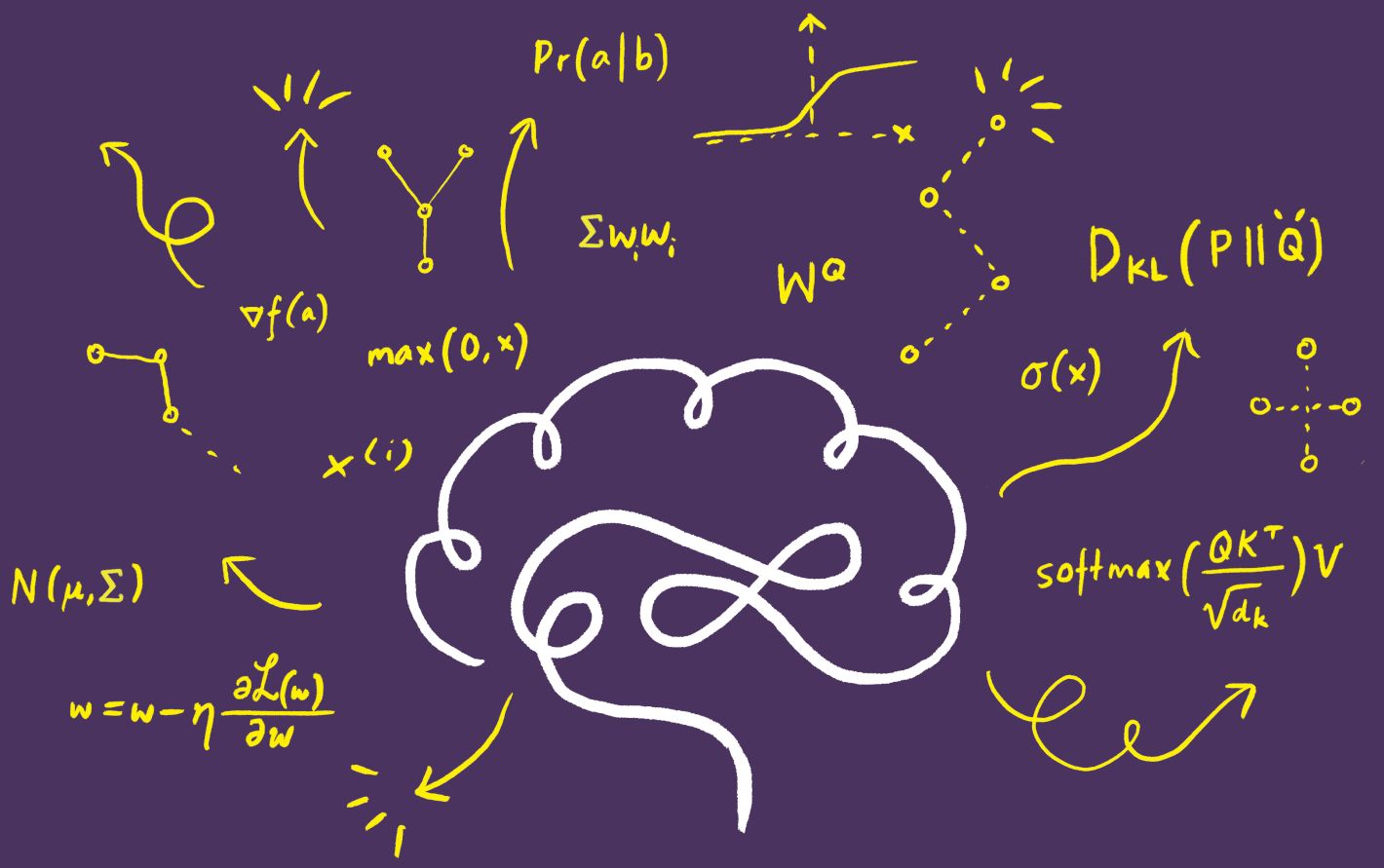


The State of AI by RISE.

2020-2024 and beyond

RI.
SE

The State of AI.

In the fascinating realm of today's technological landscape, AI is reshaping our world in ways we couldn't have imagined. We're swept into a whirlwind of innovation, driving us toward uncharted horizons at an astonishing pace.

