terms of discourse and language behaviour.

Keywords

NLP, Discourse and Dialogue, Machine Learning, Logic, Corpora, Natural Language, Pathology, Schizophrenia, Psychology

Scientific project

Modeling interaction is a crucial step for Natural Language Processing (NLP), which requires the development of automatic tools able to simulate these exchanges. A typical example is chatbots and all the services based on them. But Dialogue Models face two types of difficulties.

(I) The first issue concerns the availability of resources and models that can analyze and process dialogues. Modelling dialogues is very hard, in particular because conversations highlight particular uses such as the relationship between questions and answers.

Another perspective is to use Machine Learning approaches in order to identify dialogical relations and dialogical interactions. Generally speaking discursive analysis aims at building a structure representing the semantic links between sentences.

(II) The second is that dialogue models must be coordinated with pragmatic inferences at a higher level. In this case, we can refer to linguistic models of dialogue such as [6], or to models that capture conceptual links, such as in TTR. [4]. While speech models provide important information, dialogue makes it possible to share information in a more sophisticated way. The solution must take into account the background of all speakers, as well as how they have common ground.

The project has different perspectives that explain the two possible profiles for this position.

For the first possible profile, the applicant should have the highest level on the developments of natural language dialogue analysis. In particular we focus on natural interactions and not chat logs. Dialogue parsing has undergone developments in recent years that may allow an automatic analysis of our data.

The second possibility is to analyse these interviews with a psychological angle. Dialogical interactions with people suffering from schizophrenia contain incongruities that can lead to the loss of understanding between the speakers. We wish to develop a semantic and pragmatic model. The aim is to define the linguistic specificities of these interactions in order to have them implemented in the tool we are developing.

Candidate skills

The post-doctoral fellow must have either a PhD in Computational Linguistics/NLP, Computer Science or related fields, with good programming skills, OR in Psychology.

He/She must be fluent in English and have demonstrated its ability to publish at the highest international level.

Note that Knowledge of French is NOT required.

Supervision of students is possible, if wanted.

Supervisors

Maxime Amblard, MCF HDR, is a specialist in computational linguistics. He is interested in the use of logical and formal tools to model the semantics and pragmatics of natural language. His recent research focuses on a corpus of pathological uses of the language and dialogue's representation. http://members.loria.fr/mamblard/

Chloé Braud, CR CNRS, is a computer linguist specializing in discourse parsing. The strategies she implements are based on machine learning for domain adaptation tasks in a multilingual, cross-domain context. https://chloebt.github.io/

Michel Musiol, PR is a psycholinguist. He is interested in the analysis of the manifestation of thought disorders through language. He studied the particularities of interviews with schizophrenic patients. http://michel.musiol.free.fr/

The skills of the different supervisors are complementary for the subject, both on the formal, digital and psycholinguistic aspects.

Bibliography

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