COSI Pattern Recognition

Course code: 3621517
Course level: Master
ECTS Credits: 5.00

Course instructor/s: Markku Hauta-Kasari with assistant

Education period (Dates): 3rd semester
Language of instruction: English

Expected prior-knowledge: -

Aim:

This course will give introduction to pattern recognition. Topics are: Classification, Bayesian classifier, linear classifier, non-linear classifier, clustering, and evaluation of classification and clustering results. After the course, student knows the basic methodology of pattern recognition and can apply it into a real world pattern recognition problem. He/she is also able to develop new applications with the help of pattern recognition literature.

Teaching methods:

Lectures and exercises.

Course outline:

Introduction, Bayesian learning, subspace methods, perceptron, linear and non-linear neural networks, k-means and self-organizing maps.

Lab experiments:

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Examination:

Written exam 2 hours, ordinary re-sit examination.

Learning Outcomes[1]:

- *Knowledge* and *Comprehension* of the fundamentals, principles, applications, limits, relationships, of all concepts and topics covered by this course;
- *Application*, *Analysis*, *Synthesis* and *Evaluation* skills of the main concepts and topics covered by this course;
- Ability to apply/implement concepts and principles introduced in the lectures and laboratory exercises on practical tasks and on industrial study cases;
- Ability to self-learn, to understand some problems and to suggest/find solutions to solve these problems.

Assessment methods and tasks:

At the end of 3rd semester, each group will submit the written project report. It must consist of chapters: Introduction, Methods, Experiments, Results, Discussion, and References. In addition, the software must be returned in digital form, to be tested by the evaluation board. After the final report submission, the groups will present their project work and results as oral presentation. This will be organized by video conferencing. The grading of the project contest is the weighted grading as follows: grading of the report 30 %, solution of the project task 40 %, final presentation 30 %.

Assessment criterion:

[1] The meaning of *keywords* written in italic used to define Learning Outcomes are detailed in Annex.

Written exam and Practical works

Excellent - outstanding performance	A
Very Good - above the average standard but with some errors	B
Good - generally sound work with a number of notable errors	C
Satisfactory - fair but with significant shortcomings	D
Sufficient - performance meets the minimum criteria	E
Fail - some more work required before the credit can be awarded	FX
Fail - considerable further work is required	F

Detail of criteria used to assess acquired skills :

- *Activities and questionnaires giving evidence of knowing (5%)*
- *Activities and questionnaires giving evidence of comprehension/understanding (5%)*
- *Activities and questionnaires giving evidence of analysis (5%)*
- *Activities and questionnaires giving evidence of synthesis (5%)*
- *Activities and questionnaires giving evidence of evaluation (5%)*

Excellent	A
Very Good - above the average standard	B
Good - generally sound well	C
Satisfactory - but with significant shortcomings	D
Sufficient - performance meets the minimum criteria	E
Fail - some more work required	FX
Fail - considerable further work is required	F

The evaluation of informal learning outcomes will be based on questionnaires and laboratory notebook (self evaluation, learning diary).

Literature and study materials:

- Theodoridis – Koutroumbas: Pattern Recognition, Elsevier Academic Press, 2 nd ed. or later. Selected chapters.

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