TAISIG

Tilburg University AI Special Interest Group

Connecting and strengthening Artificial Intelligence expertise at Tilburg University

Artificial Intelligence (AI) is everywhere, from predicting how a virus spreads to recognizing works of art. It is helping to answer complex societal issues better, faster, and more efficiently, such as the energy transition, mobility, and personalized treatment in healthcare. At the same time, AI also challenges us to think about how to develop and use these promising applications in a socially responsible way. Within Tilburg University, several Departments, researchers, and programs are working on AI at a high level. TAISIG (Tilburg University AI Special Interest Group) shows what they do, with whom they collaborate, and what that can mean for you.

TAISIG

TAISIG pools and strengthens AI activities in the university and it accelerates the development of new research proposals and grant applications. TAISIG is active in regional and national networks.

EDUCATION, RESEARCH, AND IMPACT

Tilburg University educates and researches and, in this way, has an impact on society. We want our education and research to contribute to understanding and improving society. AI contributes to answering major issues better and more efficiently. Tilburg University's strength is that it illuminates these issues from various angles. We combine our knowledge of AI with that of people and society.

"We are active in fundamental AI. We have a large Department that works on AI algorithms and has several programs that attract large numbers of students. We also work on AI from other disciplines and perspectives, in School such as the Tilburg School of Economics and Management (TiSEM), the Tilburg School of Social and Behavioral Sciences (TSB), and Tilburg Law School (TLS). There are fantastic

researchers there who, from their perspectives, tie in with the big social AI issues in a close, direct connection."
Boudewijn Haverkort, Dean and full professor at the Tilburg School of Humanities and Digital Sciences (TSHD)

THREE CLUSTERS

TAISIG is divided into three clusters: AI tools and methods, ELSA, and AI applications.
AI Tools and Methods focuses on fundamental AI; ELSA (Ethical, Legal and Societal Aspects of AI) focuses on the necessary preconditions and impact of AI on society; and AI Applications deals with applications.

AI-tools and methods

"The main themes we focus on within AI research in Tilburg are natural language processing, machine learning (including deep learning), agents and robotics, decision-making and computer vision," says Marie Postma. "The applications of these AI core areas are broad," states Pieter Spronck. "Companies want to get started with AI, they want to perform better through

School	Program	Type	#students*
TLS	Law and Technology (1 yr)	Master Program	200
	Data Science	Bachelor Program	175
TSHD	Cognitive Science & AI	Bachelor Program	700
	Data Science & Society (1 yr)	Master Program	250
	Cognitive Science & AI (2 yr)	Master Program	300
TiSEM	Data Science & Entrepreneurship (2 yr)	Master Programa	150
	Information Management (1 yr)	Master Program	150

* academic year 2019-2020

number of students
1,925

AI to be competitive. The tricky thing for them is that AI is developing at lightning speed. In 2020, for example, the world's largest language model, the GPT-3 model, was introduced by Open AI. GPT-3 is able to answer all kinds of questions meaningfully because it is trained on all Internet texts through underlying technique, transformers. Our Department has been applying this technique for several years but industry is still hardly doing it. An ideal scenario is, therefore, when a researcher is partly employed by a company and partly works for the university like the PhD candidates in the national Innovation Center for Artificial Intelligence (ICAI) labs. For example, our researchers are closely involved in the KPN Responsible AI ICAI lab," says Marie Postma.

Pieter Spronck, full professor at the Tilburg School of Humanities and Digital Sciences (TSHD)
Marie Postma, associate professor in the Department of Cognitive Science and Artificial Intelligence (TSHD)

ELSA
"What do entrepreneurs run into when they want to apply AI? What difficulties do municipalities, regulators, policy makers have in establishing and enforcing policies? We can link our scientific knowledge and expertise on AI, law, ethics, sociology, and psychology to issues that live in society. We can provide an integrated, holistic approach around AI development and impact. Our goal is to contribute ideas to the technicians throughout the AI life cycle, especially since we know that values don't only matter the moment you roll out an application into society. You don't want to make a wonderful technological discovery only to conclude at the end that people don't think it's a good development or that it's simply not allowed legally."

