Response to Student Feedback
received for the course CS-EJ3211
"Machine Learning with Python"
offered in Fall 2019 for FiTech https://fitech.io/en/

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We express our sincere gratitude for the insightful and constructive comments and suggestions provided by the students of the course CS-EJ3211 "Machine Learning with Python" as offered during fall 2019. We have tried to address all comments to the extent possible. Major modifications we implemented include the following:

- The new course edition focuses on a single "business case", revolving around detecting road markings form aerial photographs of Helsinki city area, to illustrate most of the machine learning methods discussed in this course (https://github.com/alexjungaalto/ResearchPublic/blob/master/RoadMarkingHelsinki/RoadMarkingMonitoring.ipynb). This business case is used to illustrate various machine learning methods from different angles.
- The quiz questions at the end of each Python notebook now require to implement some modifications of existing code snippets.
- We have started to prepare short tailor-made lecture videos to support student learning (see YouTube channel https://www.youtube.com/channel/UC_tW4Z_GfJ2WCnKDtwMuDUA).

In what follows, we respond in a point-by-point fashion to a selection of the most relevant student feedback received for the "2019 Fall" edition.

S1 *Sometimes notebooks could be more clear.*

T1 We have revised the notebooks in order to make them more clear.

S2 *More content and clarification. Detail answer for the exercise*

T2 We will put more effort into making the model solutions for the coding assignments more clear.

S3 *Some minor issues with notebook grading: using array offset instead of mapping array to test number resulted 0 points in one of rounds.*

T3 We have tried to make the grader tests less sensitive to minor errors in the solutions to coding assignments.

S4 *Sometimes I think some bad or uncommon methods or way of coding were used in the home works. Somehow the forced template included some odd stuff, which was occasionally faulty or hard to interpret or an odd choise in general. I loved the course anyway and the teacher's enthusiasm about machine learning is admirable*

T4 We have debugged and revised the notebooks so that the provided code templates follow good coding practices.

S5 *I think the course would benefit from video-recorded lectures which would introduce each topic.*

T5 We have started to produce short lecture videos that discuss the main topics of the course. These videos will be available at the YouTube channel https://www.youtube.com/channel/UC_tW4Z_GfJ2WCnKDtwMuDUA.

S6 *Would it be possible to have live-support session in future? Because it is online course, live-support can also be arranged online.*

T6 We will try to provide such live support sessions via Skype or similar communication tools.

S7 *In some of the exercises very small error could lead to 0 points. I recomment improving the grading algorithm such that no errors = 3p, one error = 2p etc. Correspondingly, the limits to get each course grade could be a bit higher.*

T7 We have revised the coding assignments such that minor errors do not result in overly harsh penalties.

S8 *The fact that a student only needs to insert several lines of code to the assignment block and that huge parts of code are presented as ready-made demos creates a sense of 'distance' to what is happening. It would be better if assignments had to be written from scratch (eg - I don't even remember how to include necessary libraries because lines with this were always already given).*

T8 We have revised the format of the quiz questions which conclude each notebook. The new format requires to modify certain parts of the provided code templates. We agree that the learning effect benefits from requiring students to implement solutions from scratch, e.g., within a small student project. However, adding such a project would increase the course workload, which is currently limited to around 60 hours (2 credits). Therefore, since we are not planning to extend the course workload significantly, we will essentially keep the current format of coding assignments containing prepared code snippets for giving students a "warm start".

S9 *With regards to improvements, I think some real case scenarios could have been used for assignments. For instance, for assignment on classification techniques, examples on speech recognition, natural language processing could have been cited. However, having said that, this is the first such course from Aalto University and these sorts of shortcomings can actually be improved for future iterations of the course.*

T9 We agree that the student motivation benefits from using "real-world" business cases. Therefore, we have revised some of the coding assignments by considering the problem of detecting road markings in aerial photographs. This problem is related to a recently established research collaboration with city planners of Helsinki (see https://github.com/alexjungaalto/ResearchPublic/blob/master/RoadMarkingHelsinki/RoadMarkingMonitoring.ipynb)

S10 *Not enough exercises; this should be reformatted into a 5 credit course. Also, I disliked the fact that you could not get instant feedback from your submissions, as it was hard to assess what went wrong later, and this complicated my learning. I have also heard this from other students taking the course.*

T10 We are planning a new Bachelor level course "Machine Learning", which will include coding assignments similar in style to this course. This new course will be worth five credits (around 130 hours of work) and also includes lectures on theoretical foundations (basic linear algebra) as well as a student project.

