Introductory Seminar of PyTorch for Deep Learning

Daniele Angioni, Cagliari Digital Lab 2024 - Day 1

About Us

Pattern Recognition and Applications Lab

Emanuele Ledda

May 2024

Introductory Seminar on Artificial Intelligence and Machine Learning

Daniele Angioni

July 2024

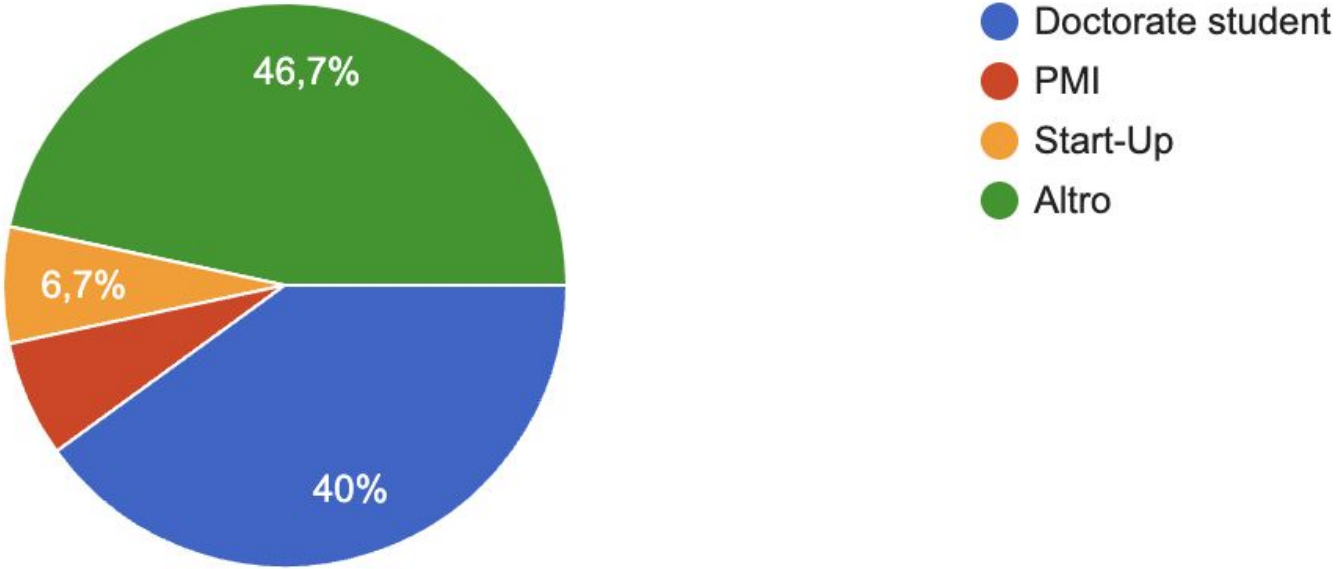
Introductory Seminar on PyTorch for Deep Learning

