Leuven.AI

The KU Leuven Institute for Artificial Intelligence

Director   Prof. Luc De Raedt

Manager   Dr. Jens Bürger

Mission of Leuven.AI

› **Unite AI** and its renowned **AI experts at KU Leuven** in an interdisciplinary institute.

› **Foster AI education** by offering courses and contributing to education programmes.

› **Foster AI research** by providing a forum for exchanging ideas and for initiating projects and collaborations on AI.

› **Offer expertise on all aspects of AI**, including on the possibilities and limitations of AI and its implications from an ethical, legal and societal perspective.

› **To promote and represent the Leuven AI community** both internally and to the outside world

› **To obtain sustainable funding** for organising and supporting all this.

Leuven.AI in numbers

16
Active ERC grants

120+
Professors with expertise in all of AI

300+
Junior researchers (PhDs & postdocs)

500+
Master students with focus on AI

800+
Scientific publications in 2022

Last updated: Sep 2023

Research lines : All of AI

Machine Learning & Data Science

Language, Speech & Vision

Reasoning, Acting & Decision-Making

Philosophical, Ethical, Legal & Societal Implications (PhELSI)

Applications of AI (biomedical, engineering, business, education)

Educational programs at KU Leuven

Advanced Master in Artificial Intelligence

(Since 1988; 200+ students annually)

Advanced Master in AI for Business and Industry

Master of Engineering: Computer Science
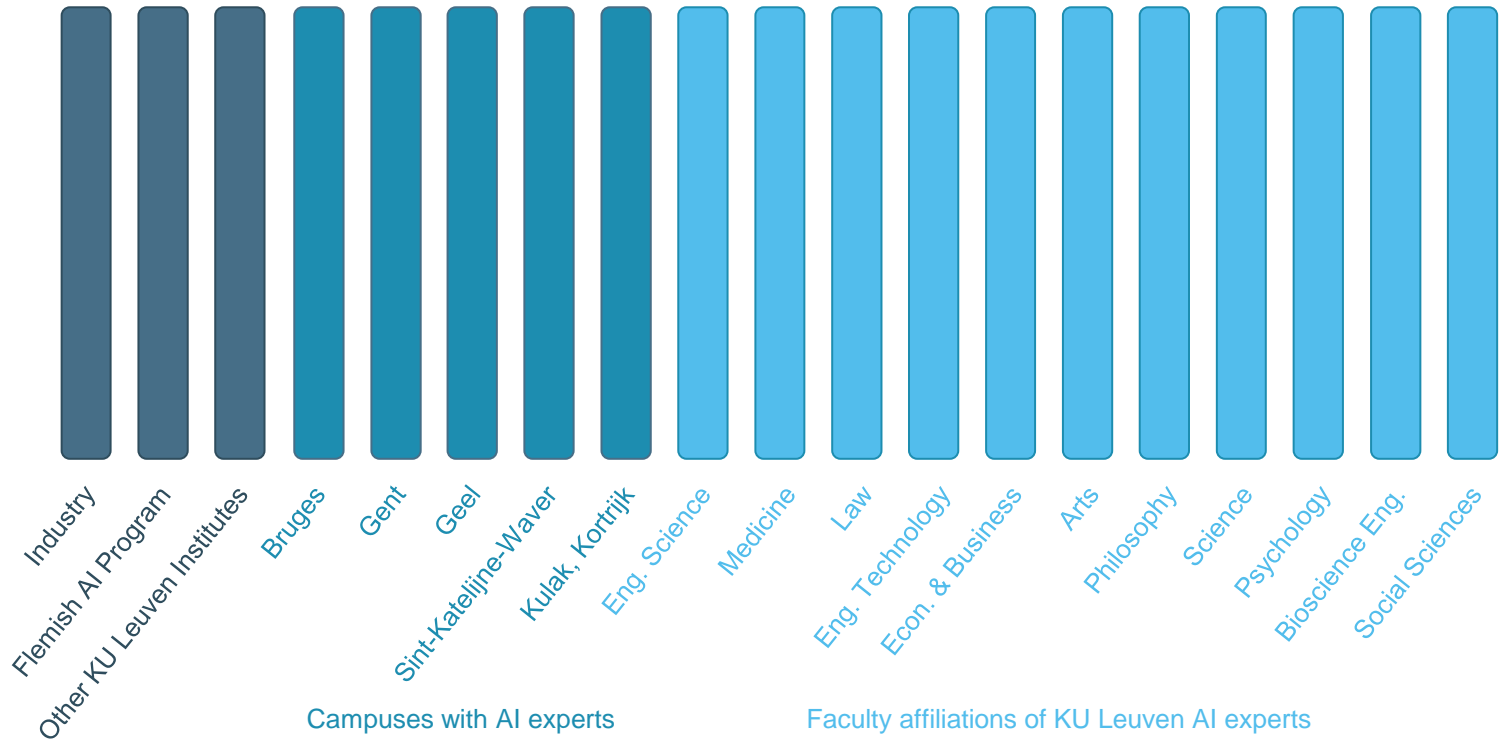
Master of Mathematical Engineering