S11 *Descriptions and comments in the code sometimes are a too much too digest. In some of the exercises there were some bugs/glitches and sometimes the automatic grading made mistakes, but all these problems were quickly addressed by teacher and assistants.*

T11 We have carefully revised the notebooks to avoid any inconsistencies or coding errors and to improve the readability of provided source code (e.g., appropriate use of comments for the code snippets).

S12 *The course runs through whole semester. Is it really compulsory to have DL during school holidays like syysloma? It's not fair to students with family. I know, people have all sorts of problems, but national holidays are kind of hard to adapt to the course schedule.*

T12 We will be more careful when deciding on the submission deadlines for the coding assignments. In particular, we will avoid having deadlines during the Finnish "ski holidays".

S13 *The grading was sometimes unclear and I could have used some more personal feedback. Often, if I lost points, I didn't know why and it seemed to be 0 or 3 and nothing in between. I know that in many assignments I got something right, but then something went wrong, the numbers didn't match with the automatic check, but I still don't know what went wrong.*

T13 We will try to make the model solutions more clear. Moreover, we will offer individual (online) meetings with course staff where the coding assignments and their solutions can be discussed in detail.

S14 *Some more advanced and complicated machine learning systems would have been nice to see at least as a demo. It would be good for motivation.*

T14 We have tried to extend the repertoire of methods considered in the student tasks and demos.

S15 *More video lectures. If not already existing, these could be created (as I believe this course will live long and is popular).*

T15 We have started to create short lecture videos that complement existing lecture videos from Prof. Andrew Ng.

S16 *Some assignments were not clearly stated an/or had errors in them. Linked video material could have been of better quality. The course book by prof. Jung was too theoretical and almost useless considering the target audience (FITech) of the course. Reading it through was not necessary to pass the course with good grades, though.*

T16 We have carefully revised the Python notebooks containing the coding assignments to avoid any errors and improve clarity of the presentation. The role of the course book as additional reading, not required for completing this course, is made now more clear at the course page https://mycourses.aalto.fi/course/view.php?id=26737

S17 *The code in the weekly tasks was not very professional (in aesthetic terms) nor using the Python language efficiently. The code was not very concise (sometimes initializing the required variables and sometimes not). At many times, I felt like alpha-testing a prototype version of the tasks.*

T17 We have carefully revised the Python notebooks to avoid errors and improve readability.

S18 *The course is too academically oriented, the material is written in a very scientific way and quite hard to understand for those without previous substantial experience of math/computer science degree. It is understandable that the subject is quite scientific, however some other programs, like fast.ai, have managed to make it way more accessible to the general public. The course materials are too academic and have quite a few spelling errors and typos and could benefit from additional proofreading by native speakers.*

T18 We have tried to better illustrate the practical relevance of course content by using a particular use case revolving around detecting road markings from aerial photographs.

S19 *I think that the story in "six rounds" could be utilized better. Each round has the own case, but the results are not interpreted too much. It is left for the student to understand what he/she just has demonstrated. And in some cases the interpretation might be wrong.*

T19 We have carefully revised the coding assignments such that they are now more aligned towards one single machine learning problem which is to detect road markings in aerial photographs. Applying different methods to the same problem and data will hopefully help students to better grasp differences between the considered methods.

S20 *The Jupyter notebooks should require more work than just filling in the gaps. I would have preferred a cohesive analysis problem that would be tackled at different angles during the course. The first assignment would focus on vector and matrix manipulation etc, and the assignments would build on previously acquired knowledge..*

T20 We will use a road marking detection problem as the suggested "cohesive analysis problem" which will be tackled from different angles in different rounds of the course. See https://github.com/alexjungaalto/ResearchPublic/blob/master/RoadMarkingHelsinki/RoadMarkingMonitoring.ipynb.

S21 *The course being open for everyone from beginner to comfortable programmers, would be great if it favoured the beginner equally as it did everyone else. Felt like the beginners were always trying to catch up always a step behind, while the rest went through the course.*

T21 We have revised the notebooks such that the required level of programming skills is kept at a minimum. The course should be accessible for anyone familiar with using a higher level language (such as Python, Java or R) to manipulate lists or arrays of numeric values.