Sara Concas

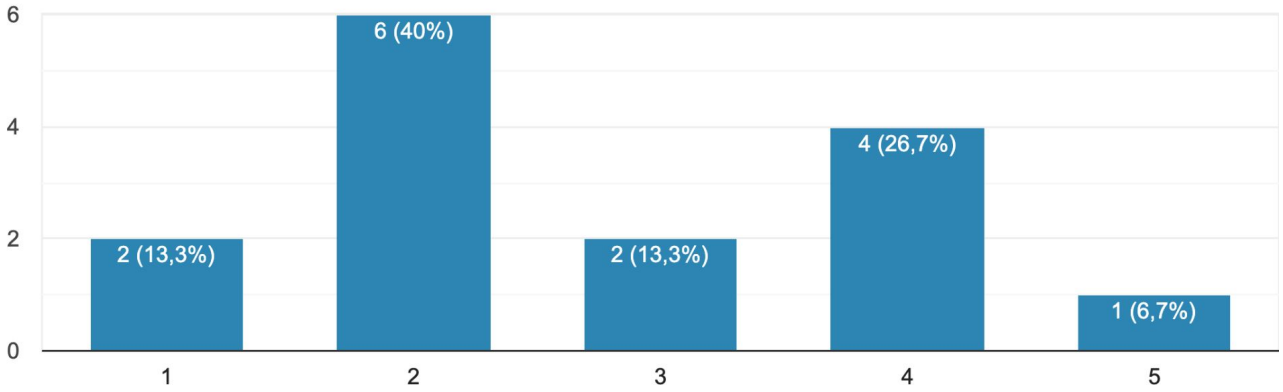
September 2024

Introductory Seminar on Computer Vision

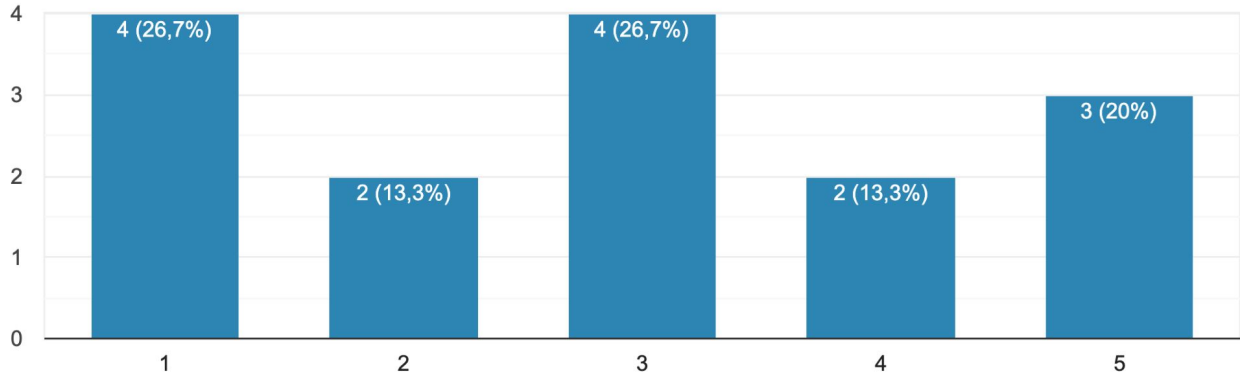
About You



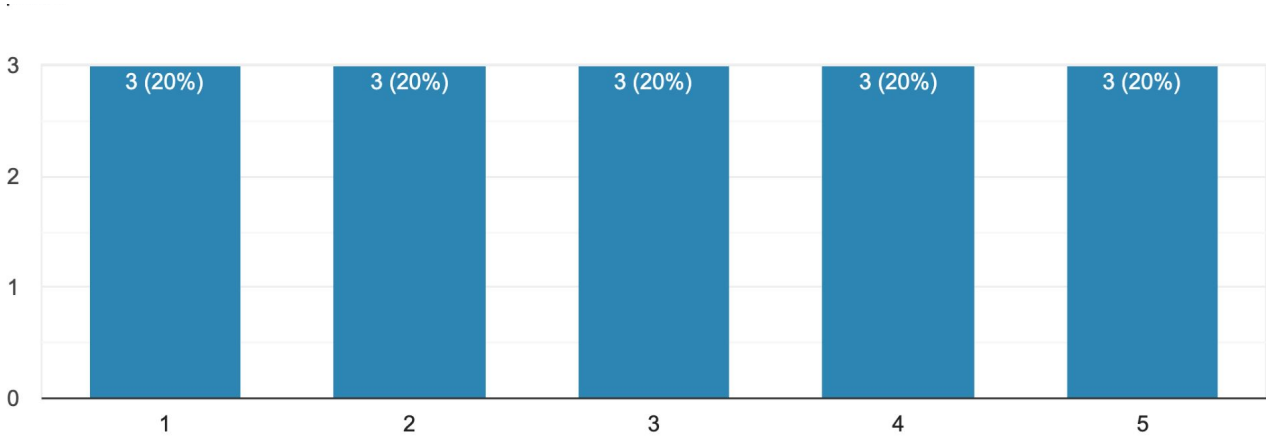
Python Skills



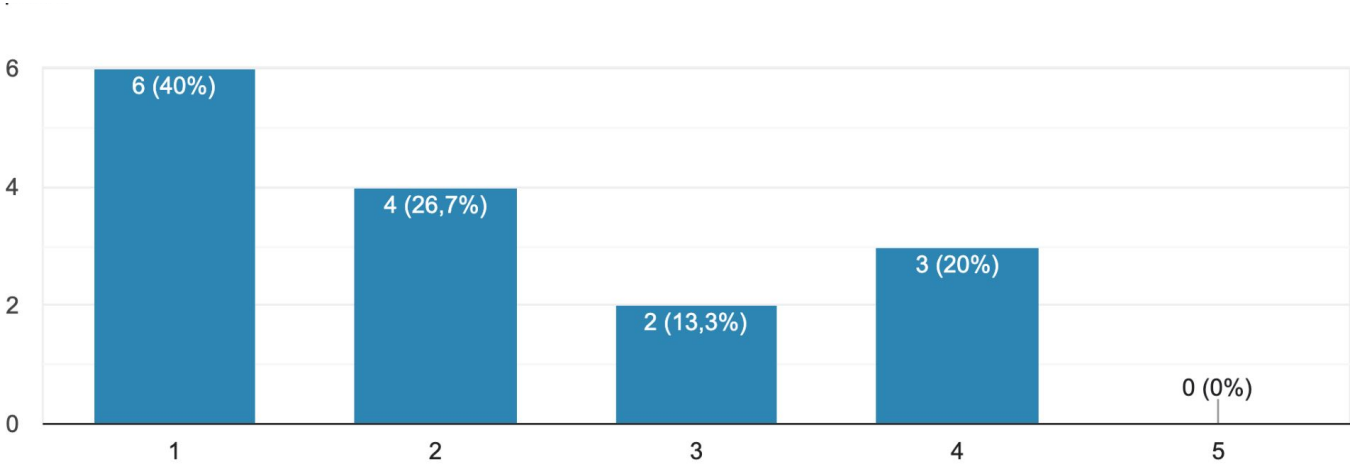
Linear Algebra understanding



Basic Calculus understanding



Basic Machine Learning understanding



Course Objectives

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To provide students with the fundamental elements of deep learning and demonstrate its application to computer vision and natural language processing.

The course will also give the basis to understand the fundamental concepts, so knowing machine learning is recommended, but not mandatory.

Prerequisite

- Understanding the basic concepts of **Linear Algebra** and **Calculus**
- Python skills
- Having a laptop 

Course Outline

1. PyTorch fundamentals: tensors and automatic gradient differentiation (autograd) (4 h)
2. Machine Learning Foundation and Neural Networks (4 h)
3. Computer Vision with PyTorch: image classification with Convolutional Neural Networks (4 h)
4. Natural Language Processing with PyTorch: text classification (and generation) with Recurrent Neural Networks (4h)
5. Adapting to different frameworks: Tensorflow (4 h)

Material

