Welcome

Dip. Informatica
University of Pisa

- *Welcome* to the new students in CS & form any other course
- The curricula
- ML in the curricula
- Other master degree students

Master Degree in Computer Science (Pisa)

Statistics (Poll): ML 2024

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PLEASE FILL THE FOLLOWING FORM, help me to know you and help you:

https://forms.gle/B5CvwY84vHcCZ5kk7

Using the UNIPI account

- How many have got the bachelor in Computer Science from **Pisa** University? Which is your bachelor degree?
- How many in the **AI curriculum**?
- How many in the (**Data&Know.) Big Data Technologies**?
- How many in the **ICT curriculum**?
- How many in the **Software curriculum**?
- How any from Master programme in **Data Science and Business Informatics**?
- How many **Digital Humanities** (Informatica Umanistica)?
- How many **Erasmus**?
- How many "**others**" and what? **Physic, Math, Eng., etc.**

Master Degree in Computer Science (Pisa)

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- Since 2017 the curricula are:
  - Artificial Intelligence (AI)
  - Data and Knowledge →(since 2021) Big Data Technologies (BD)
  - ICT Solutions Architect (ICT)
  - Software: Programming, Principles, and Technologies → (since 2025) Foundations of Software (SW)

- Advantages:
  - Opportunity to specialize in a field (identify your interest, professional qualification →supplementary diploma with your curriculum), …to enjoy!
  - Methodological courses for the area at the beginning
  - Show that 2 years more of study can be useful for your future.

Further info

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Master Degree:

- https://www.di.unipi.it/en/education/mcs

Rules & General Info:

- https://didattica.di.unipi.it/en/master-programme-in-computer-science/ → *"Getting Started as a New Student"*

Details:

- https://www.di.unipi.it/en/education/mcs/rules-and-resolutions
- Instructions for each exam and
- Modality to change master programme (to the new order) or curricula or the study plan

ML & Master degree (Pisa)

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- ML is related with all the 4 curricula (see the previous discussion on the applications)
- See *characterizing* and *electives* courses in each curricula*

- ML is *characterizing* for the AI curriculum

ML & Master degree (Pisa)

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ML & Intelligent Systems area (OLD)

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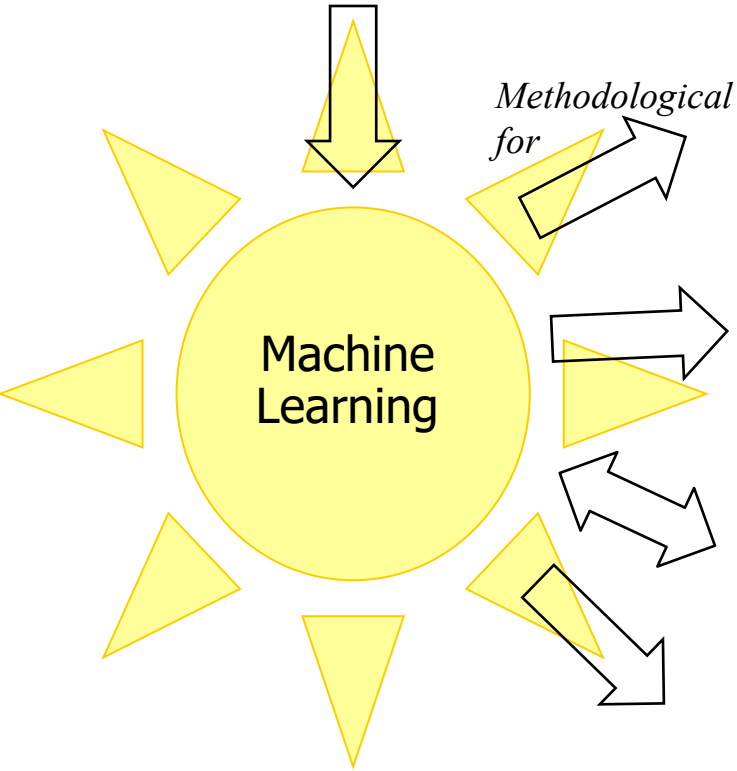
Computational mathematics for learning and data analysis
Parallel and distributed systems: paradigms and models



Methodological for

Human language technologies (AI)
Intelligent Systems for pattern recognition (AI)
Smart applications (AI)

Computational neuroscience (AI/ING)
Robotics (AI)
Semantic web (AI)

Algorithm engineering (BD)
Data mining (BD) (*)
Information Retrieval (BD)
Mobile and cyber-physical systems (ICT)

But also others:*

Bioinformatics (BD) Advanced databases (BD)
Big data analytics (WBI) …

ML & Intelligent Systems area (New, since a.y. 25/26)

