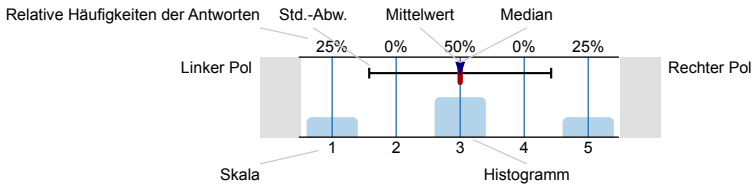
# Matthias Carl Laupichler

ML Foundations in Python (09/22)_new ()
Erfasste Fragebögen = 13

## Auswertungsteil der geschlossenen Fragen

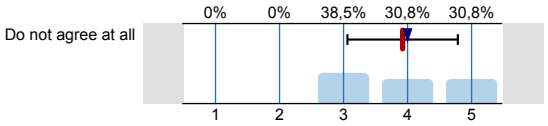
## Legende

Fragetext



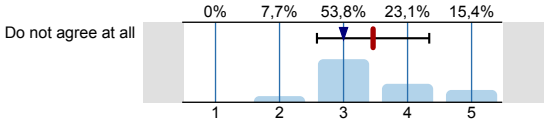

## 1. Evaluation of "Machine Learning Foundations in Python"

1.1) The course is useful for conducting my research projects.



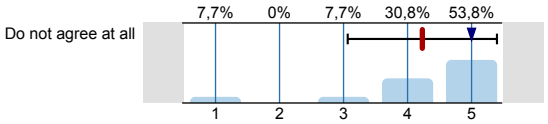

n=13
mw=3,9
md=4
s=0,9

1.2) I can use what I have learned independently in my research projects.



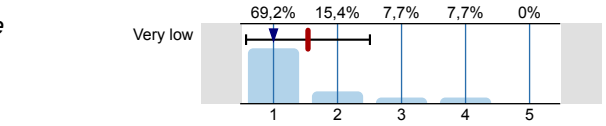

n=13
mw=3,5
md=3
s=0,9

1.3) The amount of examples in the course was appropriate.



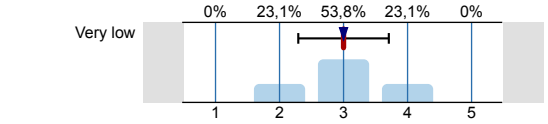

n=13
mw=4,2
md=5
s=1,2

1.4) **Python programming:** My skills in this area *before* starting the course were...



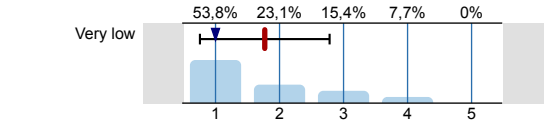

n=13
mw=1,5
md=1
s=1

1.5) **Python programming:** My skills in this area are *now*...



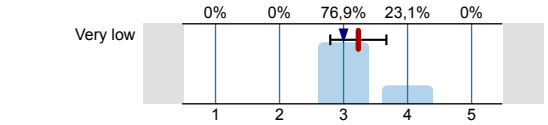

n=13
mw=3
md=3
s=0,7

1.6) **Knowledge about Machine Learning:** My skills in this area *before* starting the course were...



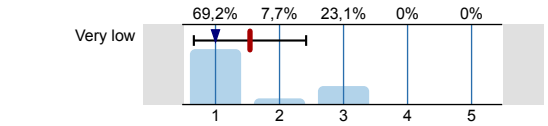

n=13
mw=1,8
md=1
s=1

1.7) **Knowledge about Machine Learning:** My skills in this area are *now*...



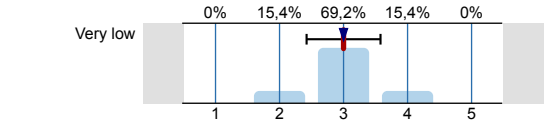

n=13
mw=3,2
md=3
s=0,4

1.8) **Machine Learning application ability (i.e., using ML in a professional environment):** My skills in this area *before* starting the course were...



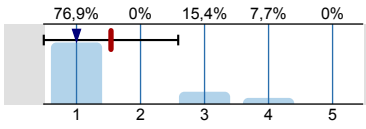

n=13
mw=1,5
md=1
s=0,9

1.9) **Machine Learning application ability (i.e., using ML in a professional environment):** My skills in this area are *now*...



