

Intelligent Systems Engineering

Course presentation

Andrea Omicini
andrea.omicini@unibo.it

Dipartimento di Informatica – Scienza e Ingegneria (DISI)
Alma Mater Studiorum – Università di Bologna

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Why This Course? I

AI is some serious stuff, nowadays

- but it is far more than machine learning and neural networks
- which we already cover elsewhere

We are heading towards *real-world intelligent systems*

- it is happening *fast*
- it is going to cover almost all known application scenarios, and push for new ones
- we are going to need *whatever AI technique* we can get our hands on
 - and put our focus on **systems**
 - as well as on **component integration**

Fundamental Questions I

What is the range of the available *AI components & techniques*?

- we have 60+ years of AI components & systems from where to draw
 - *non-symbolic* ones—mostly from robotics
 - *subsymbolic* ones—mostly from ML
 - *symbolic* ones—mostly from classic AI

Fundamental Questions II

How should we *combine & integrate intelligent components*...

... in order to *build intelligent systems*?

- this is a question that *intelligent systems engineers* should ask themselves
- a problem that cannot be solved at the mere *technology* level
 - calling instead for suitable *concepts, models, methods, methodologies*
- as anyone knowledgeable about *basic software engineering principles* would probably recognise and understand

Fundamental Questions III

How should we respond to the *new challenges* for AI systems?

Social, political, normative challenges such as

- transparency
- trustworthiness
- accountability
- explainability
- ...

?

Fundamental Questions IV

... and the answer is

Intelligent Systems Engineering

<https://apice.unibo.it/xwiki/bin/view/Course/Ise2324/>



At the End of the Course...

... students are capable of

- devising the problems requiring AI techniques for their solution
- determining the most suitable conceptual and methodological approaches
- selecting and integrating the fittest technologies for implementing the solutions detected



Who & When

Teachers

- Prof. Andrea Omicini
 - <mailto:andrea.omicini@unibo.it>
 - <http://www.unibo.it/faculty/andrea.omicini/>
 - <http://andreaomicini.apice.unibo.it/>
 - in charge of Module 1
- Prof. Giovanni Ciatto
 - <mailto:giovanni.ciatto@unibo.it>
 - <http://www.unibo.it/faculty/giovanni.ciatto/>
 - <http://giovanniciatto.apice.unibo.it/>
 - in charge of Module 2

2nd Semester

- February-June 2024

Project

- on a *student-selected topic* in the area of *intelligent systems engineering* spanning from theory to implementation
- some examples – both old and new ones – can be found at

<https://apice.unibo.it/xwiki/bin/view/Courses/Series/Ise/Projects>

- final exam as a *project discussion*

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