Université de Franche-Comté
Bureau doctoral - 03 81 66 59 12 formations.doctorales@univ-fcomte.fr

Doctoral school SPIM - science course 2015-2016

Acronym : SPIM-MLTA	***Machine Learning – Theory and Algorithms***
Required prior knowledge	Students should preferably have the following background: • Familiarity with the basic probability theory. • Familiarity with the basic linear algebra.
Form of examinaton	Project to work at home
Keywords	
Learning outcomes	This course provides a broad introduction to Machine Learning. This branch of Artificial Intelligence aims at designing algorithms that allow physical or virtual entities (robots, avatars...) to improve their performance in order to fulfill a given task. Topics presented in this course are detailed below. Each part lasts 2 hours.
Content	Part #1: Framework – Definitions and notations – The different kinds of learning (supervised, unsupervised, reinforcement learning) – Some examples – Review elements in linear algebra and probabilities Part #2: The methodological environnement of learning – Hypothesis space – Experimental protocols – Concepts for the experimental evaluation Part #3: Supervised Learning – Issue – A simple tool: the linear discriminants – Other more powerful tools: the multi-layer perceptron and the radial basis function networks – Examples Part #4: Unsupervised Learning – Issue – A simple algorithm: K-Means – Another algorithm: the Kohonen's self-organization maps – Examples Part #5: Reinforcement Learning – Issue – Links between Dynamic Programimng and Reinforcement Learning – Some dynamic programming algorithms: Value Iteration and Policy Iteration
Instructor(s)	LAURI Fabrice (SET, UTBM, MCF)
Number of participants	Beetwen 8 and 15 participants
Hours	14h (Lecture cours: 8h + Exercices: 0h + Pract. Work, TP-projet:0h)
Calendar number of sessions, dates and times	1 session in 2015-2016: ↳ 01/02/2016 9:00-12:00 and 14:00-18:00 ↳ 02/02/2016 9:00-12:00 and 14:00-18:00
Location (room, building, adress, city)	UTBM, Rue Thiery Mieg, 90000 Belfort (room to confirm)
Registration Procedures	by email to formations.doctorales@univ-fcomte.fr Your message MUST specify your Full name, graduate school, research team, the style of training and / the sessions you wish to register. If you are outside the UFC also indicate your year of thesis, the name of your manager and your home university. Registrations will be taken into account until three weeks before the date of formation within the limits of available seats. You will receive an acknowledgment of your request, then a notice by email approximately one week prior to training. WARNING: The courses are expensive, by registering, you agree to participate. If you are exceptionally ultimately unable to participate, be sure to inform as soon as possible.
Comments	Participants who have validated this course (registration at each session and validation rules as above) and who have completed the online survey will receive a certificate via email in the days / weeks following the training. This training is open to doctoral students from other graduate schools. This course will be taught in English or French (depending on age) with course materials in English