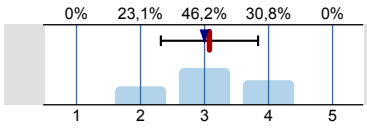

n=13
mw=3
md=3
s=0,6

1.10) **Ability to use the most important Python libraries for machine learning:** My skills in this area *before* starting the course were...



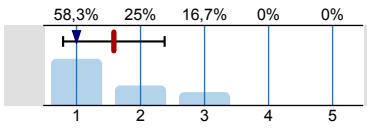

n=13
mw=1,5
md=1
s=1,1

1.11) **Ability to use the most important Python libraries for machine learning:** My skills in this area are *now*...



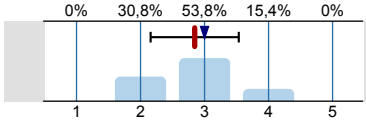

n=13
mw=3,1
md=3
s=0,8

1.12) **Ability to use the most important Python libraries for data visualization:** My skills in this area *before* starting the course were...



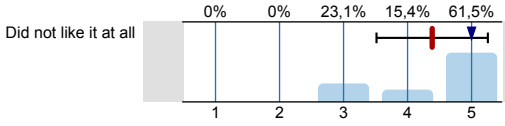

n=12
mw=1,6
md=1
s=0,8

1.13) **Ability to use the most important Python libraries for data visualization:** My skills in this area are *now*...




n=13
mw=2,8
md=3
s=0,7

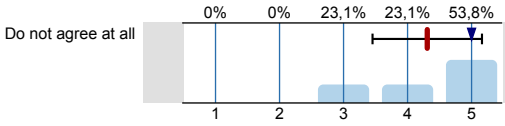
1.14) **Additional question:** How do you feel about using Github as a tool in the course?




n=13
mw=4,4
md=5
s=0,9

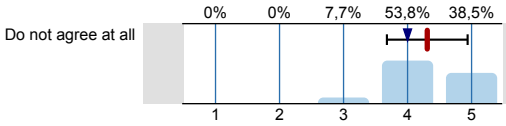
## 2. Questions about the course (1)

2.1) The course follows a clear structure.



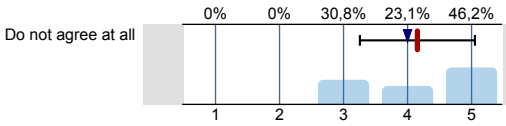

n=13
mw=4,3
md=5
s=0,9

2.2) The way the course is designed adds to the understanding of the material.



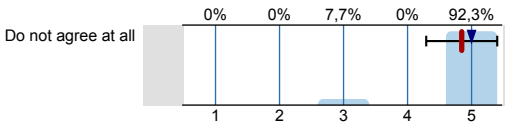

n=13
mw=4,3
md=4
s=0,6

2.3) The course has a good mix of knowledge transfer, interactive elements and discussion.



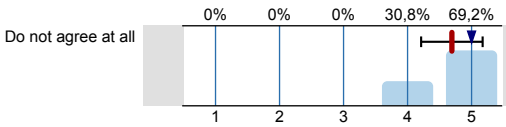

n=13
mw=4,2
md=4
s=0,9

2.4) The instructors are responsive to students' questions and suggestions.



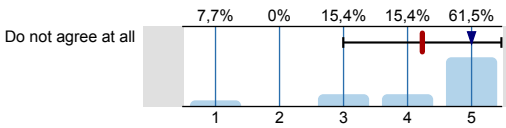

n=13
mw=4,8
md=5
s=0,6

2.5) The instructors clarify the usability and usefulness of the course content.



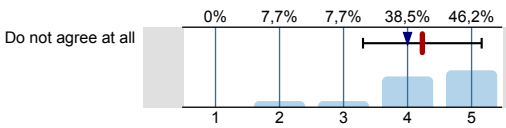

n=13
mw=4,7
md=5
s=0,5

2.6) The instructors use good teaching materials (e.g., slides, presentations, bibliography, script) to support the learning process.



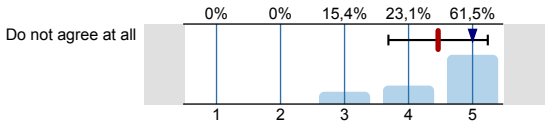

n=13
mw=4,2
md=5
s=1,2

2.7) The instructors have good time management skills.