This reality stirs a mix of emotions.

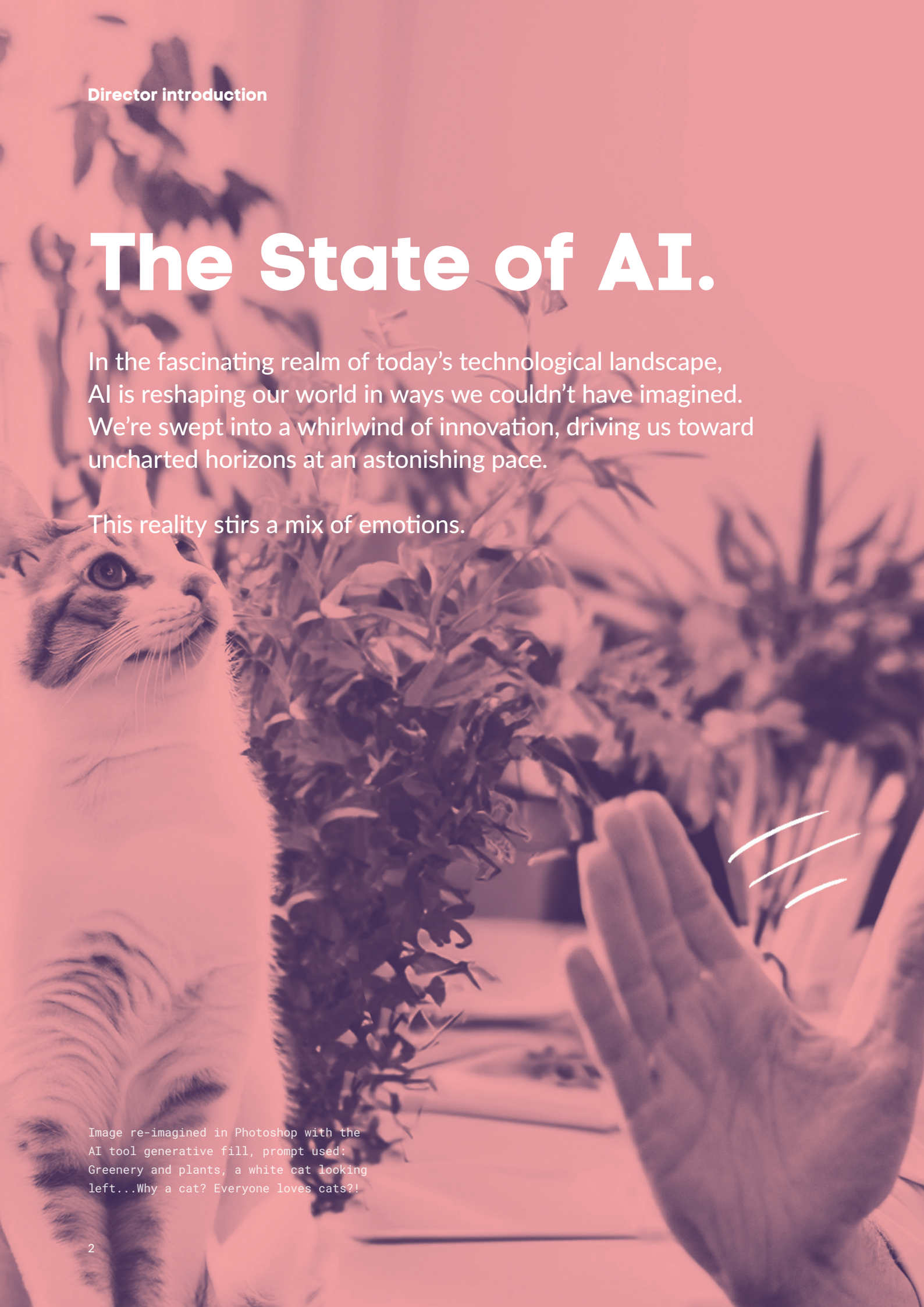


Image re-imagined in Photoshop with the AI tool generative fill, prompt used: Greenery and plants, a white cat looking left...Why a cat? Everyone loves cats?!