Elements of AI (Dutch)

University-wide course AI for Everyone

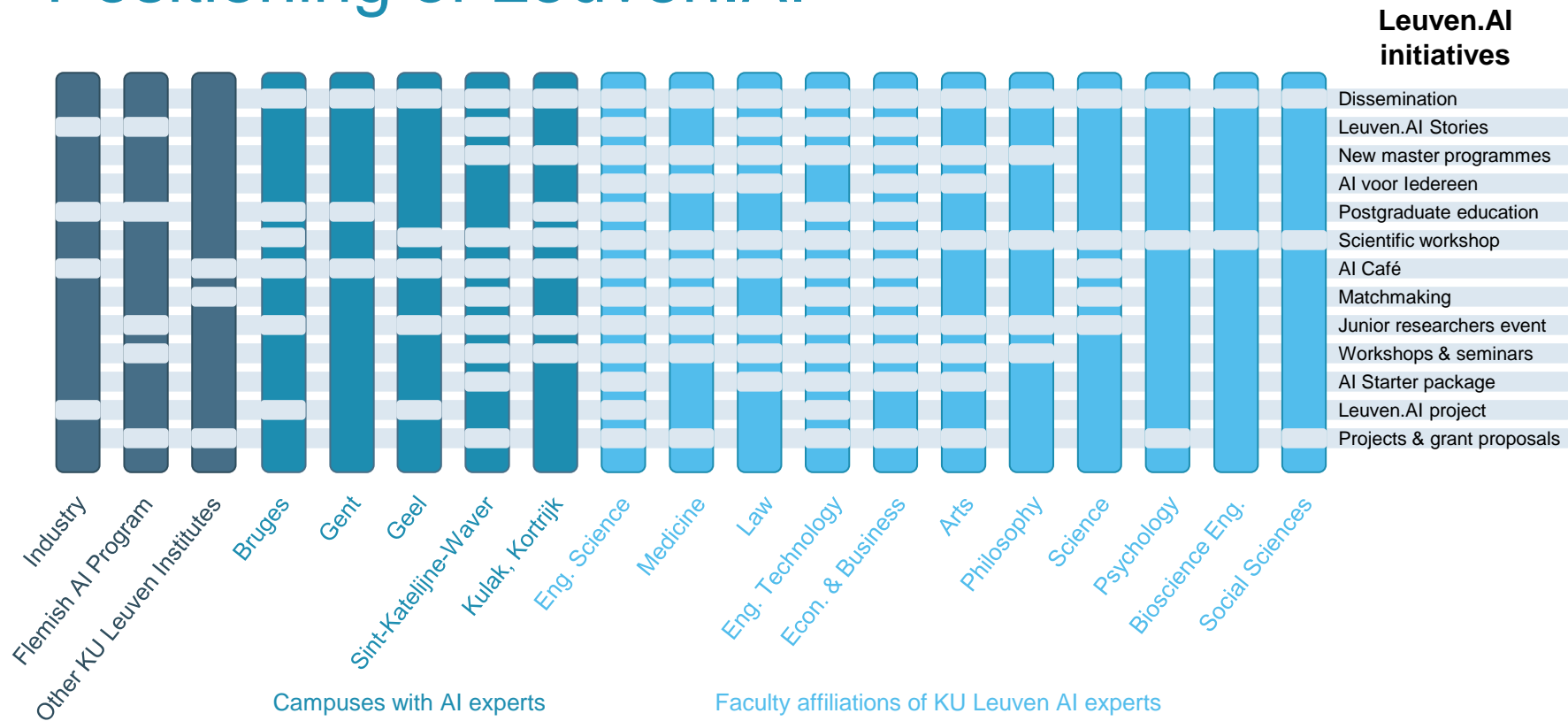**Postgraduate Studies: Big Data & Analytics in Business and Management**

