Report - DD2421 - 2018-06-19

Respondents: 1
Answer Count: 1
Answer Frequency: 100.00 %

Please note that there is only one respondent to this form: the person that performs the course analysis.

Course analysis carried out by (name, e-mail):

Atsuto Maki (atsuto@kth.se)

COURSE DESIGN

Briefly describe the course design (learning activities, examinations) and any changes that have been implemented since the last course offering.

This is the first course round where the course is given as DD2421 Machine Learning.

The course provides an overview of the field of machine learning and describes a number of learning paradigms, algorithms, theoretical results and applications. It also covers some basic concepts of statistics, artificial intelligence and information theory relevant to machine learning. The course is the successor of DD2431 Machine Learning (6.0 points) which we ran for several years and for three years since I made a major change in 2014 while taking over the responsibility from Örjan Ekeberg. With the new course code DD2421 we made numerous additions across different topics (see below).

Summary of the course design - lectures, labs, and written exams:

12 lectures with lecture notes made available on course webpage
(6 by Atsuto Maki, 3 by Giampiero Salvi, 2 by Örjan Ekeberg, and a summary lecture by all).
The materials are mainly based on James et al. [1], Prince [2], and Rojas [3] for supplementary reading, all available online.
[1] An Introduction to Statistical Learning,
G. James, D. Witten, T. Hastie and R. Tibshirani (Springer, 2013).
[2] Computer Vision: Models, Learning, and Inference, Simon J.D. Prince (Cambridge University Press, 2012).
[3] Neural Networks – a Systematic Introduction, R. Rojas (Springer-Verlag, 1996).

Three lab assignments are orally examined by a group of TAs: 1. Decision Trees, 2. Support Vector Machines, and 3. Boosting.

Written exam by A-section (eight multiple choice) + B-section consisting of nine questions. In A-section simple questions regarding basic concept and/or terminology were asked as an essential part for passing. B-Section consisted of questions typically corresponding to a learning outcome (full point 27). Graded in the range of A-F/Fx.

Changes made from DD2431:
• Some new contents have been added. Those include:
- K-fold cross-validations
- More examples to demonstrate the concept of Curse of Dimensionality
- Variations of robust line-fitting methods under the presence of outliers
- Gradient/coordinate decent approaches for optimisation
• More explanations given in the lecture on Artificial Neural Networks.
• We spread out the submission deadlines of the labs more equally.

THE STUDENT'S WORKLOAD

Does the students' workload correspond to the expected level (40 hours/1.5 credits)? If there is a significant deviation from the expected, what can be the reason?

In average the students' workload corresponds to the expected level while it varies between individuals: 6-20 hours for most of the students. According to some students' comments, they seem to spend different number of hours depending on their target, if they aim for a high grade or just to pass the course.

THE STUDENTS' RESULTS

How well have the students succeeded on the course? If there are significant differences compared to previous course offerings, what can be the reason?

We saw an increase of overall passing rate, by 4.4%, compared to the last edition of DD2431 although we set the minimum score for a pass (9 /27, 33% correct) in a same ratio as before (8/24). The level of the exam was moderate.
About two thirds of passing students received 'A' or 'B' but more B's than A's whereas in DD2431 more students would receive A's; it can be seen as a consequence of removing bonus points (up to 3 points). We required 24/27 points for an 'A' (over 90% correct answer).

OVERALL IMPRESSION OF THE LEARNING ENVIRONMENT

What is your overall impression of the learning environment in the polar diagrams, for example in terms of the students' experience of meaningfulness, comprehensibility and manageability? If there are significant differences between different groups of students, what can be the reason?

The course has been well received by most students; they think that it is a great course covering a wide range of topics, labs are fun, and lectures are clear. The exams are perceived as fair. In the polar diagrams, balanced impression is observed on the overall response, and no particular differences were identified between different groups of students.

Some students find the course too easy and others "difficult" - we are aware of the fact that the participating students have very diverse background in terms of their experiences for Machine Learning. Some say "perfect" or "the course is neither really hard or easy so I believe you should not increase the necessary workload any more." It can be assumed that those regarding it as too easy are coming well-prepared ML specialised students (if not shallow learners). The course is defined as an introductory course and we find those comment to some extent natural although the transition of DD2421 from DD2431 was geared towards the level of the ML program students.

As in the most negative comment, "it is really hard to learn on a 400 people classes", we would need more teaching resources (as we put in our plan). On the other hand, we also received comments such as, "I really liked the questions that you could discuss with your neighbour during the lecture" and even, "I am happy that I took the course and discovered what I want to work with in my life".

