INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Liste d'éléments pédagogiques

Practical info

Location(s)

Toulouse

Signal II and Optimization

ECTS
4 crédits

Hourly volume
50h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

1) Wavelet transform
2) Filter Banks with exact reconstruction
3) Properties of wavelets (localisation in space and frequency) and applications to the approximation of functions.
4) Notion of sub-gradient and proximal operator in convex analysis
5) Basic properties of proximal and Forward-Backward algorithms

The student will be able to:

1) Provide examples of wavelets
2) Carry out numerical approximation of images with wavelets.
3) Identify which convex problems can be solve using the previous algorithms and be able to implement these algorithms on simple cases

Necessary prerequisites

Signal 1
Optimization 1 & 2

Practical info

Location(s)

Toulouse

Non-contractual information

Project Research – Innovation

ECTS
8 crédits

Hourly volume
55h

Practical info

Location(s)

Toulouse

Non-contractual information

Machine learning

ECTS
4 crédits

Hourly volume
52h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

- Properties and limits of the main machine learning algorithms.
- Bias - variance trade-off, model selection.
- Algorithms for risk estimation: bootstrap, cross validation.
- Optimization and algorithmic implementations with R and Python (Scikit-learn) of the studied algorithms.
- Ethical and legal concepts of artificial intelligence.

The student will be able to:
- Analyse big data sets from various domains: insurance, marketing, industry, by using R and Python libraries.
- Execute the main machine learning methods and algorithms (discriminant analysis, k-nn, support vector machines, classification and regression trees, random forests, neural networks..)
- Optimize hyper-parameters values and construct pipelines for automating.
- Optimize the missing values management.
- Detect ethical or legal failures (bias, discrimination, opacity) of machine learning algorithms.

Location(s)

Toulouse

Practical info

Communication in organisations with LV2

ECTS
6 crédits

Hourly volume

Introducing

Objectives

Objectives:
At the end of this module, the student will have understood and be able to explain (main concepts):

-How to answer the demand of the civil society for technical and scientific information
-How to carry out critical analysis in order to give appropriate answers when questioned about such issues
-How to consider the circulation and content of information within the organizations in which they will be hired

The classes given in English will focus on the specific linguistic characteristics of the English used in scientific contexts in order for the students to understand and master them.
The students will also be made aware of the specificities of scientific English as relates to publications in his specific field of research.

Module L 2
The objectives, defined in reference to the CEFRL for the 5 language activities, are specific for the language studied ¿ Chinese, German, Spanish ¿ and the level of the student.
They can be consulted on :
https://moodle.insa-toulouse.fr/course/view.php?id=44

In certain cases, students may be authorised to follow an English module instead of another language

Necessary prerequisites

Necessary knowledge:
For classes in English : understanding of scientific English

Practical info

Location(s)

Toulouse

Political sciences semestre 2

ECTS
3 crédits

Hourly volume

Practical info

Location(s)

Toulouse

Non-contractual information