INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

DPT INFORMATIQUE
COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
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Conferences and Seminars

Machine Learning and Data Analytics

IDENTIFICATION

CODE : IF-5-S1-EC-OT2
ECTS : 6.0

HOURS

Lectures :	0.0 h
Seminars :	64.0 h
Laboratory :	0.0 h
Project :	0.0 h
Teacher-student contact :	64.0 h
Personal work :	64.0 h
Total :	128.0 h

ASSESSMENT METHOD

1.5 hour exam to test the assimilation of the content. Documents will be authorized.

TEACHING AIDS

All documents will be available on moodle (http://moodle.insa-lyon.fr)

TEACHING LANGUAGE

English

CONTACT

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AIMS

This class aims at giving the theoretical and practical basics for mining large volumes of data. It includes: artificial intelligence (machine learning and data mining) as well as optimization.

The main skills you will acquire are :
- Learn the theory behind predictive modeling, machine learning, clustering, pattern mining and optimisation
- Learn several algorithms for each task and understand their specificity, limits and parameters

These skills will be reinforced in satellite projects of this class.

CONTENT

« Predictive analytics » - machine learning methods including two key techniques: support vector machines (SVM) and artificial neural networks ("deep learning") with different types of architectures (MLP, CNN, autoencoders, GAN, recurrent neural networks, LSTM)

« Descriptive analytics » - discovery of heterogeneous, structured and dynamic patterns in big data

« Prescriptive analytics » - exploiting knowledge extracted during descriptive and predictive analytics to propose action plans for policy makers

BIBLIOGRAPHY

- Ian Goodfellow and Yoshua Bengio and Aaron Courville : Deep Learning
- Christopher Bishop : Pattern Recognition and Machine Learning
- J. Han and M. Kamber. Data Mining: Concepts and Techniques. Morgan Kaufmann, 2000.
- P. N. Tan, M. Steinbach, and V. Kumar. Introduction to Data Mining. Addison-Wesley, 2006.
- M. J. Zaki, W. Meira Jr. Fundamentals of Data Mining Algorithms. Cambridge Univeristy Press, 2013.
- C. C. Aggarwal. Data Mining: The Textbook, Springer, May 2015

PRE-REQUISITE

Basic of database management, data-mining and statistics.
If you were at the department in 4th year, the following classe must be mastered:
- IF-4-FD
- IF-4-BDD
- IF-4-ST
- IF-3-BDR
- IF-3-MD