Reference Book: Stevens, Eli, Luca Antiga, and Thomas Viehmann. Deep learning with PyTorch. Manning Publications, 2020.

Other useful references:

- Pattern Recognition and Machine Learning, C. Bishop, Springer, 2007
- Dive into Deep Learning, A. Zhang, Z. C. Lipton, M. Li, A. J. Smola, 2020:
- Pattern Classication (2nd ed.), R. O. Duda, P. E. Hart, e D. G. Stork, John Wiley & Sons, 2000

The material in the seminar repository.

Assessment

- Written examination for PhD students

- By passing the exam you will get a maximum of 2.5 CFU
  - This can be lower depending on previous similar courses you have taken
  - Ask the coordinator of your PhD course for clarification on the exact number of CFU

- The course assessment will be performed on the last day of the course. If you are not able to attend that day, please let me know so we can schedule a different time.

Course Calendar

- 1/07/2024 h 9:00-13:00
- 2/07/2024 h 9:00-13:00
- 3/07/2024 h 9:00-13:00
- 4/07/2024 h 9:00-13:00
- 5/07/2024 h 9:00-13:00

All lectures will be held in Laboratorio L.I.D.I.A Software (Building N - Entrance N1)

Course attendance is required (online or in person) for at least 12 hours (3/5 lessons)

In the next chapter....

- PyTorch fundamentals
- tensors basics
- autograd

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