Machine Learning (B-KUL-T44MLN)

This is a translated version. Original version in Dutch.

4 ECTS | Dutch | 36 | First term | Cannot be taken as part of an examination contract

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Aims

The aims of this course are the following:

- The students need to have an understanding of the machine learning algorithms. This understanding is established by programming key parts of the algorithms in PYTHON in a programming assignment and by the lectures provided during the semester and video recordings of the Massive Open Online Course (MOOC).
- The student is able to deploy the machine learning algorithms in unseen applications and report on it.
- The student is able to measure the performance of a machine learning task and is able to give advice on improving the performance.
- The student acquires knowledge in machine learning using a Massive Open Online Course (MOOC). Knowledge they acquire after graduation will mostly be via MOOCs, hence this course contributes to life-long learning attitudes.

Previous knowledge

Basic knowledge of Algebra, Calculus, Statistics is required.

Basic PYTHON programming skills are also required.

Order of Enrolment

Mixed prerequisite:
You may only take this course if you comply with the prerequisites. Prerequisites can be strict or flexible, or can imply simultaneity. A degree level can be also be a prerequisite.
Explanation:
STRICT: You may only take this course if you have passed or applied tolerance for the courses for which this condition is set.
FLEXIBLE: You may only take this course if you have previously taken the courses for which this condition is set.
SIMULTANEOUS: You may only take this course if you also take the courses for which this condition is set (or have taken them previously).
DEGREE: You may only take this course if you have obtained this degree level.

(STRICT(T2STAT) OR STRICT(T2STAE) OR FLEXIBLE(T1AWS0)) AND (STRICT(T34DAS))

The codes of the course units mentioned above correspond to the following course descriptions:
T1AWS0 : Mathematics (No longer offered this academic year)
T2STAT : Statistics
T2STAE : Statistics
T34DAS : Data Science

Identical courses

This course is identical to the following courses:
T44MLE : Machine Learning

Is included in these courses of study

Master of Electronics and ICT Engineering Technology (Leuven) 60 ects.

Activities

2 ects. **Machine Learning: Lectures** (B-KUL-44hMLN)

2 ECTS | Dutch | Format: Lecture | 18 | First term

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Content

Content:

Linear regression

Multivariate regression

Logistic Regression

Variance / bias

Neural networks

Support Vector

k-means clustering

Anomaly detection

Principle component analysis

Recommender systems

Course material

Massive Open Online Course (MOOC) on Coursera: Machine Learning by Andrew Ng.

Format: more information

The Machine Learning course will use the Coursera Machine Learning MOOC.

We use the flipped classroom principle: the students prepare the next lecture by looking at the videos and performing the assignments of the MOOC. When they have dificulties with some parts of the content they can ask questions prior to the next lecture on the Toledo Forum.

During the lecture I shortly summarize the content of that week. Furhtermore I will try to answer the questions on the forum and finally we look at some exam questions of previous years.

2 ects. **Machine Learning: Lab Sessions** (B-KUL-44pMLN)

2 ECTS **Dutch** **Format: Practical** **18** **First term**

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Content

Content:

Linear regression

Multivariate regression

Logistic Regression

Variance / bias

Neural networks

Support Vector

k-means clustering

Anomaly detection

Principle component analysis

Recommender systems

Course material

We use the programming exercises of the MOOC. We use the Python software package.

Format: more information

With each chapter in the MOOC there is a programing exercise included. The functions developed in these exercise sessions are used for the project.

The project consists of 4 parts :

*The proposal part : here the students select a dataset on which they would like to work. They write a proposal of what they are going to do. The TA coach them in this process.

*The milestone part: here the students show their progress to the TA. They write a milestone report. The TA coaches the students.

*Final report: students submit a full report building further on the proposal part and the milestone part. This is marked.

*Poster: the students present a poster to the other students. This is marked.

The project is carried out in pairs of students.

Evaluation

Evaluation: Machine Learning (B-KUL-T72005)

Type : Partial or continuous assessment with (final) exam during the examination period

Description of evaluation : Written, Report

Type of questions : Multiple choice, Open questions

Learning material : Course material, Calculator, Computer

Explanation

Realization of the final mark.

The total point of this course is calculated on the basis of the published partial marks with the following weights:

OLA Lecture: 40%

OLA Lab Sessions: 60%

Realization of the published partial marks:

OLA Lecture: the points are on the theory exam during the exam period. This is a closed book exam consisting of multiple choice questions and open questions.

OLA Lab Sessions: the points are on the marked assignments, final report and poster of the project. The project is carried out per two students.

If the university decides that it is confronted with situations of general force majeure or situations where the safety and health of members of the academic community of KU Leuven may be endangered and changes to the teaching and evaluation activities occur as a result, these changes will be communicated via Toledo.

1. The total point of this OPO is calculated on the basis of the published partial figures with the following weights:

OLA Lecture: 40%

OLA Lab Sessions: 60%

2. The sub-digit for 'lecture and lab sessions' is a whole number out of 20.

Absences:

If no report is submitted for the project, you will receive a 0/20 even if you were present.

In the event of absence during compulsory lab sessions (proposal coaching, milestone coaching and poster session) during the lesson weeks, you must still inform the education ombuds on the day itself. In addition, contact the lecturer from whom you have missed compulsory sessions or evaluation moments as soon as possible and certainly within the week. If you are absent during the exam period, you must notify the exam ombuds on the day itself.

Information about retaking exams

This course unit allows partial mark transfers in case of partial pass mark:

- 44hMLN - Machine Learning: Lectures (during and beyond academic year)
- 44pMLN - Machine Learning: Lab Sessions (during and beyond academic year)

Required in stage	Optional in stage	First term	Second term	Both terms
This year	Next year	Alternating years	External	Prerequisites
Taught by	Language of instruction	Duration		

ADMISSIONS

- How to apply
- Scholarships
- Degree-seeking students
- Non-degree-seeking students
- Doctoral students
- Reseachers
- Short-term study visits
- Prepare your stay

QUICKLINKS

- Alumni
- International Office
- Student Services
- Pangaea
- LRD
- UZ Leuven
- Jobs and Careers
- Libraries
- News and press
- Agenda
- Culture
- Sports
- KU Leuven shop
- Contact

INTERNAL TOOLS

- Toledo
- KU Loket
- Webmail
- Intranet
- Who's who
- Organisational chart

OTHER LANGUAGES

- Nederlands
- Français
- Deutsch
- Español
- 中文版
- Русский

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