CS-431 **Introduction to natural language processing**

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Cursus	Sem.	Type
Computer science minor	H	Opt.
Computer science	MA1, MA3	Opt.
Cybersecurity	MA1, MA3	Opt.
Data Science	MA1, MA3	Opt.
Data science minor	H	Opt.
Digital Humanities	MA1, MA3	Opt.
Learning Sciences		Opt.
Life Sciences Engineering	MA1, MA3	Opt.
Neuro-X minor	H	Opt.
Neuro-X	MA1, MA3	Opt.
SC master EPFL	MA1, MA3	Opt.
UNIL - Sciences forensiques	H	Opt.

Language of teaching	English
Credits	6
Session	Winter
Semester	Fall
Exam	Written
Workload	180h
Weeks	14
Hours	**4 weekly**
Lecture	2 weekly
Exercises	2 weekly
Number of positions	

Summary

The objective of this course is to present the main models, formalisms and algorithms necessary for the development of applications in the field of natural language information processing. The concepts introduced during the lectures will be applied during practical sessions.

Content

Several models and algorithms for automated textual data processing will be described: morpho-lexical level: n-gram and language models, spell checkers, ...; semantic level: models and formalisms for the representation of meaning, embedings, ...
Several application domains will be presented: Linguistic engineering, Information Retrieval, Textual Data Analysis (automated document classification, visualization of textual data).

Keywords

Natural Language Processing; Computationnal Linguisitics; Part-of-Speech tagging

Learning Outcomes

By the end of the course, the student must be able to:
- Compose key NLP elements to develop higher level processing chains
- Assess / Evaluate NLP based systems
- Choose appropriate solutions for solving typical NLP subproblems (tokenizing, tagging, ...)
- Describe the typical problems and processing layers in NLP
- Analyze NLP problems to decompose them in adequate independant components

Teaching methods

Flipped classroom (reviews and supervised "hands-on" in class) ; practical work on computer

Expected student activities

attend lectures and practical sessions, answer quizzes.

Assessment methods

4 quiz during semester 16%, final exam 84%

Resources

Bibliography

1. M. Rajman editor, "*Speech and Language Engineering*", EPFL Press, 2006.
2. Daniel Jurafsky and James H, Martin, "*Speech and Language Processing"*, Prentice Hall, 2008 (2nd edition)
3. Christopher D. Manning and Hinrich Schütze, "*Foundations of Statistical Natural Language Processing*", MIT Press, 2000
4. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, *Introduction to Information Retrieval*, Cambridge University Press. 2008
5. Nitin Indurkhya and Fred J. Damerau editors, "*Handbook of Natural Language Processing*", CRC Press, 2010 (2nd edition)

Ressources en bibliothèque

• Handbook of Natural Language Processing / Indurkhya

• Introduction to Information Retrieval / Manning

• Speech and Language Processing / Jurafsky

• Speech and Language Engineering / Rajman

• Foundations of Statistical Natural Language Processing / Manning

Websites

• https://coling.epfl.ch/

Moodle Link

• https://go.epfl.ch/CS-431