

Boosting Artificial Intelligence

Position Paper

June 2020

Regional upscaling for AI

In order to speed up the implementation of the European approach on AI and maximise its impact on our societal challenges, the following is needed:

- 1. Infrastructure:** a human centered approach in a fair European framework
- 2. Interconnectivity:** data valuation & standardisation of interfaces
- 3. Smart Business Models:** investments in SMEs embedded in regional ecosystems of excellence

Technological leadership

The 24 partners from the triple helix in East Netherlands welcome the European approach on **Artificial Intelligence (AI)** presented in the EC's White Paper. The potential impact of AI is large and will enable Europe to preserve **technological leadership**. Its implementation will be beneficial to the economy, the environment, and our wellbeing. To optimise its impact the valorisation pathway of integrated AI is key. It calls for a human centered approach, both in design and usage. And a strong focus on the backbone of the European economy, the SMEs, to develop regionally embedded business cases, together with its quadruple helix partners. Thus directly strengthening the regional innovation ecosystems of Europe.

The current Covid19 pandemic has strongly stimulated further steps in the digital transition, including AI applications, and at the same time poses ethical discussions on privacy when it comes to tracking and tracing. All developments will have to be firmly based on the societal challenges and the UN Sustainable Development Goals (SDGs).

In this position paper the 24 partners in Think East Netherlands emphasize the importance of a human centered approach and interconnectivity in order to create a level playing field for regional SMEs.

Paradigm shift

Currently we witness a paradigm shift in industries, health care, agrofood and energy towards a more demand-driven approach. The smart use of data allows for a more personalised or customized approach. Digital technologies enable connections between operational technology and information technology, merging products and services. Instead of mere products or services, integrated value solutions can be developed. The standard, linear supply chain is being transformed in value networks and collaboration in digital ecosystems. There is a need for SMEs to incorporate digitalisation at a strategic level to realize more added value from data, and secure

a smooth exchange of data in (new) value chains. This entails expanding their portfolio to new data-driven products and services. Simultaneously, they need to digitalise their internal operations. As a result a fully digital SME will be both a user and a developer of digital tools. In order for companies to become future proof and to develop new value chains the strategic implementation of digitalisation has to be part of their corporate strategy.

New AI business models

New business models will arise and smart integration of data will further the development from monitoring towards analyses and prediction, using AI applications. The regional innovation perspective allows the quadruple helix partners to rapidly develop and test new innovations, scaling these new products and services in practice. Regional partners, including regional authorities, can stimulate the uptake by acting as launching customer. Our partners have been doing this for years, within the framework of the UN SDGs. Not just defining ambitions, but realising projects and innovations with a hands-on mentality.

To further stimulate this, these developments call for action!

A human-centred approach

Design thinking

The development of AI applications should be based on the European approach on Ethical AI. The methodology should be human-centred. This consists of both a strong consumer involvement, as well as the further uptake of citizen involvement through citizen science and smart city concepts. This will stimulate demand-driven innovations.

A technological advancement that should be made is in the direction of explainable (or interpretable) AI: ensuring that people can understand how AI technologies came to a conclusion. This will instil insight and trust in the tools being used, leading to improved collaboration.

Talent Development

Another important aspect is an integrated AI vision on talent development. This can be done by building upon existing expertise and infrastructures, including (E)DIHs. AI can be integrated in curricula of education and research, and professional learning. This will enhance skills and enable continuous investments in AI related practice, including ethics and security.

Interconnectivity

For solid AI applications interconnectivity and interoperability of digital systems are needed. The current data sets are often still stand alone or not available. This calls for data standards and definitions for technical interfaces. A (mobile) web- and cloudbased infrastructure should enable the smart interconnectivity of AI applications with Big Data, Internet of Things, applied by Design Thinking, as mentioned earlier.

