Thesis and Stage Opportunities AY23/24

Giacomo Boracchi, Politecnico di Milano, DEIB

https://boracchi.faculty.polimi.it/

Updated on February 2024

The Team

We are 3 faculties, 10 PhD students, 1 Research Assistants... and 20+ MSc students!

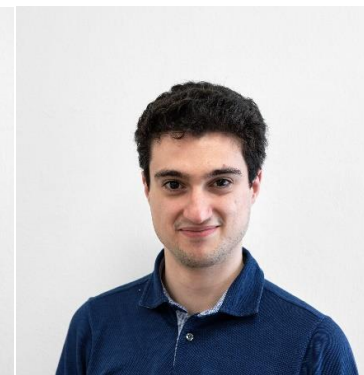Giacomo Boracchi   Luca Magri   Federica Arrigoni   Filippo Leveni   Loris Giulivi   Antonino Rizzo   Michele Craighero

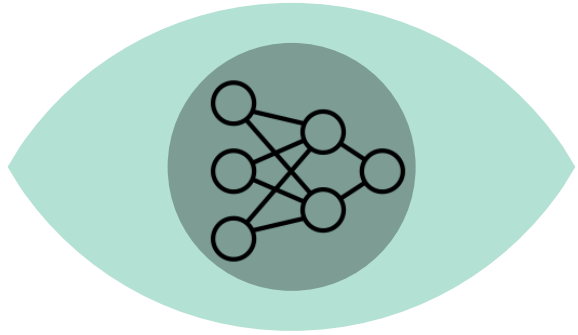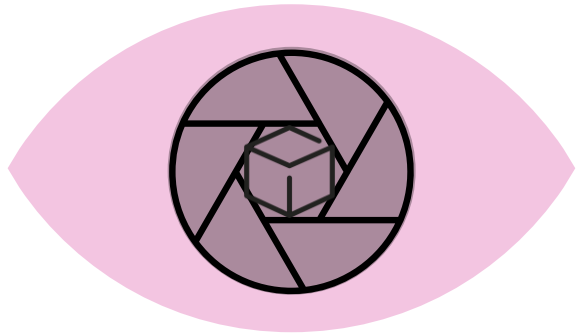Edoardo Peretti   Roberto Basla   Andrea Porfiri Dal Cin   Andrea Diecidue   Olmo Notarianni   Yunkang Cao

Our expertise
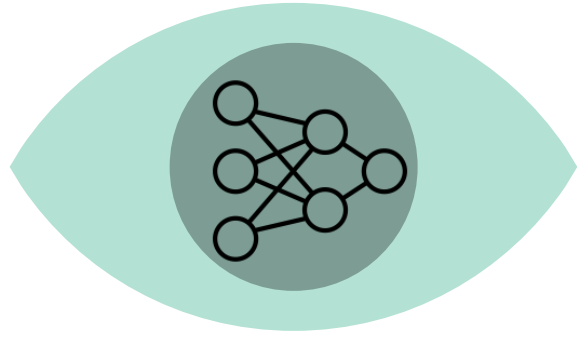
Deep Learning for Visual Recognition

Computer Vision and Pattern Recognition

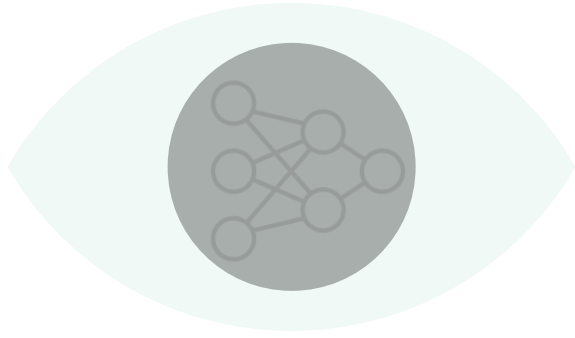Image Processing and Analysis

Our expertise

Deep Learning for Visual Recognition

- Image Classification
- Object Detection
- Image Segmentation, Instance Segmentation
- Anomaly Detection, Open Set Recognition
- Applications to 1D signals and 3D data