ANALYSIS OF THE LEARNING ENVIRONMENT

Can you identify some stronger or weaker areas of the learning environment in the polar diagram - or in the response to each statement - respectively? Do they have an explanation?

The polar diagrams show mostly smooth distribution in the moderately high range between 5-6 with exceptions on items 14-15 and 20. The first two are related to the amount of feedback, which I recognise as a point for taking some measure; we have drop-in sessions to help the labs exactly for this purpose but for the 350+ students the assigned slots were not sufficient as in a student's comment that help sessions were very crowded. I would like to have additional hands from more TAs in each session. The other point is about "opportunities to choose what to do", but as explained by a student, "This is an introductory course, I shouldn't choose what to do."

ANSWERS TO OPEN QUESTIONS

What emerges in the students' answers to the open questions? Is there any good advice to future course participants that you want to pass on?

Two students raised issues on a specific TA being inconsistent (this TA will not be part of the team in the next course round) while reporting that they learned a lot from other lab presentations; the message is that "all TAs should have the same approach and get the same instructions". It is a point noteworthy for improvements although we did not have an issue on this before (at least not reported).

Good common advice can be summarised in this quote, "Attend the lectures and read the course literature. It is all about keeping up with the theory. When doing the labs, don't just write the code, that is the easy part. Make sure that you understand the concepts of Machine Learning in the labs, that is the purpose of them."

PRIORITY COURSE DEVELOPMENT

What aspects of the course should primarily be developed? How could these aspects be developed in the short or long term?

- In the short and long term it will be useful to continue to improve the instructions in the labs.
- We should see to it that TAs follow the same approach and get the same instructions for examining the lab assignments.
- In order to increase feedback to students we should allocate more TAs in each drop-in help session.
- We need to handle the issues in lab-booking which occurred at the transition to Canvas from KTH Social.

OTHER INFORMATION

Is there anything else you would like to add?

We have based the course design on the predecessor, DD2431, as we have already established it as a stream-lined course. However, we have included more contents as stated above to go deeper in most of the subjects, as appropriate for a 7.5 credit course.

The TAs were Alexander Kozlov (primary), Ylva Jansson, Martin Hjelm, Sergio Salvatore Caccamo, Saeed Dabbaghchian, Emil Wärnberg, Kalin Stefanov, Ramon Heberto Martinez Mayorquin, Andreas Lindner (doktorand), Hector Anadon Leon, Lucas Rodés Guirao, and Ciwan Ceylan (MSc students).

Course data 2018-09-26

DD2421 - Machine Learning, HT 2017 mi17h-SAP

Course facts

Course start:	2017 w.36
Course end:	2017 w.43
Credits:	7,5
Examination:	LAB1 - Laboratory Work, 3.5, Grading scale: P, F TEN1 - Examination, 4.0, Grading scale: A, B, C, D, E, FX, F
Grading scale:	A, B, C, D, E, FX, F

Staff

Examiner:	Atsuto Maki <atsuto@kth.se>
Course responsible teacher:	Atsuto Maki <atsuto@kth.se>
Teachers:	Giampiero Salvi <giampi@kth.se> Atsuto Maki <atsuto@kth.se> Örjan Ekeberg <ekeberg@kth.se>
Assistants:	

Number of students on the course offering

First-time registered:	1
Total number of registered:	1

Achievements (only first-time registered students)

Pass rate[1] [%]	100.00%
Performance rate[2] [%]	100.00%
Grade distribution[3] [%, number]	B 100% (1)

1 Percentage approved students
2 Percentage achieved credits
3 Distribution of grades among the approved students

DD2421 - Machine Learning, HT 2017 mi17h

Course facts

Course start:	2017 w.35
Course end:	2017 w.43
Credits:	7,5
Examination:	LAB1 - Laboratory Work, 3.5, Grading scale: P, F TEN1 - Examination, 4.0, Grading scale: A, B, C, D, E, FX, F
Grading scale:	A, B, C, D, E, FX, F

Staff

Examiner:	Atsuto Maki <atsuto@kth.se>
Course responsible teacher:	Atsuto Maki <atsuto@kth.se>
Teachers:	Giampiero Salvi <giampi@kth.se> Atsuto Maki <atsuto@kth.se> Örjan Ekeberg <ekeberg@kth.se>
Assistants:	

Number of students on the course offering

First-time registered:	351
Total number of registered:	366

Achievements (only first-time registered students)

Pass rate[1] [%]	85.80%
Performance rate[2] [%]	91.30%
Grade distribution[3] [%, number]	A 32% (96) B 34% (103) C 24% (73) D 10% (30) E 3% (10)

1 Percentage approved students
2 Percentage achieved credits
3 Distribution of grades among the approved students