Master of Engineering: AI (Starting 2024-25)
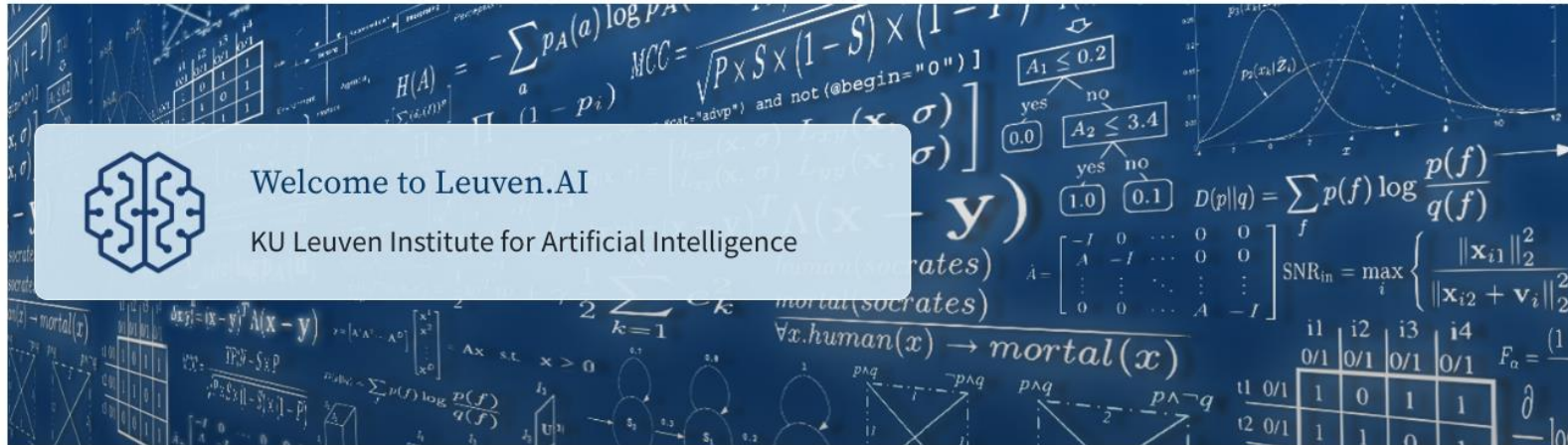
How to leverage Leuven.AI?

Positioning of Leuven.AI

Industry | Flemish AI Program | Other KU Leuven Institutes | Bruges | Gent | Geel | Sint-Katelijne-Waver | Kulak, Kortrijk | Eng. Science | Medicine | Law | Eng. Technology | Econ. & Business | Arts | Philosophy | Science | Psychology | Bioscience Eng. | Social Sciences

Campuses with AI experts   Faculty affiliations of KU Leuven AI experts

KU LEUVEN   **LEUVEN.AI**

7

Positioning of Leuven.AI

Leuven.AI initiatives

Dissemination
Leuven.AI Stories
New master programmes
AI voor Iedereen
Postgraduate education
Scientific workshop
AI Café
Matchmaking
Junior researchers event
Workshops & seminars
AI Starter package
Leuven.AI project
Projects & grant proposals

Industry
Flemish AI Program
Other KU Leuven Institutes
Bruges
Gent
Geel
Sint-Katelijne-Waver
Kulak, Kortrijk
Eng. Science
Medicine
Law
Eng. Technology
Econ. & Business
Arts
Philosophy
Science
Psychology
Bioscience Eng.
Social Sciences