Our expertise

Computer Vision and Pattern Recognition

- Multi-View Geometry
- Camera Calibration
- 3D Reconstruction and Localization
- 3D Shape Analysis and Matching
- Robust Model Fitting and Clustering
- 3D Modeling and Rendering
- Quantum Computer Vision
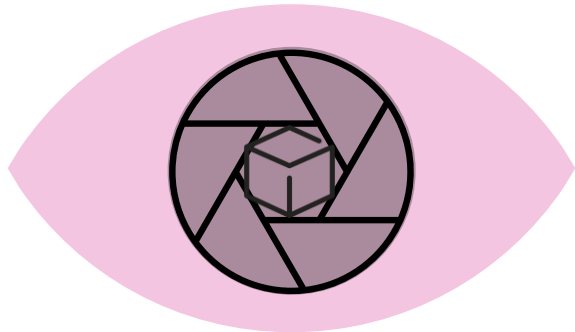
Our expertise

Image Processing and Analysis

- Statistical Algorithms for Image Analysis
- Template Detection
- Image Denoising and Restoration
- Noise Modelling

Research collocation

Our Industrial Reach
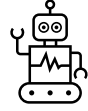
Industry 4.0

Medical

Security
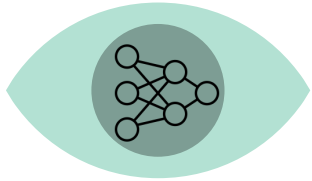
Deep Learning for Visual Recognition
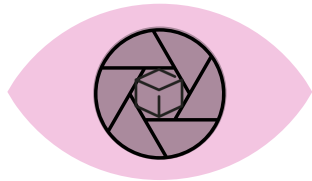
Computer Vision and Pattern Recognition

Image Processing and Analysis

EU / National Funded projects

Perivallon (EU): Protecting the EuRopean terrItory from organised enVironmentAl crime through inteLLigent threat detectiON tools (together with Prof. Fraternali)
https://perivallon-he.eu/

AI for Port Management (National): Combining traffic simulation and ML to design optimal traffic policies

GeoPride: Geometric Primitive Decomposition to model 3D world
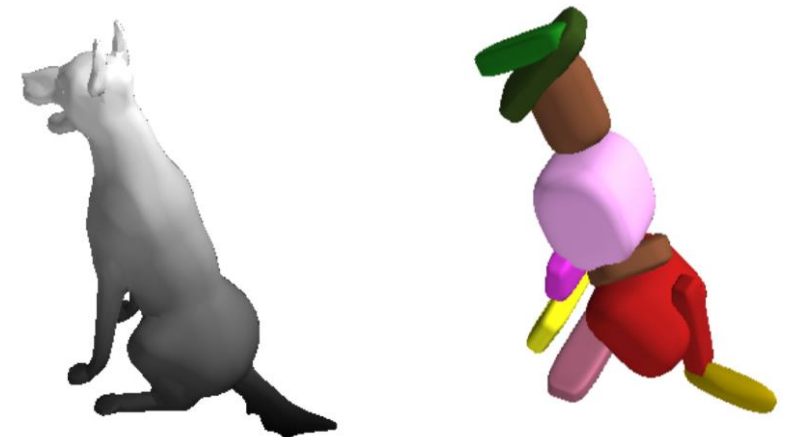
Joining us for a Thesis

Thesis Types

There are three types of thesis

- Academic Research Thesis

- Thesis on research projects

- Internships

All our thesis are research thesis. We shoot at a full thesis up to 7 points.

Academic Research thesis

Join us to work on a challenging research project!

We are looking for someone to:

- Continue a research line we have started,

- Investigate new brave ideas,

- Explore a new research challenge and propose new ideas

What you'll do:

i) brainstorm, ii) read papers, iii) discuss with us, iv) implement codes, v) run experiments, vi) analyze results.

Iterate the process multiple times.

Thesis on Research Projects

Help us out in a research project! We often need help in carrying on our project activities. We are looking for someone to:

- Be directly involved in project activities, including meetings.