Data valuation

1. The first step to value data is by bridging the gap: transforming data into information. Next to technological possibilities, data needs to be turned into usable information. Here data strategies, data analytics and data security/privacy and ethics are key.
2. A strong connection to other digital key enablers technologies (such as high- performance computing, big data, internet of things, blockchain will allow for investments in usable applications such as digital twinning, embedded AI (IoT), predictive maintenance and robotics.
3. The European Commission can promote integrated innovation projects, and include a focus on the ICT sector and their embeddedness in value chains.
4. The second step to value data is the development of applications and business models. This calls for open and secure data sources as well as defining data ownership.

A fair European framework

The aim is to create an European level playing field aligning the European Common Market in the field of AI. This will enable SMEs to create data driven business propositions and decrease the dependency on large data companies.

Investments in digital infrastructure

Continuous investments are needed to create a solid digital infrastructure in all regions of Europe. Besides branched networks, this includes a digital highway and hardware development in ever smaller devices. In order to decrease the use of fossil fuel energy minimising CO₂- emissions, green information technologies will boost the uptake of sustainable energy. Next to the cutting-edge developments, priority is upscaling of customized AI applications. Large scale roll out of proven technologies within a broad scope of SMEs. This can be facilitated in regional demonstrators and testbeds, facilitated in the (E)DIHS.

European funding and investments

The required financial investments are significant. Dedicated funding and synergy between the different European programmes will create the largest multiplier effect. Setting out targeted calls and funds under Horizon Europe, Digital Europe, Interregional Innovation Investments, ERDF and CAP, as well as guaranties and investments cofinanced by the EIB and InvestEU. This will enable the birth of a state of the art interregional research environment and strengthen the regional innovation ecosystems, benefiting from regional financing and investment infrastructures, such as start-up funds, and SME funding through regional development agencies.

Regional ecosystems of excellence

A large number of education and research institutes, as well as companies in our region are leaders in Europe when it comes to innovations in the sectors AgroFood, Health, High Tech, and Energy. But what truly sets East Netherlands apart in Europe? Based on this regional innovation perspective we work together on two flagships: Smart & Sustainable Industries, and Concepts for a Healthy Life.



Artificial Intelligence (AI) in East Netherlands

A great deal of knowledge on the field of artificial intelligence is present in East Netherlands. Several universities in the region are doing research on the subject, and are training AI talents. Higher and intermediate vocational education studies apply some of this AI-knowledge in practice at businesses in the region.

What is AI?

AI stands for artificial intelligence. Intelligence that enables machines, software and appliances to solve problems independently. In a way, they imitate the human intellectual powers.

According to the recent AI2020 study, cultural resistance is the main challenge for companies in implementing their SMART(AI) business strategy. Successful use of AI and of Big Data from existing and new data sources offers opportunities for enhanced process control, improved quality of final products and increased competitiveness for the industry.

AI KNOWLEDGE NETWORK IN EAST NETHERLANDS:

RADBOUD UNIVERSITY

15 professors
10 research groups
1.000 students

Fields:
• Machine Learning
• Deep Learning
• Neural Networks
• Speech and Language technology
• Natural Intelligence
• Autonomous Systems
• Medical Imaging
• Data Science

Facilities:
• 3 ICAI laboratories (Innovation Center for AI)

WAGENINGEN UNIVERSITY

Fields:
• Smart Farming
• Smart Dairy
• Agri-Food robotics
• Data science in Agrofood
• Bio-information
• Vision
• Geo Information
• Life stock management

Facilities:
• WDCW Wageningen Data Competence Center

AI TECHNOLOGIES



TWENTE UNIVERSITY

Hardware for AI / AI for hardware

Fields:
• Health Technology
• Smart Industry/Robotics
• Energy Systems

Facilities:
• DSI Digital Society Institute

HAN

3 Lectorate
Fields:
• Data Science and AI
• (Data) Analytics
• Autonomous Vehicles
• Digital Twin
• Smart Grids
• Smart Industry
• Bio Computer Science

SAXION

Lectorate Ambient Intelligence
Lectorate Mechatronica
Fields:
• AI Vision
• Drones
• Robotics

FPC FRAUENHOF PROJECT CENTER

Field:
• AI in Production

WINDESHHEIM

Fields:
• ICT in healthcare
• Blockchain
• Robotics

AI business network

East Netherlands:

> 100 companies

Do you want to make your company visible? To apply, please link to www.eastnl.nl/ai

What are AI's possibilities?