Campuses with AI experts

Faculty affiliations of KU Leuven AI experts

Collecting and sharing upcoming AI events

Leuven.AI Workshops and Seminars

📅 Jul 01, 2024 - 10 Jul 2024 👤 Multiple speakers

Summer School on the Law, Ethics & Policy of AI

`PhELSI` `Summer school`

📅 Jun 12, 2024

Meet the jury seminar: From Lab to Clinic: AI-Driven Musculoskeletal Image Analysis and Clinical Translation

`Applications of AI` `Language, Speech & Vision` `Guest lecture`

📅 Jun 11, 2024 👤 Guillaume Mercère

The Moment-SOS hierarchy

`Machine Learning & Data Science` `Research results`

📅 May 27, 2024 👤 Grethell Castillo Reyes

Extension and Acceleration of the CAMF Approach to select Optimal Intervention Sites in the Presence of Spatial Interaction

`Machine Learning & Data Science` `PhD Defense`

📅 May 27, 2024 👤 Multiple speakers

Leuven.AI scientific workshop 2024

`Leuven.AI event` `Workshop`

📅 May 17, 2024 👤 Katja Seeliger (Max Planck Institute for Human Cognitive and Brain Sciences,Leipzig)

In-silico modelling of visual information processing

`Applications of AI` `Guest lecture`

📅 May 17, 2024 👤 Tunca Doğan (Hacettepe University, Ankara)

(Bio)molecular Representation, Property Prediction and Design with Artificial Intelligence-Driven Approaches

`Applications of AI` `Guest lecture`

📅 May 13, 2024 👤 Peter Coppens

Provable Safe Learning-based Control of Uncertain Systems

`Machine Learning & Data Science` `PhD Defense`

📅 May 08, 2024 👤 Anna Poetsch (Technical University Dresden)

Using DNA language models to understand different layers of code in genomes

`Applications of AI` `Guest lecture`

📅 May 08, 2024 👤 Wouter Saelens, VIB-Inflammation Research Center

The multidimensional cell: how intersecting intrinsic and extrinsic cellular processes shape cellular function

`Applications of AI` `Guest lecture`

📅 May 06, 2024 👤 Bianca Dumitrascu (Columbia University)

Statistical machine learning for learning representations of embryonic development

`Applications of AI` `Guest lecture`

📅 Apr 30, 2024 👤 Lennert De Smet

Differentiable Sampling of Categorical Distributions using the CatLog-Derivative Trick

`Machine Learning & Data Science` `Research results`

Weekly update with upcoming events and seminars distributed via Leuven.AI news: leuvenainews@ls.kuleuven.be.