Ronald Leenes, full professor of Tilburg Law School (TLS)
Esther Keymolen, associate professor in Philosophy of Data Driven Technology (TLS)

7
Programs

2
Bachelor programs

5
Master programs

AI-applicaties
"How do you develop an application that is demonstrably reliable, cost-effective, and quality enhancing? The answer lies in involving an entire chain in the research. For most researchers, it's a new approach to involve end users right from the start. A problem is never isolated. There are always multiple groups involved, multiple types of equipment, and multiple locations and disciplines. You have to include all of that. Tilburg University, because of our focus on humanities and social sciences, is in an excellent position to map this out."

Margriet Sitskoorn, full professor at the Tilburg School of Social and Behavioral Science (TSB)

Application areas AI
Tilburg University focuses on the following topics, among others:

Health and care: medical imaging, patient analysis, personalized care;

Business and services: business process optimization, fin-tech, market analysis;

Education and learning: learning analytics, virtual environments, on-line learning;

Industry and transportation: preventive maintenance, logistics, regulations;

**Society and government:** labor market analysis, livable cities, social legislation, decision support;

Media and behavior: online platforms, digital cultures, behavioral influencing.

OUR HOLISTIC, MULTIDISCIPLINARY APPROACH

Tilburg University stands out for its holistic, multidisciplinary approach. It tackles AI issues collectively, across the board.

To this end, TAISIG has an internal structure with three sub-areas, as described above. The figure below shows the interrelationship between the two disciplinary work areas and the application spaces.

Ethical, Legal & Societal Aspects

Computational Methods & Techniques

Application Spaces
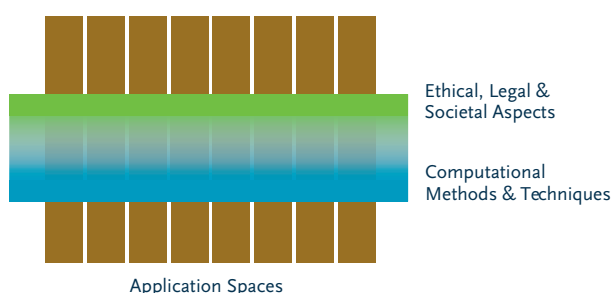
"The whole world is engaged in a digital transformation. The coronavirus situation is also accelerating that process, just look at our education system; the current shift to online education would have been unthinkable a year ago. Everything and everyone is engaged with AI in some way. That is why it is necessary that Tilburg University now shows what it stands for and what knowledge and expertise it has. In this way, we will strengthen our role and our position. We have a lot of knowledge to offer in a broad sense. From TAISIG, we give researchers support in applying for research funds and a platform to present that research."
Emile Aarts, full professor at the Tilburg School of Economics and Management (TiSEM)

TOGETHER WITH YOU

Tilburg University collaborates with local, national, and international partners. We help companies and governments answer their challenges using AI. Also an important focus is asking and answering the ethical and legal questions in the deployment of AI. We collaborate with other knowledge institutions. We do this in consortia, smaller partnerships, and in MindLabs, JADS, and the DAF Technology Lab.

FUTURE PERSPECTIVE

In the recent period, the importance of AI has grown substantially in all three primary university domains (education, research, and impact). The social and economic relevance of AI is also increasing, and TiU therefore wants to leverage and build on its integral knowledge and expertise.

For example, we will participate in several new regional, national, and international initiatives to contribute to societal challenges. Researchers from all Schools will participate in these.

The integration of various disciplines, existing knowledge, and societal need means that AI has the potential to develop into a research focal point at TiU. The ambition for this is to further develop existing study programs and initiate new ones and to carry out more progressive research in co-creation with social partners. An important starting point here is that TiU wants to give substance to the responsible use of AI. We can achieve this through our holistic approach, for which technical and human science expertise reinforce each other.

TAISIG will play an active role in developing the direction and content of this TiU AI strategy.