AI is already deployed in various application areas:

 Food Agro: 'data from smart sensors enables AI to minimize water wastage and overfertilization'

 Health: 'by analysing thousands of scanned images, diseases can be detected early on by AI'

 Industry: 'based on production processing data, AI can predict which machines are in need of maintenance'

 Energy: 'AI allows us to develop smart grids that can control variable supply and use of energy from sustainable sources like solar panels'

Integrated AI showcases in East Netherlands

In our region there are many examples of the integration of AI in the daily practice of companies and in society in general. These are always multidisciplinary, and embedded in an application domain. Partners in the region work on the development of hardware, sensory data, system architecture, algorithms, domain specific knowledge, and the support for SMEs with expertise, skills and investments. Our developments range from fundamental and applied research to testbeds, labs and the uptake in business and society. Partners have cooperated in European projects on Artificial Intelligence with a total budget of over €211 million during the current programming period.

ELLIS

One of the new units of the European Laboratory for Learning and Intelligent Systems (ELLIS) is situated at Radboud University. Within the unit, research regarding machine learning and other topics related to artificial intelligence will take place in the next few years. Its purpose is to bring together the best European experts in the field, with a focus on AI for Life Sciences.

CLAIRE network

The Radboud University is part of the CLAIRE research network. Together 375 research groups and institutions are committed to realise the vision of CLAIRE: European excellence across all of AI, for all of Europe, with a human-centred focus. To achieve this, CLAIRE proposes the establishment of a pan-European Confederation of Laboratories for Artificial Intelligence Research in Europe that achieves "brand recognition" similar to CERN.

ICAI labs

The region hosts three Innovation Centres for Artificial Intelligence labs, which are part of a national network aimed at technology and talent development. The Radboud University has two ICAI labs on health and the Wageningen University is developing one on agrofood.

iHub– interdisciplinary hub for Security, Privacy and Data Governance

The iHub is Radboud University's new interdisciplinary research hub on Security, Privacy, and Data Governance. It brings together a diverse range of scholars from across the humanities, social sciences, engineering and life sciences to tackle urgent questions raised by the increased digitalization and datafication of science and society.

Rocket

INTERRREG project on regional collaboration on key enabling technologies. It stimulates implementation of AI in SMEs by funding interregional innovation projects.

Smart and Sustainable Industries

Enabling the digital and sustainable transformation in Industry with AI applications the stimulate predictive maintenance, smart manufacturing, inspection robotics, and resource efficiency in the process industry. Using predictive modelling, we can quantify the Key Performance Indicators of an industrial process, and predict the indicative of the need for process maintenance. This optimizes process safety, sustainability, environmental burden and economic operation. H2020 project DIH-RIMA and DIHs Industrial Reality Hub, and BOOST Smart Industry. The NWA-funded PrimaVera project works toward an integrated approach for predictive maintenance. With predictive maintenance the reliability of infrastructure and production resources can be increased, and the costs of maintenance can be reduced. This approach combines data acquisition, diagnostics, prognostics, and logistical and organizational optimization. Specifically, AI is used to improve acquisition of rich and reliable data, data validation, and failure behaviour.

Smart Food Production

Enabling smart food production with the Icon Project FoodDara.S. Including AI opportunities for agrofood and animal behaviour. Examples are agriculture robots / drones, computer vision, animal tracking, H2020 project DIH AGROfood robotics, optimal breeding, less resources, hand free production, quality control and processing. H2020 project Smart Agrihubs, autonomous greenhouses – smart farming, enhance corporate decision making and food integrity, by smart sensing & monitoring, smart analysis & planning, and smart monitoring.

Prevention, MedTech and Personalised Nutrition in Health

Enabling prevention in Health and (rehabilitation) care with the Icon Project TopFit. AI applications to operate exoskeletons, Load monitor / injury prevention, medical robotics, intelligent imaging, personalised E-health. H2020 project DIHHERO and healthy brain: AI for neuroscience.