Leuven.AI webpage -> Contact

Events – fostering new collaborations

Junior researchers event

Nov 2020, Nov 2023

Matchmaking events

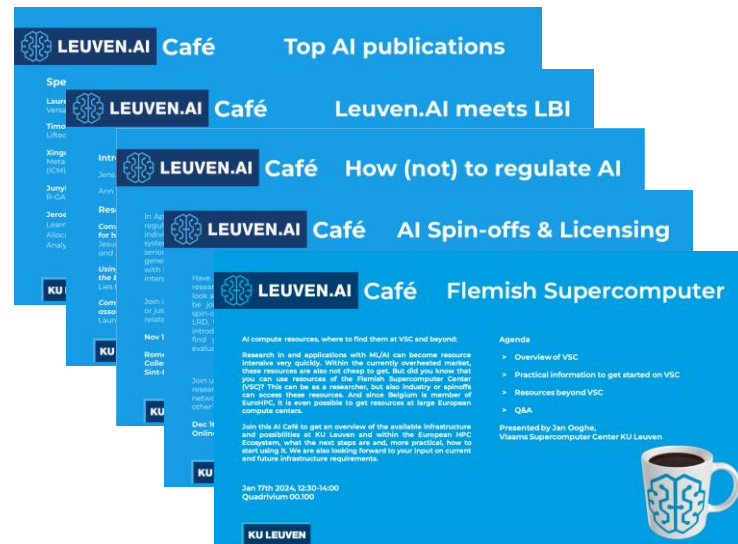Applications: May 2021

AI-Health: Oct 2023

AI Café: Recurring networking events for (junior) AI researchers

Scientific Workshops

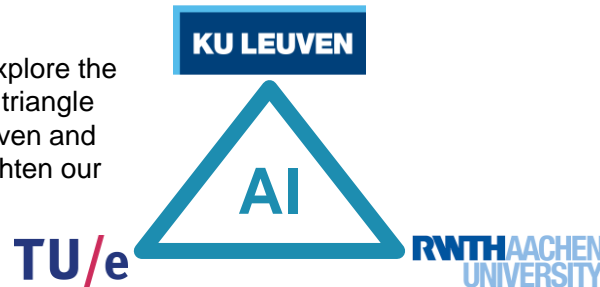AI Applications: 2022

Science of AI & AI for Science: 2024

Development of research networks

Leuven.AI has catalysed the contributions and participation of KU Leuven researchers in the various elements of the Flemish AI Action Plan.

Leuven.AI has been invited to explore the establishment of an AI research triangle with colleagues from TU Eindhoven and RWTH Aachen. Our aim is to tighten our regional collaborations with top universities.

Leuven.AI and its members have joined international AI networks of excellence and pan-European AI initiatives.

ICT-48-2020 NoE

Pan-European Organisations

Leuven.AI is representing KU Leuven within Data Science & AI focus group of the Una Europa alliance.

Leuven.AI Stories

Senne Berden, Tias Guns
Feb 9, 2023 · 12 min read · ■ Machine Learning & Data Science, Reasoning, Acting & Decision-Making
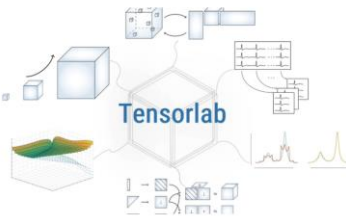
Sudoku Assistant – an AI assistant combining machine learning and reasoning

We introduce The Sudoku Assistant, an AI assistant that integrates machine learning and reasoning to interpret, solve and explain pen-and-paper Sudoku scanned with a smartphone. The assistant demonstrates three increasingly important concepts in AI research: the integration of learning and reasoning, explainable AI and human-centered AI.

Eric Evert, Lieven De Lathauwer
Jan 9, 2023 · 9 min read · ■ Machine Learning & Data Science

Tensors and multilinear algebra: what and why

Tensor methods: what they are and why we like them. A layman's introduction.

Toon Vanderschueren
Jun 7, 2022 · 8 min read · ■ Applications of AI

Minimizing fraud losses using cost-sensitive machine learning and learning to rank

Stopping fraudsters is an important challenge for banks. We develop a machine learning method to support a bank's fraud investigators by predicting the investigation priority of all outgoing transfers. Our approach minimizes the cost of fraud given limited capacity to investigate transactions.

Simon Vandevelde
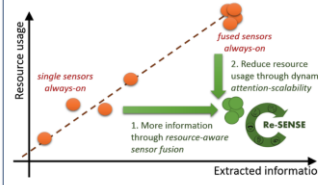Mar 30, 2022 · 7 min read · ■ Reasoning, Acting & Decision-Making

Knowledge-Based Decision Support for Adhesive Selection

The Adhesive Selector is a knowledge-based AI tool that helps experts to select the right adhesive for a specific bonding task. It was created by researchers of DTAI and EAVISE in collaboration with Flanders Make.

Marian Verhelst, Jens Bürger
Mar 14, 2022 · 11 min read · ■ Reasoning, Acting & Decision-Making

Re-SENSE: Resource-efficient sensing through dynamic attention-scalability

With the growing adoption of AI and machine learning algorithms, we are also becoming increasingly aware of the energy footprint of training and executing such intelligent algorithms. In this story, we talk to Professor Marian Verhelst about her ERC project Re-SENSE that investigated low-energy, resource-efficient execution of machine learning models for embedded sensing applications.

Simon Geirnaert
Dec 3, 2021 · 6 min read · ■ Applications of AI

Listening in chaos: control a hearing aid with your brain

How can a hearing aid user eavesdrop at a family party? New brainwave technology enables users to listen to the speaker they really want to hear.

