Deep learning for biologists

The course, the instructors, the participants

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CNR, Milan (Italy)

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CREA, Lodi (Italy)

Welcome to Deep Learning for Biologists!

- 5 days, from 14:00 to 20:00, two/three breaks per day
- mix of:
    - slides → lectures
    - jupyter notebooks → hands-on sessions
    - do-it-ourselves exercises (collaborative)
- introductory course aimed for:
    - biologists with little data analysis experience who wish to understand what all the fuss about DL is
    - more experienced biologists who wish to apply DL to their own research projects
    - a combination of the above

Welcome to Deep Learning for Biologists!

- the two instructors will interchange during the 5 days in leading the lectures and practicals: the other will assist you if you have questions or technical problems (slack channels, etc.)
- **questions are welcome at all times**: don't be shy and ask if something is not clear!
- the **do-it-together collaborative exercises** will be a chance to practice what we learnt and discuss it together
- the **final quiz** will test our knowledge
- at the end of the course, usually doubts remain: if you are interested, next week the instructors will organise a 1.5 hrs Zoom session to answer your questions and discuss your DL projects

Welcome to Deep Learning for Biologists!

- What is Deep Learning?
- The black box: a neural network for image recognition
- The building blocks of deep learning
- From logistic regression to neural networks: the not-so-black box
- Cross-validation and performance measures
- More building blocks: advanced stuff
- Convolutional neural networks
- Deep learning models for biological classification problems
- Transfer learning
- Deep learning for regression problems
- Recurrent Neural Networks
- Image segmentation

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detailed timetable here

Welcome to Deep Learning for Biologists!

- This is the **fifth edition** of the course: few things still to fine tuned, continuously evolving topic & material
- Started as intro to cutting-edge field: DL now has evolved a lot!
- Your feedback will be particularly important to keep the course up and running: during the course, during the wrap-up discussion on Friday, or when we meet again next week for an aftermath discussion

Filippo in a slide

- **Roma** (*born*)
- **Perugia** (*MSc degree*)
- **Cork, ICBF** (*Web-design & Database*)
- **Cremona, ANAFI** (*Quantitative Genetics*)
- **Guelph, CGIL** (*Visiting Scientist*)
- **Wageningen, WUR** (*PhD*)
- **Göttingen University** (*post-doctoral researcher*)
- **Lodi, PTP** (*P.I., 'omics in animals, plants, humans*)
- **Caldes de Montbui, IRTA** (*visiting, Bayesian stats*)
- **Milan - CNR** (*tenured researcher*)
- **Cardiff University** (*biostatistician*)
- **Bruxelles - ERC** (*seconded national expert*)
- **Milan - CNR** (*senior researcher*)

Nelson in a slide

- **Tortona** (*born*)
- **Pavia** (*MSc computer engineering, PhD*)
- **Fairfax, GMU** (*informatics security*)
- **Lodi, PTP** (*database, biostatistician*)
- **Zagreb, Centre of Excellence for Biodiversity and Molecular Plant Breeding** (*biostatistician*)
- **Wageningen, NPEC@WUR** (*data scientist, drones*)
- **Lodi, CREA** (*senior researcher*)

Us on the internet

- https://bioinformateachers.github.io/
- https://github.com/ne1s0n/bioinformateachers

The participants

So, what about you? [done!]