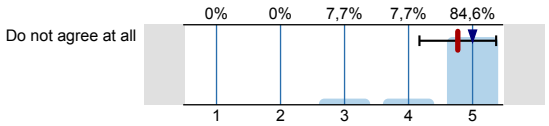

n=13
mw=4,2
md=4
s=0,9

2.8) The instructors express themselves clearly and comprehensively.




n=13
mw=4,5
md=5
s=0,8

2.9) The instructors encourage active student participation in the course.

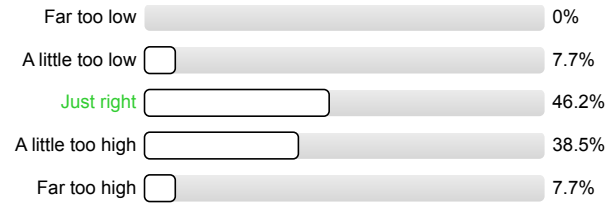



n=13
mw=4,8
md=5
s=0,6

## 3. Questions about the course (2)

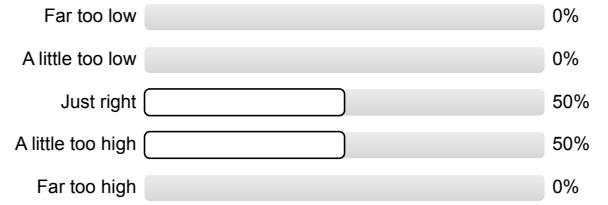
3.1) The difficulty of the lecture part of the course (i.e., theoretical input by instructors) is…

n=13



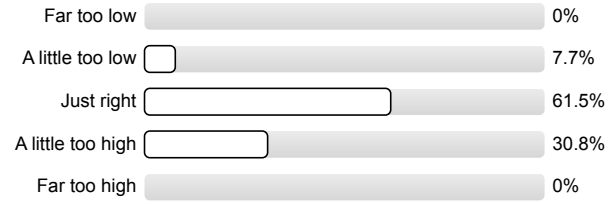

3.2) The difficulty of the exercise part of the course (e.g. programming exercises in python) is…

n=12



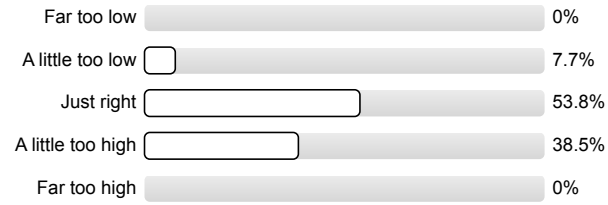

3.3) The scope of the exercises is...

n=13



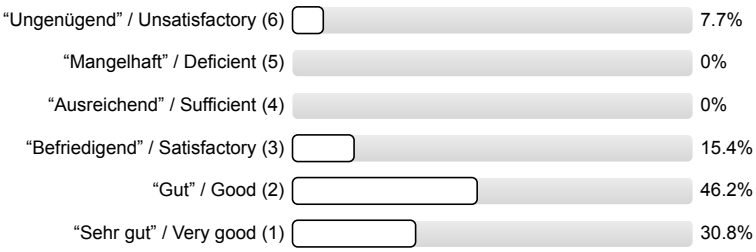

3.4) The pace of the course is…

n=13




3.5) Overall, I give the course the following school grade:

n=13



3.6) Overall, I give the lecture part of the course (i.e., theoretical input by instructors) the following school grade:

n=13

| | |
|---|---|
| “Ungenügend” / Unsatisfactory (6) | 0% |
| “Mangelhaft” / Deficient (5) | 0% |
| “Ausreichend” / Sufficient (4) | 7.7% |
| “Befriedigend” / Satisfactory (3) | 7.7% |
| “Gut” / Good (2) | 38.5% |
| “Sehr gut” / Very good (1) | 46.2% |

3.7) Overall, I give the exercise part of the course (e.g., programming exercises in python) the following school grade:

n=13

| | |
|---|---|
| “Ungenügend” / Unsatisfactory (6) | 7.7% |
| “Mangelhaft” / Deficient (5) | 0% |
| “Ausreichend” / Sufficient (4) | 7.7% |
| “Befriedigend” / Satisfactory (3) | 15.4% |
| “Gut” / Good (2) | 30.8% |
| “Sehr gut” / Very good (1) | 38.5% |