Jonas Soenen, Lola Botman, Konstantinos Theodorakos, Dries Van Daele, Aras Yurtman, Jessa Bekker, Koen Vanthournout
Nov 3, 2021 · 13 min read · ■ Machine Learning & Data Science

Enabling the energy transition with smart meter data

Increasing household electricity consumption (e.g. widespread adoption of electrical vehicles) is driving the low-voltage energy grid to its capacity limits. Simply replacing or scaling up such an infrastructure is neither trivial nor cost-effective. Instead, the Flanders AI Research Program, supports research on intelligent solutions for grid management. Here we present different AI-driven approaches currently under investigation by KU Leuven and EnergyVille.

Your Story
LEUVEN.AI
Stories

Matthias De Lange
May 10, 2021 · 10 min read · ■ Language, Speech & Vision

Towards Adaptive AI with Continual Learning

A remaining challenge to many machine learning approaches is the divide between training and deployment of models, limiting their relevance to either very narrow application domains or to short periods of time before new data renders them outdated. In this post, we are presenting state-of-the-art work on Continual Learning, a stream of ML research aiming to make ML models truly adaptive.

Peggy Valcke, Nathalie Smuha, Eşyip Kun
Apr 2, 2021 · 10 min read · ■ PhELSI

Europe as International Standard Setter for Artificial Intelligence: the role of the Council of Europe

Increased awareness of AI's risks when left unchecked – from discrimination to surveillance – has driven regulators across the world to work on AI-specific rules. Time to find out more about what kind of organisation the Council of Europe is, what it is doing in the area of AI, and why it is important to take part in the discussion!

AI Starter Package

Elements of AI and AI voor iedereen

Elements of AI is an introductory, text-based course on AI, developed by the University of Helsinki and Reaktor. To date, it is the most popular MOOC in computer science and was also made available in Dutch language by Leuven.AI members.

Building on top of Elements of AI, the university-wide course *AI voor iedereen* offers a wide range of practical use case applications of AI, such as AI in sports, fraud detection, forensics, and many more.

Elements of AI   AI voor iedereen

Identifying expertise

Uniting more than 100 senior researchers, we are active in almost all areas of AI research and education. To foster collaborations, to explore synergies, and to drive applications of AI, we aim to connect Leuven.AI members and KU Leuven researchers based on shared interests and matching expertise.

Regardless if you already are an AI expert or only getting started with AI, we will help you search and identify colleagues with the right AI expertise for your ideas and projects.

Contact us

Writing a project description

Reaching out to potential collaborators is best done with a concise description of your project idea, giving a good grasp on all relevant AI-related aspects.

We support KU Leuven researchers in communicating their ideas to Leuven.AI colleagues via the development of 3-page project descriptions, which can be communicated and made accessible to relevant Leuven.AI members.

Contact us

Leuven.AI as project partner

Besides identifying expertise and helping to initiate collaborations, Leuven.AI can also act directly as a partner for internal, national or international projects.
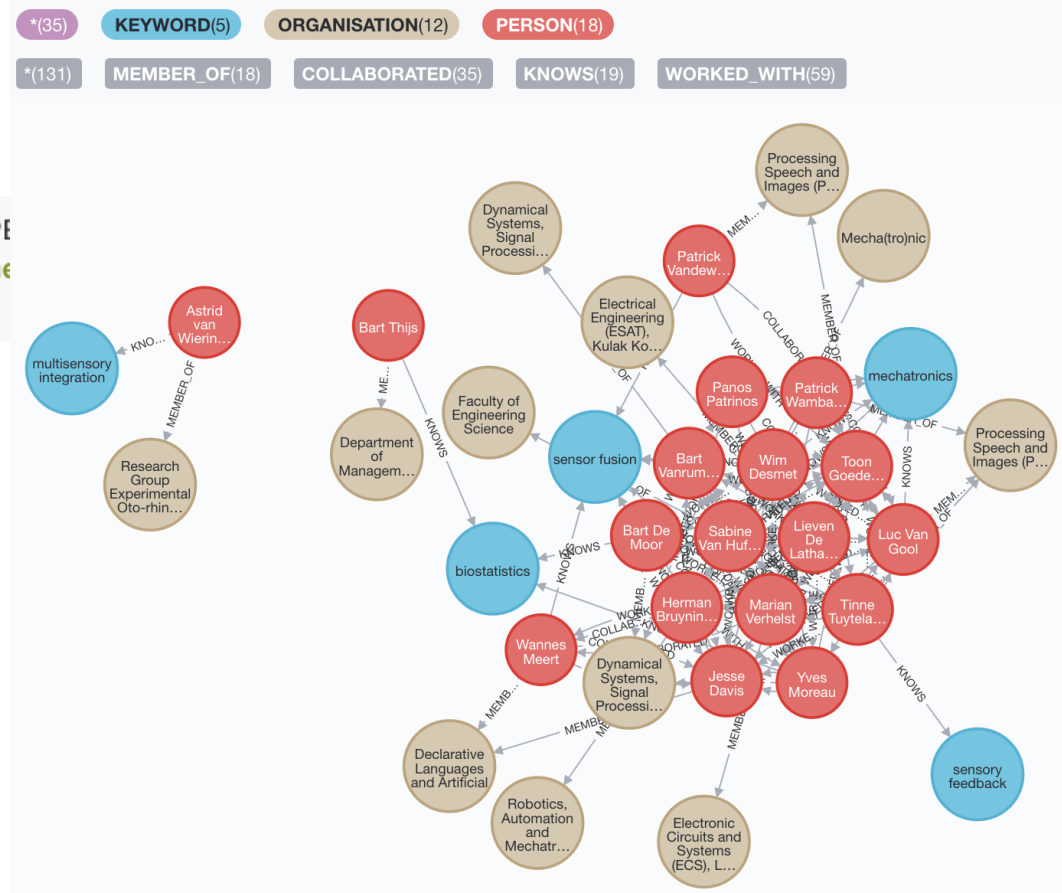
As such, we can provide specific feedback during the project definition or execution, co-organise project events, or disseminate AI-related project outcomes via our networks. How Leuven.AI best strengthens your project will be evaluated on a case-by-case basis.