Excitement.

Applied AI fuels innovation, offering boundless possibilities for real-world applications that affect all industries and sectors today.

Curiosity.

Meanwhile, the frontier of AI Science beckons with promises of breakthroughs, pushing the boundaries of what we thought possible and sparking curiosity at every turn.

Uncertainty.

As AI continues to permeate industries and societies, we're witnessing a transformative shift, where AI Transformation revolutionizes the way we work, live, and interact.

Unease.

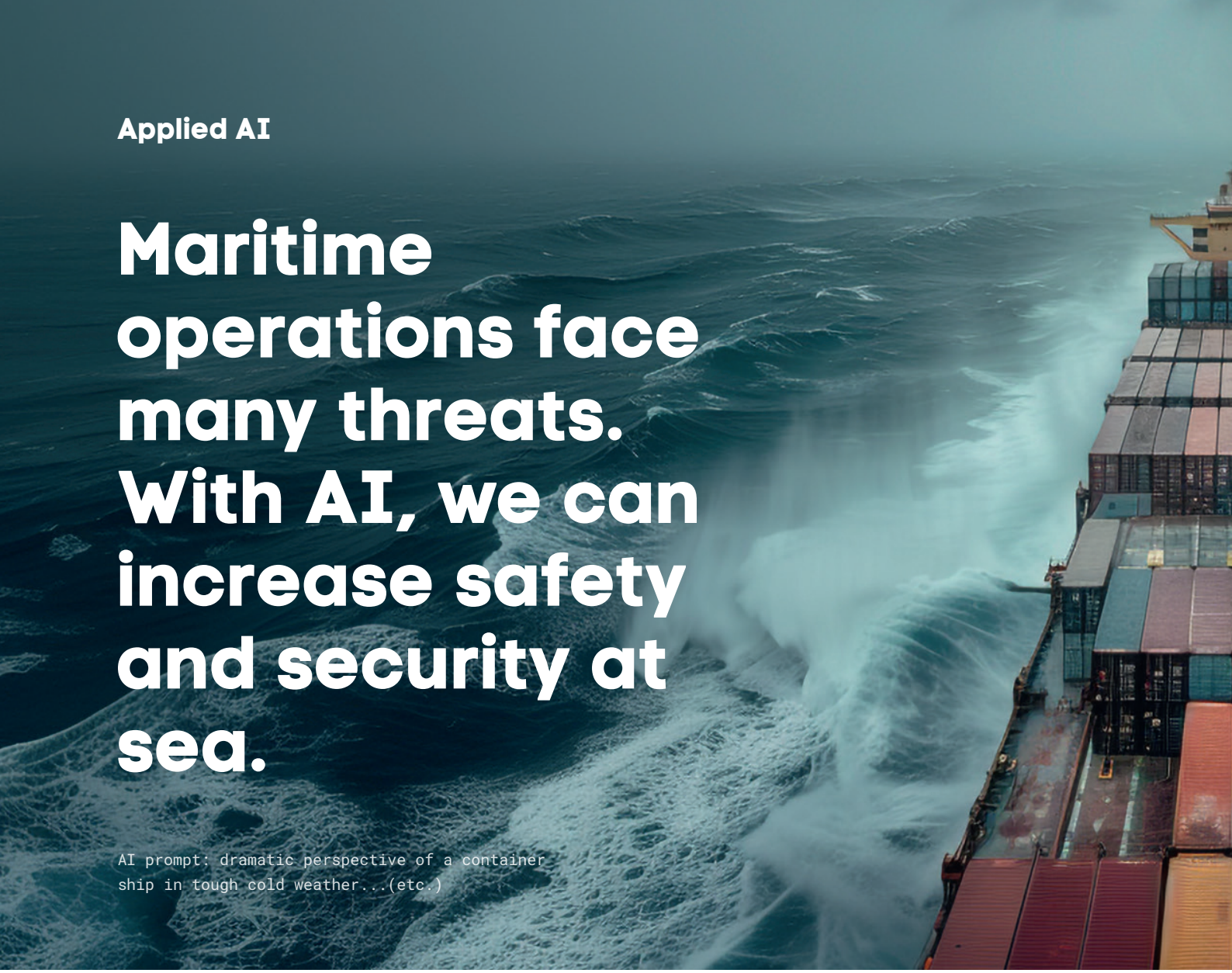
The need for robust AI Policies becomes increasingly apparent, as we strive to navigate the complexities of ethics, accountability, and transparency, ensuring that AI's trajectory aligns with our values and aspirations for a better tomorrow.

