INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Liste d'éléments pédagogiques

Practical info

Location(s)

Toulouse

Prescriptive Analytics

ECTS
4 crédits

Hourly volume

Introducing

Objectives

This course addresses several efficient models for processing data encountered in industrial combinatorial problems. These models are based on logical inference and mathematical optimisation techniques : constraint satisfaction problems (CSPs), boolean satisfiability (SAT)
and integer linear programming (ILP).
In the first part (CSPs), students are expected to understand and to be able to apply the main constraint propagation techniques and solving strategies, by hand, but are also initiated to programming tools that integrate general solvers (ex : CPLEX) during practical works.
In the SAT modeling part of this course, students are initiated to some propagation and heuristic solving techniques used in SAT solvers (DPPLL, Implication Graphs, Conflict Analysis, Two-watched litterals algorithm). Various applications problems such as allocation, graph colouring, scheduling serve as training examples for SAT encoding.
In the last part (MILPs), students will have to translate industrial problems into mixed-integer linear programs, then to solve them efficiently using branching algorithms or decomposition methods, embedded in existing tools such as CPLEX.

Necessary prerequisites

Algorithmics & programming (I2MIIF11, I2MIIF21). Fundamentals in Computer Science (I4IRIF11), Intelligent Systems (I4IRSD11)

Practical info

Location(s)

Toulouse

Software Defined Communication Infrastructure

ECTS
4 crédits

Hourly volume

Introducing

Objectives

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

- the concepts related to the virtualization of network functions (in the NFV sense)
- the concepts related to network programming (in the SDN sense)
- the model of autonomic computing defined (among others) by IBM
- the views of real-world actors involved in a-large-scale project (application developer,-middleware operator, network operator)

The student will be able to:
- use an SDN network emulator (ContainterNET)
- use an SDN (Ryu) controller
- use a standardized MANO NFV (SON-EMU)
- develop a standardized VNF
- architect and implement solutions that take advantage of the concepts of virtualization of network functions and programmable networks, in the context of the realization of an SDCI
- apply and implement the model of autonomic computing to a problem of management of QoS in an SDCI

Necessary prerequisites

Networks Interconnexion - TCP/IP

Object oriented design UML (2. 0)

Object Oriented Programming - Java

Service-Oriented Architectures

Network Programming - TCP/IP

Practical info

Location(s)

Toulouse

Cloud Computing

ECTS
6 crédits

Hourly volume
69h

Practical info

Location(s)

Toulouse

Model driven engineering

ECTS
6 crédits

Hourly volume

Practical info

Location(s)

Toulouse

Modeling, evaluation and optimisation of networks and protocols

ECTS
4 crédits

Hourly volume
78h

Practical info

Location(s)

Toulouse

[FRANCAIS] Commande avancée et supervision

ECTS
6 crédits

Hourly volume

Practical info

Location(s)

Toulouse

Projet physique PTP_ISS

ECTS
4 crédits

Hourly volume

Practical info

Location(s)

Toulouse

Service Robotics

ECTS
6 crédits

Hourly volume
50h

Toulouse

Introducing

Objectives

At the end of this module, the student would be able to explain the main components of a robot service and to say in which way it differs from industrial robotics; he/she will know the main concepts in humanoid robotics and why it is difficult to control a walking robot. His/her knowledge will
include the main notions in jointed robotics: direct and inverse kinematic models, dynamic model of the robot, trajectory generation and stability of a bipedal robot.

The student is supposed to be able to model a jointed robot, to understand its technical components and to analyse the functioning of a service robot in its domestic or professional environment.

Necessary prerequisites

Matrix theory, Linear control

Practical info

Location(s)