3.8) Overall, I give course week 1 ("Mathematical Principles of Machine Learning") the following school grade:

n=13

| | |
|---|---|
| “Ungenügend” / Unsatisfactory (6) | 7.7% |
| “Mangelhaft” / Deficient (5) | 0% |
| “Ausreichend” / Sufficient (4) | 7.7% |
| “Befriedigend” / Satisfactory (3) | 7.7% |
| “Gut” / Good (2) | 38.5% |
| “Sehr gut” / Very good (1) | 38.5% |

3.9) Overall, I give course week 2 ("Machine Learning Foundations") the following school grade:

n=13

| | |
|---|---|
| “Ungenügend” / Unsatisfactory (6) | 0% |
| “Mangelhaft” / Deficient (5) | 0% |
| “Ausreichend” / Sufficient (4) | 0% |
| “Befriedigend” / Satisfactory (3) | 0% |
| “Gut” / Good (2) | 61.5% |
| “Sehr gut” / Very good (1) | 38.5% |

3.10) Overall, I give course week 3 ("Deep Learning") the following school grade:

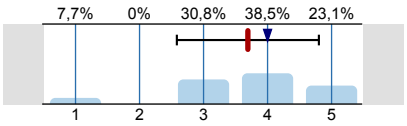
n=13

| | |
|---|---|
| “Ungenügend” / Unsatisfactory (6) | 0% |
| “Mangelhaft” / Deficient (5) | 7.7% |
| “Ausreichend” / Sufficient (4) | 7.7% |
| “Befriedigend” / Satisfactory (3) | 0% |
| “Gut” / Good (2) | 46.2% |
| “Sehr gut” / Very good (1) | 38.5% |

## 4. Questions about the course (3)

4.1) How much did you learn in this course?

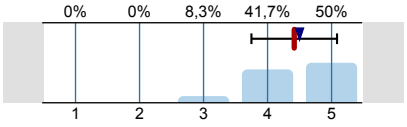
Very little — Very much




n=13
mw=3,7
md=4
s=1,1

4.2) How interested were you in the topic ***before*** the course began?

Very little — Very much




n=12
mw=4,4
md=4,5
s=0,7
E.=1

## 5. Participant statistics

5.1) This course was (for me)...

n=13

| | |
|---|---|
| a compulsory course | 0% |
| an elective course ("Wahlpflichtfach") | 0% |
| voluntary, but necessary to obtain an additional certificate (e.g. Doctorate Plus, module of a graduate program) | 30.8% |
| a completely voluntary course (i.e., no external benefits whatsoever) | 69.2% |

5.2) What is your highest educational qualification?

n=13

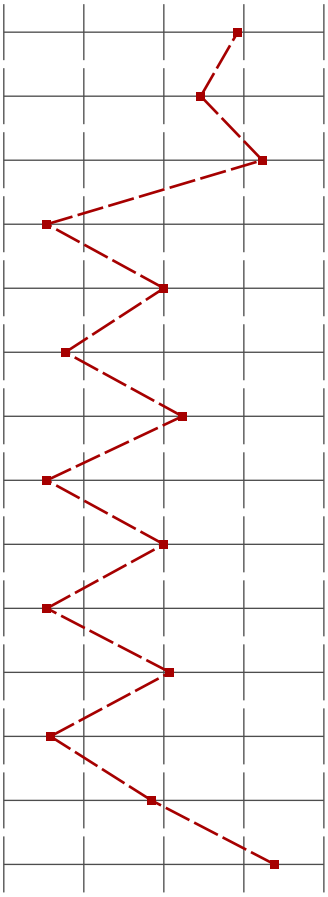
| | |
|---|---|
| High school diploma / Baccalaureate / “Abitur” | 7.7% |
| Bachelor (or comparable) | 15.4% |
| Master (or comparable) | 46.2% |
| PhD / “Doctorate” | 30.8% |
| Habilitation / Professorship | 0% |
| None of the above | 0% |

5.4) To which gender identity do you most identify?