The aim of this report is to render key insights from top AI experts comprehensible to everyone, while also offering guidance on navigating the multifaceted emotions AI may evoke.

In this State of AI by RISE report, we invite you to delve into the depths of innovation and discovery through our main areas of work. This report demonstrates our commitment to fulfilling the Swedish national AI objective: positioning Sweden as a leader in AI utilization to enhance national welfare and competitiveness.

Bon voyage,
Sverker Janson, Director
Center for Applied AI at RISE

Maritime operations face many threats. With AI, we can increase safety and security at sea.



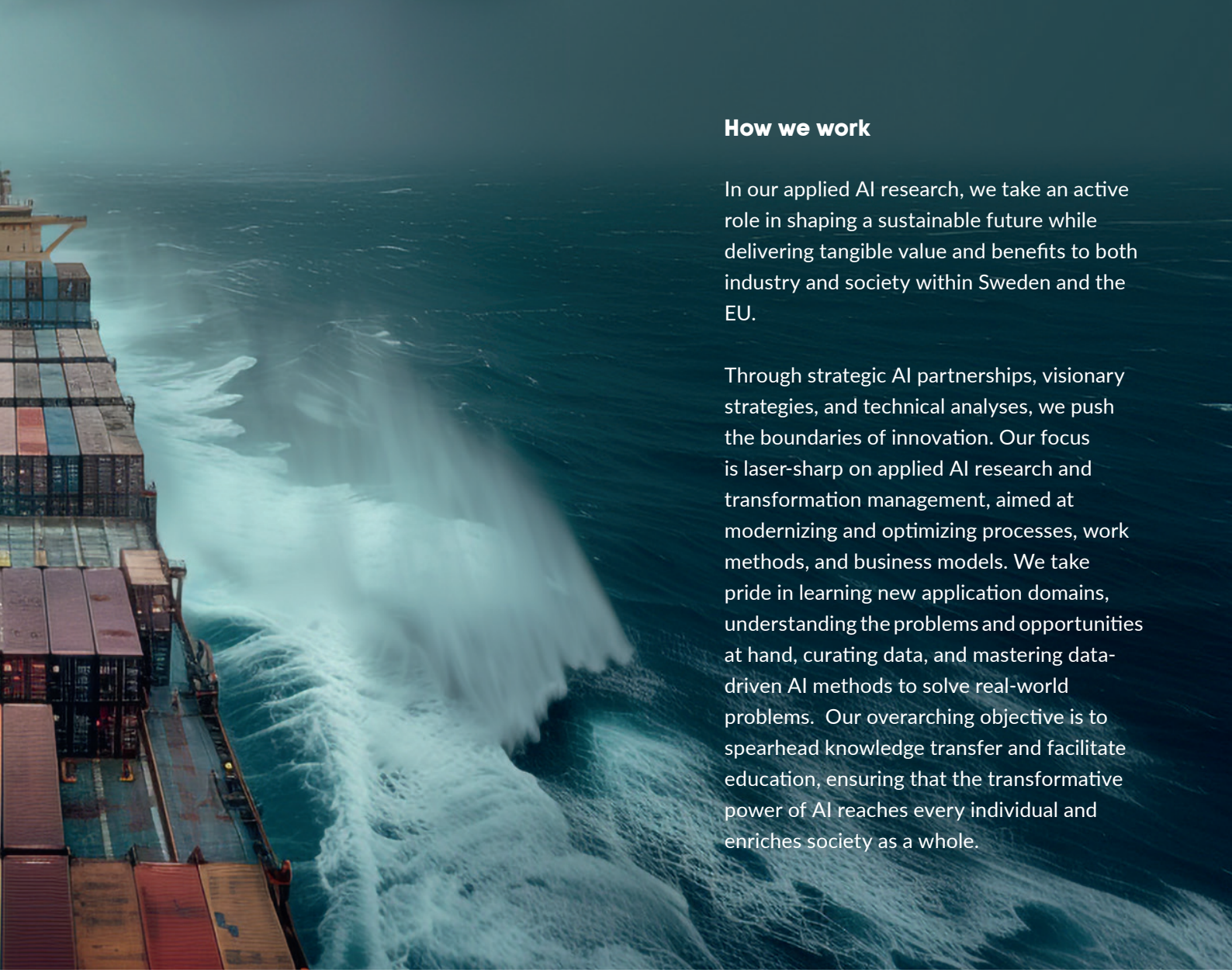
AI prompt: dramatic perspective of a container ship in tough cold weather...(etc.)