Contact us

Leuven.AI Expertise finder

```
1  match (o:ORGANISATION)-[:MEMBER_OF]-(p:PE
2  where k.name contains "biostat" or k.name
3  return p,k,o
```

- Leuven.AI can help you find relevant colleagues …

- … or help colleagues find you.

AI as a Service

Activities and initiatives – Research

In-lab research

And more…

AI Starter Package

Writing a project description

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Leuven.AI as project partner

Besides identifying expertise and helping to inititate collaborations, Leuven.AI can also act directly as a partner for any internal, national or international project.

As such, we can provide specific feedback during project definition or execution, co-organise project events, or disseminate AI-related project outcomes via our networks, among others.

Contact us

Research Networks

AI as a Service (AIaaS)

AI as a Service (AIaaS)

AIaaS is a **university-wide service**, offered by Leuven.AI, providing expertise and support **for the adoption and integration of AI tools** across KU Leuven.

AIaaS in a nutshell

AIaaS can be a fit when…

… you have a **non-research AI task** that you **cannot map to existing people** available to you.

Common profiles

PhD
3+ years
@50k€/a

Postdoc
1+ year(s)
@80k€/a

N/A
<1 year
<80k€

Why AIaaS? Because of common obstacles!

Expertise

- Despite the availability of AI tools, it is not trivial to apply and evaluate them correctly
- You want to maintain a focus on your expertise and research objectives

Objectives

- Advancing AI is nice to have, but not needed for your tasks
- You only want to allocate a limited amount of resources to AI. I.e., you don't have a multi-year budget to hire your own AI expert.

Resources

Funding call examples

HORIZON-CL4-2021-HUMAN-01-21

A human-centered and ethical development of digital and industrial technologies

Artists are contributing in system design and system testing and by allowing exploration of technology in an artistic context. The call addresses all digital technologies but in particular Artificial Intelligence. Calls will be open to research and technology institutions, companies, and SMEs willing to provide access to selected (digital) technologies and to connect to the arts.

HORIZON-MISS-2023-CANCER-01-01

Research and Innovation actions supporting the implementation of the Mission on Cancer

Proposals should address all of the following:
- […]
- Combine knowledge and high-quality data from biomedical and clinical studies, and real-world data, using advanced digital tools and technologies such as computer modelling and artificial intelligence with the objective to understand relevant tumor-host interactions and their impact on treatment and care solutions for cancer patients.

