

Journée du Département 4

Department 4 Day

8h30 : Accueil // Welcoming

8h35 : Sunit Sivasankaran (Multispeech)

Speech enhancement using the speaker localization information.

8h55 : Emilie Colin (Synalp)

Natural language processing and automatic grammar exercises generation.

9h15 : Maria Borichev (Sémagramme)

Tea Coffee and Unicorns - Type theory and dialogue structure

9h35 : Pierre Monnin (Orpailleur)

Knowledge Reconciliation with Graph Convolutional Networks: Preliminary Results

9h55 : Nicolas Turpault (Multispeech)

Audio embeddings for ambient sound analysis

10h15 : Thien Hoa Le (Synalp)

"How much can Syntax help Sentence Compression ?"

10h35 : Pierre Ludmann (Sémagramme)

Dynamic Construction of Discourse Relations

10h35 : pause // break

11h15 : Tatiana Makhalova (Orpailleur)

MLD-based Pattern Mining

11h35 : Anastasia Shimorina (Synalp)

Surface Realisation Using Full Delexicalisation

**11h55 : Présentations des doctorants en première année
// First-year PhD students presentations**

Traitement automatique des langues et des con- naissances

**Mercredi 12 juin 2019
8h30-13h00
Salle A008**

Natural Language Pro- cessing & Knowledge Discovery

**Wednesday, June 12th 2019
8:30 am – 1 pm
Room A008**

Sunit Sivasankaran : *Speech enhancement using the speaker localization information*

This work deals with enhancing the quality of speech by first estimating the position of the speaker in a noisy environment. The performance of a speaker localization system deteriorates in adverse acoustic conditions involving competing speakers, reverberation and noise. In this work, we consider the common situation when the target speaker utters a known word or a sentence such as the wake-up word of a distant-microphone voice command system. We propose a method that exploits the text information in order to improve the speaker localization performance in conditions involving competing speakers. On estimating the speaker location, we obtain an enhanced speech by beamforming the signal in the direction of the target speaker. Experiments on simulated as well as real data shows positive impact of the proposed method on speech recognition systems.

Emilie Colin : *Natural language processing and automatic grammar exercises generation*

Using deep learning for text generation, the goal of this thesis is to generate sentences with syntactical variations.

Maria Borichev : *Tea Coffee and Unicorns - Type theory and dialogue structure*

Studying dialogues is a major subject in natural language processing. It is a complex task which links approaches from fields such as semantics, pragmatics and more generally logic and cognition. My work focuses on a compositional approach to dynamic models of questions and answers mechanisms in a dialogue setting. We want to control the storage of the data that is considered as available to all participants of a conversation. We work towards applying our model to real-life examples of dialogue interactions provided by three different corpora. Machine Learning is now the most popular way to solve NLP problems, however here, we focus on developing formal and computational tools to handle specifics of dialogue interactions on top of already existing methods for general discourse. In this talk, I present an approach to dialogue modeling in a dynamic framework.

Pierre Monnin : *Knowledge Reconciliation with Graph Convolutional Networks: Preliminary Results*

In this article, we investigate the task of identifying nodes that are identical, more general, or similar within and across knowledge graphs. This task can be seen as an extension of instance matching or entity resolution and is here named knowledge reconciliation. In particular, we explore how Graph Convolutional Networks (GCNs), previously defined in the literature, can be used for this task and evaluate their performance on a real world use case in the domain of pharmacogenomics (PGx), which studies how gene variations impact drug responses. PGx knowledge is represented in the form of n-ary relationships between one or more genomic variations, drugs, and phenotypes. In a knowledge graph named PGxLOD, such relationships are available,

coming from three distinct provenances (a reference database, the biomedical literature and Electronic Health Records). We present and discuss our preliminary attempt to generate graph embeddings with GCNs and to use a simple distance between embeddings to assess the similarity between relationships. By experimenting on the 68,686 PGx relationships of PGxLOD, we found that this approach raises several research questions. For example, we discuss the use of the semantics associated with knowledge graphs within GCNs, which is of interest in the considered use case.

Nicolas Turpault : *Audio embeddings for ambient sound analysis*

We aim to compute an audio embedding to be able to help ambient sound analysis. In this work, we've been using a triplet loss based model to use the information contained by labeled and unlabeled data. We show different ways of sampling data to create triplets. We show that unlabeled data is helping in this semi-supervised setting, but a small necessary number of labeled data is needed.

Thien Hoa Le : "*How much can Syntax help Sentence Compression ?*"

Sentence compression involves selecting key information present in the input and rewriting this information into a short, coherent text. Using the Gigaword corpus, we provide a detailed investigation of how syntax can help guide both extractive and Abstractive sentence compression. We explore different ways of selecting subtrees from the dependency structure of the input sentence; compare the results of various models and show that preselecting information based on syntax yields promising results.

Pierre Ludmann : *Dynamic Construction of Discourse Relations*

To account discourse relations and cohesion, Asher and Lascarides developed the Segmented Discourse Representation Theory (SDRT) on the ground of Kamp's Discourse Representation Theory (DRT). Yet DRT's dynamic logic rely on a model of imperative computation, hardly compatible with the applicative model basing Montague semantics. In order to retrieve the compositionality, de Groote and Lebedeva propound a redevelopment of dynamic logic, based on Church's simple theory of types. Eventually, Asher and Pogodalla combined the two investigation lines laying the foundation for a system conciliating SDRT and the dynamic approach based on the simple theory of types. In the wake of these works, mine is to define a dynamic model of discourse, based on type theory, that accounts for discourse relations.

Tatiana Makhalova : *MLD-based Pattern Mining*

Pattern Mining is a well-studied field in Data Mining and Machine Learning. The modern methods are based on dynamically updating models, among which MDL-based ones ensure high-quality pattern sets.

Formal concepts also characterize patterns in a condensed form. In this talk, we consider MDL-based algorithm called Krimp in FCA settings and its modified version that benefits from FCA and relies on probabilistic assumptions that underlie MDL.

Anastasia Shimorina : *Surface Realisation Using Full Delexicalisation*

Surface realisation maps a meaning representation to a sentence and can be viewed as consisting of three subtasks: word ordering, morphological inflection and contraction generation. We propose a modular approach to surface realisation which models each of these components separately, and evaluate our approach on the 10 languages covered by the SR'18 Surface Realisation Shared Task shallow track. We provide a detailed evaluation of how word order, morphological realisation and contractions are handled by the model and an analysis of the differences in word ordering performance across languages.

First-year PhD students:

Ashwin Geet D'Sa

Lou Lee

William Babonnaud

Nacira Abbas

Laurine Huber

Guilherme Alves da Silva

Nyoman Juniarta

Nicolas Furnon

Ajinkya Kulkarni

Raphael Duroselle

Angela Fan