Energy Storage and Management Solutions

Enabling the energy transition with the Icon Project Energy Storage and Management Solutions. AI enabling the development of Next generation Smart Grids for hydrogen, multimodal energy systems (including hydrogen), data centre energy efficiency, and battery management.

Green Information Technology

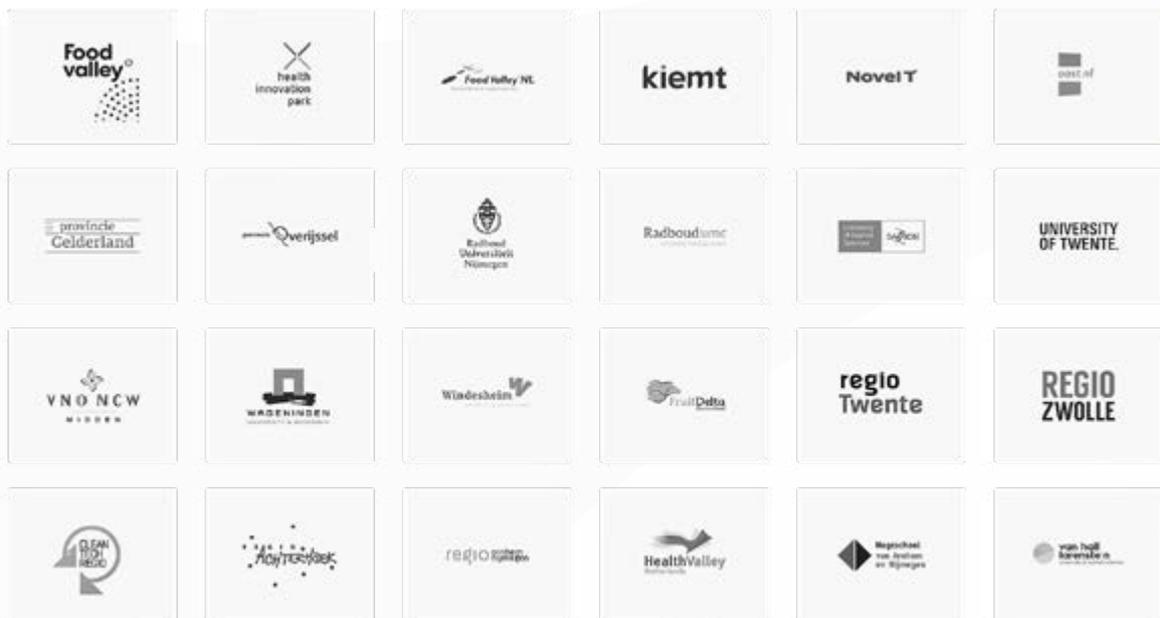
Research contributing to ecological sustainability in the development and use of information technology. In multidisciplinary teams, researchers and students explore for example fundamentally new ways of data processing and storage, such as single atom data storage and brain-inspired computing.

Other H2020 projects:

- Roboprentice, (submission 17 June): the prime objective of the RoboPrentice project is to deliver a toolkit of laboratory-validated software components, methods, and guidelines that can be deployed by robot builders and automation solution providers to enhance socially collaborative behaviours of their robot solutions. AI-supported software modules will enable task recognition, estimation of cognitive state, and planning capabilities for human-robot collaboration.
- LEMONtools (submission 17 June): The LEMONtools project will research, develop and deliver in a modular set of tools with which exo-skeletons can be enhanced with the capability to monitor internal joint load exposure, using machine learning to calibrate sensors, optimize data acquisition, determine historical load profiles and optimize exo-skeleton functioning.

Th!nk East Netherlands

This partnership of 24 triple helix partners represents the regional innovation ecosystem in the East Netherlands and our innovative strength.



East
Th!nk Netherlands

Sustainable Smart Industry & Concepts for a Healthy Life

thinkeast.nl/artificial-intelligence/