HORIZON-CL5-2023-D5-01-02

Clean and competitive solutions for all transport modes

Proposals are expected to address all the following aspects:
- […]
- Advanced use of physics-based, data-driven or hybrid models in general, considering for example Artificial Intelligence (AI) with machine learning algorithms, model training and self-adaptive functions.

Service types

No coding consultancy

- Co-writing of AI-related parts of project proposals

- In-depth analysis and discussion of potential AI approaches

- Technical guidance of in-lab researchers (thesis students, PhDs, postdocs)

Co-development

- Development of AI tools tailored to your application

- Incl. data pre-processing, model training, evaluation, visualization, etc.

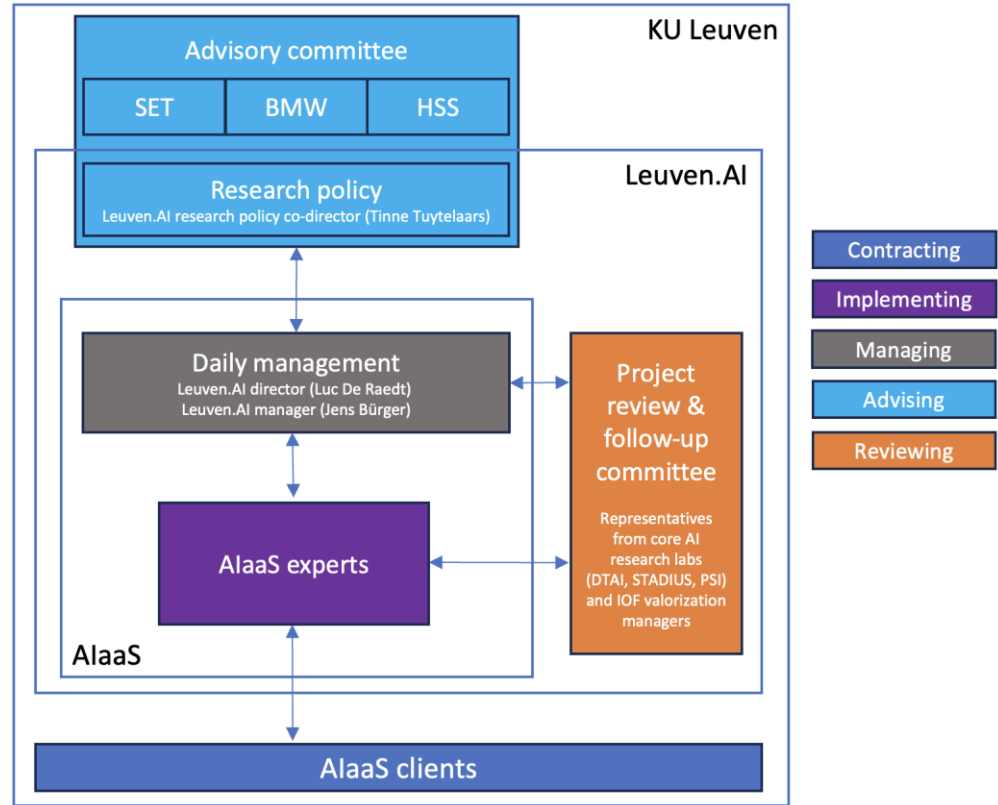- Implementation of existing algorithms from literature

SOTA AI tools

- Implementation of SOTA (KU Leuven) AI tools

- Increase of TRL

- AIaaS partner for collaborations with external clients

In general: AIaaS is meant for whenever AI is a tool, i.e., the (sub)task not having a sufficient AI research component.

Examples

- Implement an existing algorithm within your application (e.g., for text data, image data, time series data, etc.)

- Make your AI algorithm more performant or usable (TRL increase)
  - Adapt your AI algorithm to run (better) on HPC infrastructure

- Build a demo – either at the project start or end

- Bootstrap your PhDs' AI skills via temporary access to an AI expert

- …

AIaaS Governance

More information

- Visit the AIaaS page (for KUL staff)
  - https://ai.kuleuven.be/resources/ai-as-a-service
- Contact us
  - AIaaS manager: Jens Bürger
  - General email: aiaas@ai.kuleuven.be
- Schedule a first exploratory meeting

An Institute Uniting AI Expertise at KU Leuven

Thank You

KU LEUVEN LEUVEN.AI