Università degli Studi di L'Aquila - Dipartimento di Ingegneria e Scienze dell'Informazione e Matematica

Course catalogue

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Programme of Course "Machine Learning"

- Code: DT0176
- Type of course unit: Elective (Master Degree in Computer Science curriculum GSEEM), Compulsory (Master Degree in Computer Science curriculum NEDAS), Elective (Master Degree in Computer Science curriculum SEAS), Elective (Master Degree in Computer Science curriculum UBIDIS)
- Level of course unit: Postgraduate Degrees
- Semester: 1

Number of ects credits: (Master Degree in Computer Science) 6 (workload 150 hours)

Teachers: Pasquale Caianiello (Pasquale.Caianiello@univaq.it)

1	**Course objectives**	Knowledge of main machine learning techniques and their applications to problems of supervised and unsupervised learning.
2	**Course content and learning outcomes (dublin descriptors)**	Topics of the module include: • Machine learning problems: binary classification, multilabel classification, association, regression, prediction, clusterization. • K-nearest neighbor classification and clusterization. Decision trees. • Percepton, multilayer perceptron, error backpropagation:theory and practice. • Data sets, Training sets, Test sets, learning validation techniques, temporal sequences, learning as model construction, exploration of model space, optimization. • Genetic algorithms, ensemble methods and voting strategies, random forest • Support Vector Machines On successful completion of this module, the student should : -know main learning problems and models to solve them; -be able to identify a proper learning model for a given problem; -be able to set up problem data and run learning systems on them; -assess, rate, and measure performance of different learning models solution for a given problem; -discuss and interpret results obtained by learning systems and propose possible improvements; -deliver a final solution system/application for a given learning problem.
3	**Course prerequisites**	Knowledge of basic concepts of linear algebra and dicrete mathematics. Ability to develop an experimental or implementation project
4	**Teaching methodsand language**	Lectures **Language**: English **Reference textbooks** • Paul Daumé III, ***A Course in Machine Learning***. CIML. 2012. *http://ciml.info* • Lutz Hamel, ***Knowledge Discovery with Support Vector Machines***. Wiley. 2009. *http://onlinelibrary.wiley.com/book/10.1002/9780470503065;jsessionid=B70DCD27F248C991415BF42D979BDE5*
5	**Assessment methods**	Written test, homeworks, and discussion of an implementation or experimental project