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DATA MINING AND MACHINE LEARNING

1. SYLLABUS INFORMATION

1.1. Course title
Data Mining and Machine Learning

1.2. University
Pázmány Péter Catholic University

1.3. Semester
1st year, 1st semester

2. COURSE DETAILS

2.1. Course nature
Compulsory

2.2. ECTS Credit allotment
5

2.3. Recommendations

2.4. Faculty data
Dr. Gergely István Lukács

3. COMPETENCES AND LEARNING OUTCOMES

3.1. Course objectives
Knowledge: data mining and machine learning algorithms, their application, evaluation and related concept

Skills: using different data mining tools, analyzing datasets, describing patterns discovered in datasets (models), predicting values, evaluating the performance of models

3.2. Course contents
Input and output of data mining process
Task types (e.g., clustering, classification, numeric prediction, association rule mining)
Basic methods (1R, Naïve Bayes, ID3, rule based classification, linear regression, logistic regression, perceptron, Winnow, k-nearest neighborhood, k-means, Apriori)
Evaluation
Industrial Strength Algorithms (C4.5, CART, Ridge, Lasso, Regression trees, Bayesian Networks, Support vector machines, mean-shift, DBSCAN, Expectation-Maximization, Gaussian Mixture Models)
Preprocessing and postprocessing
Ensemble learning methods

3.3. Course bibliography

[1] Ian Witten and Eibe Frank, Data Mining, Practical Machine Learning Tools and Techniques, 3rd ed.,2011, Morgan Kaufmann Publishers

4. TEACHING-AND-LEARNING METHODOLOGIES AND STUDENT WORKLOAD

4.1. Contact hours

	Hours
Classroom instruction (minimum 33%)	48
Independent study time	48

4.2. List of training activities

Activity	Hours
Lectures	24
Practice	12
Computer lab	12
Assessment activities	4

5. EVALUATION PROCEDURES AND WEIGHT OF COMPONENTS IN THE FINAL GRADE

5.1. Regular assessment

Quizzes at each practice and lab

5.2. List of evaluation activities

Evaluatory activity	%
Final exam	60
Programming assignments/classroom activities	40