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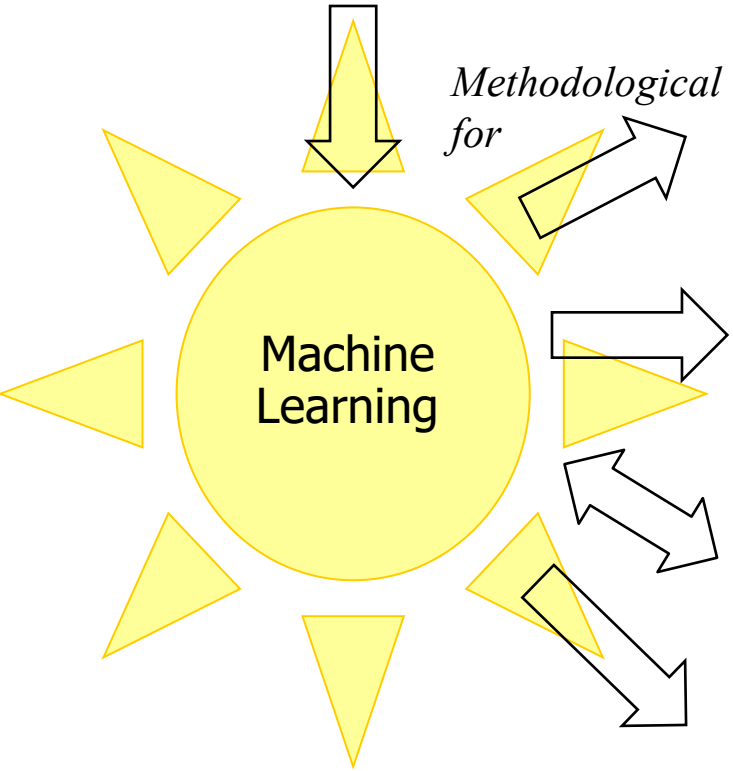
Computational mathematics for learning and data analysis
Parallel and distributed systems: paradigms and models



Methodological for

Human language technologies (AI)
Generative and deep learning (AI)
Computer vision (AI)

Computational neuroscience (AI/ING)
Robotics (AI)
Semantic web (AI)
Learning on Graphs (AI)

Algorithm engineering (BD)
Algorithm design
Data mining (BD) (*)
Information Retrieval (BD)
Mobile and cyber-physical systems (~~ICT~~)

See (link):

Artificial Intelligence

But also others:* Bioinformatics (BD) Advanced databases (BD)
Big data analytics (WBI) Digital Health lab ...

ML & Master degree (Pisa)

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- ML is related with all the 4 curricula (see the previous discussion on the applications)
- See *characterizing* and *electives* courses in each curricula*

- ML is *characterizing* for the AI curriculum

AI curriculum - Plan

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- Methodological **characterizing** basis (to build adaptive/intelligent systems):

- Artificial intelligence fundamentals - 6 CFU
- Computational mathematics for learning and data analysis - 9 CFU
- Machine learning - 9 CFU
- Parallel and distributed systems: paradigms and models - 9 CFU

Blu: shared with other curricula

Red: as characterizing course is only in AI (but can be shared as electives)

AI curriculum - Plan

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The other **characterizing** and related fields:

- Human language technologies - 9 CFU
- Generative and deep learning - 9CFU
- Computer vision - 9 CFU (new)

Group: AI electives (9 CFU)

- Algorithm engineering (BD)
- Algorithm design
- Data mining (BD)
- Mobile and cyber-physical systems (ICT)

Group: AI electives (6 CFU) → *A complete list of more than* **16** here

- Information retrieval (BD)
- Computational neuroscience (ING)
- Social and ethical issues in computer technology
- Robotics
- Semantic web
- Learning on Graphs (new)
- …

Further info: FAQ

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AI curriculum:

Note on Studies plan: since 2021

60 CFU **characterizing** courses

27 CFU (1 of 9 CFU and 3 of 6 CFU) from **electives**

At least 9 CFU **free choice**

Seems only 1x9 CFU + 3x6 CFU + 1 exam of 9 CFU (free choice)

But it is also possible to choice

1x9 CFU + 3x6 CFU + 2x6 CFU (free choice)

i.e. 9 free choice credits covered with 2 exams of 6 CFU

Study plan link: https://didattica.di.unipi.it/laurea-magistrale-in-informatica/piani-di-studio-3/

Sinergy with CM

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- Take the opportunity to *follow* **in parallel** *CM and ML*
  - You get both mathematical background for learning and the ML methods , with reciprocal stimulus and continuously deepening or the underlying math/comp aspects or the modellistic effects of such choices (regardless of the order).
- In any case, for all the students, very useful opportunity for integration of the basic mathematical **background**:
  - Please see the time table by your-self
- Anyway, the course is *not* mandatory to follow ML, as many students in the past from other Master Degree or curricula without CM (we are aware of this).

A note for students coming from IIA (Unipi CS-BSc)

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- The first 6 lectures will be "easy" for you
- But warning, they are not equal to the content in IIA!
  - Take care of new parts, with different math concepts, etc.
  - We are moving from intro of the main concepts of ML trough simple model examples (simple models as a means for the concepts introduction) to understanding **principles** and **models at the state-of-the-art** to solve ML tasks (models and principles as the subject).

- From lecture 5/6 ahead the content is completely new

Further Info?

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Please ask

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