- Work under our strict supervision.

- Contribute to the project with experiments and reporting.

What you'll do (on top of academic thesis activities): take part / present in project meetings, contribute to reporting and project communications.

Research Internship

- These thesis are activated within existing research collaborations with companies / research institutions and typically lead to a full, reseach-oriented thesis

- All these companies are sponsoring PhD Scolarship and/or Industrial Research Projects

- You might be collaborating with other MsC/PhD students currently involved in the same research project

- Internship opportunities are often available and not always mandatory. It is also possible to work to an academic thesis with the project team.

What you'll do (on top of academic thesis): join the research team in the company.

What we do offer

- Our supervision + co-supervision by a (brilliant) PhD student / colleague of ours

- Our proposals are meant for thesis $[-1, 7]$ points, disregarding whether it is academic/project/internship

- Opportunity to learn a new topic and develop solid expertises and skills

- Our help

What we do offer

General guidance on «how to address thesis work»

- Thesis management

- How to prepare the Related work

- How to Formulate your Research Problem

- Thesis / Executive Summary Preparation

- Thesis Presentation

Please, have a look here: https://magrilu.github.io/tht/

Every now and then we organize meetings to illustrate ongoing research activities

What we do require

Our MSc students need to:

- Show Enthusiasm,

- Be Talented and Dependable,

- Be Rigourous in studying, put special care in analyzing results,

- Have a big sense of initiative,

- Be willing to learn and to brainstorm with us

- Be willing to study papers, not just develop codes,

- Put a Constant effort on the thesis work,

- Give frequent and nicely prepared updates

- Expect 9 – 12 months work,

What we do appreciate

We know this is not always possible… but we prefer

- Meeting in person

- Students taking part to our lab life

If you feel like a brilliant candidate...

... and you are considering

- Having your thesis work submitted for publication

- Pursuing a PhD related on our research topics...

Just let us know! We will do our best to make sure you will have a clear idea about this after your thesis

Have a look at our "Thesis hall of fame"

https://magrilu.github.io/thof/

You can find executive summaries and thesis slides for students that graduated under our guidance.

.. That webpage is still growing!

Applying for a Thesis

What to do now

Check the thesis titles here (link on my website):

https://docs.google.com/document/d/1F7MoZ9G1dIcTRHF_w63P3JZY82YJ9UXI8G0UI6K_dSc/edit

Come and talk to us to know about the thesis opportunities you are interested in:

- This is very important for you, you'll make a more informed application to the thesis
- This is very important for us, we might already have an idea on who is the right champion for the thesis!
- Remember to introduce yourself!

What to do before applying

- Read some material related to the thesis topic
- Write us if you need further information / materials

The **correct mindset**:

- Don't worry if there is some background missing. This rather standard and it's easy to catch up, studying materials we provide. Let us know what your background is, we will consider whether you are suited or not.
- Nobody knows everything about their thesis before starting. This is not like the exam session.
- Consider you'll need to know everything before graduating ☺
- You need to be interested your topic, and like people to work with!
- Consider this might be your only / first experience in research

How to apply for a thesis

Once you are convinced of doing the thesis with us:

Fill in the form https://forms.gle/XkvosV64kngwUiy38

Remember to tell us:

- Which thesis are you interested in and which are **«first options»**

- What is your background, which courses you have passed that are inherent to the thesis you selected.

- Mention also:

  - any information you deem relevant for working on that specific thesis.

  - successful projects and your programming expertise.

- A short motivation paragraph.

Deadline to apply for a thesis

We will start thesis assignment around Monday February 26th

To be eligible for a thesis, submit your proposal by that time, even though we might leave the form opened until the end of that week.

You will receive an email from us to schedule a meeting (possibly in person, but if not possible online) right after the deadline.

Before the deadline, you are welcome to write us email for enquiring

The form will close on Wednesday 28th

After having submitted your application

We'll get in touch with you to

- have a meeting

- and (typically later) assign a thesis proposal

We will start from students entering "first options" and having an excellent match with our expectation

Thesis work is expected to start in early March with a "general meeting".