n=13

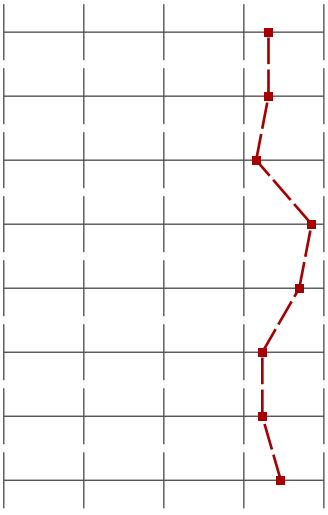
| | |
|---|---|
| Female | 61.5% |
| Male | 38.5% |
| Other / Diverse | 0% |
| Prefer not to answer | 0% |

## 1. Evaluation of "Machine Learning Foundations in Python"



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1.1) | The course is useful for conducting my research projects. | Do not agree at all | Fully agree | n=13 | mw=3,9 | md=4,0 | s=0,9 |
| 1.2) | I can use what I have learned independently in my research projects. | Do not agree at all | Fully agree | n=13 | mw=3,5 | md=3,0 | s=0,9 |
| 1.3) | The amount of examples in the course was appropriate. | Do not agree at all | Fully agree | n=13 | mw=4,2 | md=5,0 | s=1,2 |
| 1.4) | **Python programming:** My skills in this area *before* starting the course were... | Very low | Very high | n=13 | mw=1,5 | md=1,0 | s=1,0 |
| 1.5) | **Python programming:** My skills in this area are *now*... | Very low | Very high | n=13 | mw=3,0 | md=3,0 | s=0,7 |
| 1.6) | **Knowledge about Machine Learning:** My skills in this area *before* starting the course were... | Very low | Very high | n=13 | mw=1,8 | md=1,0 | s=1,0 |
| 1.7) | **Knowledge about Machine Learning:** My skills in this area are *now*... | Very low | Very high | n=13 | mw=3,2 | md=3,0 | s=0,4 |
| 1.8) | **Machine Learning application ability (i.e., using ML in a professional environment):** My skills in this area *before* starting the course | Very low | Very high | n=13 | mw=1,5 | md=1,0 | s=0,9 |
| 1.9) | **Machine Learning application ability (i.e., using ML in a professional environment):** My skills in this area are *now*... | Very low | Very high | n=13 | mw=3,0 | md=3,0 | s=0,6 |
| 1.10) | **Ability to use the most important Python libraries for machine learning:** My skills in this area *before* starting the course were... | Very low | Very high | n=13 | mw=1,5 | md=1,0 | s=1,1 |
| 1.11) | **Ability to use the most important Python libraries for machine learning:** My skills in this area are *now*... | Very low | Very high | n=13 | mw=3,1 | md=3,0 | s=0,8 |
| 1.12) | **Ability to use the most important Python libraries for data visualization:** My skills in this area *before* starting the course were... | Very low | Very high | n=12 | mw=1,6 | md=1,0 | s=0,8 |
| 1.13) | **Ability to use the most important Python libraries for data visualization:** My skills in this area are *now*... | Very low | Very high | n=13 | mw=2,8 | md=3,0 | s=0,7 |
| 1.14) | **Additional question:** How do you feel about using Github as a tool in the course? | Did not like it at all | Liked it very much | n=13 | mw=4,4 | md=5,0 | s=0,9 |

## 2. Questions about the course (1)



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2.1) | The course follows a clear structure. | Do not agree at all | Fully agree | n=13 | mw=4,3 | md=5,0 | s=0,9 |
| 2.2) | The way the course is designed adds to the understanding of the material. | Do not agree at all | Fully agree | n=13 | mw=4,3 | md=4,0 | s=0,6 |
| 2.3) | The course has a good mix of knowledge transfer, interactive elements and discussion. | Do not agree at all | Fully agree | n=13 | mw=4,2 | md=4,0 | s=0,9 |
| 2.4) | The instructors are responsive to students' questions and suggestions. | Do not agree at all | Fully agree | n=13 | mw=4,8 | md=5,0 | s=0,6 |
| 2.5) | The instructors clarify the usability and usefulness of the course content. | Do not agree at all | Fully agree | n=13 | mw=4,7 | md=5,0 | s=0,5 |
| 2.6) | The instructors use good teaching materials (e. g., slides, presentations, bibliography, script) to support the learning process. | Do not agree at all | Fully agree | n=13 | mw=4,2 | md=5,0 | s=1,2 |
| 2.7) | The instructors have good time management skills. | Do not agree at all | Fully agree | n=13 | mw=4,2 | md=4,0 | s=0,9 |
| 2.8) | The instructors express themselves clearly and comprehensively. | Do not agree at all | Fully agree | n=13 | mw=4,5 | md=5,0 | s=0,8 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2.9) | The instructors encourage active student participation in the course. | Do not agree at all |  | Fully agree | n=13 | mw=4,8 | md=5,0 | s=0,6 |

## 4. Questions about the course (3)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4.1) | How much did you learn in this course? | Very little |  | Very much | n=13 | mw=3,7 | md=4,0 | s=1,1 |
| 4.2) | How interested were you in the topic ***before*** the course began? | Very little |  | Very much | n=12 | mw=4,4 | md=4,5 | s=0,7 |

# Auswertungsteil der offenen Fragen

## 4. Questions about the course (3)

4.3) What did you like most about the course?

- - very encouraging and interactive instructors, who responded really well to questions and were very motivated
- Filling in the prepared scripts based on the comments
- I like the way the course developed my understanding about maching learning from nothing to suffiecient levels and linked it with practical life applications.
- Linear Algebra, Deep feedforward networks and Interpretability and Sequence learning. The patience and guidance of Moritz, Polina and Elena in practice section.
- Our tutors/teachers were very dedicated and committed to explaining the content in a way that everyone could understand.
- Sufficiently broad in its selection of topics to get an overview of ML.
  Using tools that are actually used in current research/professional applications of ML.
  Briefly presenting and explaining ideas of original (and also in part also quite recent) research papers and giving the proper reference for further reading.
- The focus on "hands-on" exercises to approach the course contents allowed me to improve my python skills very fast; The course perfectly matched my prior knowledge (some statistics & linear algebra, some experience with git, command line, HPC usage etc.)
- The interaction of the student with the exercises and the helpful guidence of the instructors.
- The practical exercises
- The structure of the coding exercises was correct. The Utils, that were not in the scope of the exercise were already developed to help, i.e. visualization, and the TODOs focused properly in the scope.
- lectures were pretty good. Topics were explained in an understandable way. Elena and Moritz did a great job in explaining the topics.

4.4) What could be improved about this course?

- - even more in-depth application-focused lectures and exercises: application-wise the last week was great but the content progressed too fast to fully grasp the concepts
  - recaps would have been useful
  - related to previous points: a day or two between sessions might have been useful to have time to review course material at home and keep up with pace
  - adapt prerequisites (at least for non-informatics students more than only "basic python programming" is required as well as some basic understanding of algebra and calculus, working with shell etc.)
- Die Erklärungen der Aufgaben hätten an allen Tagen eher so wie in Woche zwei aufgebaut sein sollen
- For full-time working professionals, it would be phenomenal if a similar course could also be offered, e.g., in the evenings throughout an entire semester.
- I believe the lectures could be more comprehensive and should be taught in more simpler manners for the beginners with no such background
- JAX is a simple to use library and good for learning, but more widely used architectures in industry/academia could give the students not only the feeling about ML, but also some tools to face the libraries they'll probably find outside
- Maybe a exercise performed by the class together before starting with the own exercises would be helpful
- More instructions on bender and linux
- Sometimes a lot of time was consumed because the participants had vastly different entry level skills, I do not know if that can be improved though, it is always hard to work with very heterogeneous groups
- The course felt a little fast for me. But, I don't have a strong mathmatics or programming background. So I know that other students might not feel the same.
- The doc strings in the exercises could be enhanced and extended.
  Some mismatches between the code snippets and the actual exercise .py files we were supposed to use.
  Typos in the slides, partially missing explanations on the slides, especially with regard to equations and notation used (adopted from different resources). This makes it a bit difficult understanding the slides, which we need to fully grasp the tasks in the exercises.
- good enough
- tasks were a little bit to difficult for people with almost no knowledge of using python. I would also recommend to do some programming tasks together after the lecture. I would recommend to do the lecture, than one task of programming together and in the

afternoon self-programming work.

## 5. Participant statistics

5.3) What is your main field of research?

- Behavior Genetics
- Clinical medicine and Oncology
- Epidemiology
- I am a radiology resident.
- Neuiroscience
- Neuroscience
- Nuerosciences
- Onkologie
- Pharmacy
- Physics
- Statistics (Biometrics)
- computer science

5.5) What is your age (in years)?

- 21
- 24
- 25
- 26
- 27
- 29
- 30 (3 Nennungen)
- 31
- 32 (2 Nennungen)
- 33