The oceans present many threats that challenge the safety and security of maritime operations. From potential groundings to environmental violations, illegal fishing, and hidden activities of "dark vessels," which operate without transmitting their location, the maritime domain presents a myriad of risks. However, AI can help increase both safety and security at sea.

Maritime traffic is responsible for a large part of passenger and goods transportation in the world, with steadily increasing traffic volumes. With the melting ice in the Arctic, new routes become accessible, resulting in increased Arctic marine traffic, posing new challenges in uncharted waters.

The project AI-ARC focused on reducing risks and enhancing safety and security in the Arctic and Baltic Sea through a Virtual Control Room. This is a platform for enhancing situational awareness and decision-making, powered by a collection of AI services for analyzing various sources of real time maritime data and detecting multiple types of risks. The solution is designed to benefit coast and border guard authorities and private industries.

RISE has contributed several services for anomaly detection and intent recognition to this project. The services use Hybrid AI, combining machine learning and rule-based techniques. Anomaly detection involves identifying statistically unusual data in a large dataset, an area RISE has been involved in since 2001. Intention recognition identifies behavior patterns that suggest specific plans or intentions. Using a combination of these techniques, we developed detectors for various illegal activities at sea. These include environmental violations, such as unauthorized tank cleaning; illegal fishing in protected areas or incorrect economic zones; and suspicious behaviors linked to smuggling, including unexpected meetings at sea or deviations from typical



How we work

In our applied AI research, we take an active role in shaping a sustainable future while delivering tangible value and benefits to both industry and society within Sweden and the EU.

Through strategic AI partnerships, visionary strategies, and technical analyses, we push the boundaries of innovation. Our focus is laser-sharp on applied AI research and transformation management, aimed at modernizing and optimizing processes, work methods, and business models. We take pride in learning new application domains, understanding the problems and opportunities at hand, curating data, and mastering data-driven AI methods to solve real-world problems. Our overarching objective is to spearhead knowledge transfer and facilitate education, ensuring that the transformative power of AI reaches every individual and enriches society as a whole.

routes to the claimed destination. We also produced a detector for vessels loitering above critical infrastructure, which may indicate an intention to survey or sabotage it. This last point will be taken further in the new EU project VIGIMARE, which specifically aims for protection of critical infrastructures at sea and land.

A successful demonstration of the developed detectors for illegal activities in the Baltic Sea was performed in Karlskrona in September 2023, hosted by the Swedish Coast Guard.

The EU project AI-ARC was led by Laurea University of Applied Sciences and involved 22 partners from 12 countries.

Scan QR code to dive deeper or contact ***Anders Holst***

The state of Applied AI

AI applications have long generated value but have been costly to develop due to the need for significant expertise, data collection, and model building. Consequently, they have been inaccessible to most organisations.

The advent of Generative AI heralds a new era in AI, user-friendly, ready to deploy, and versatile across a range of applications. Despite existing limitations, its potential impact is profound. This new, accessible AI continues to expand its capabilities, with chatbots evolving into multimodal systems. These integrate deep domain expertise not only through text but also through vision and other modalities, transforming them into comprehensive knowledge models critical for all industries.

AI and Science

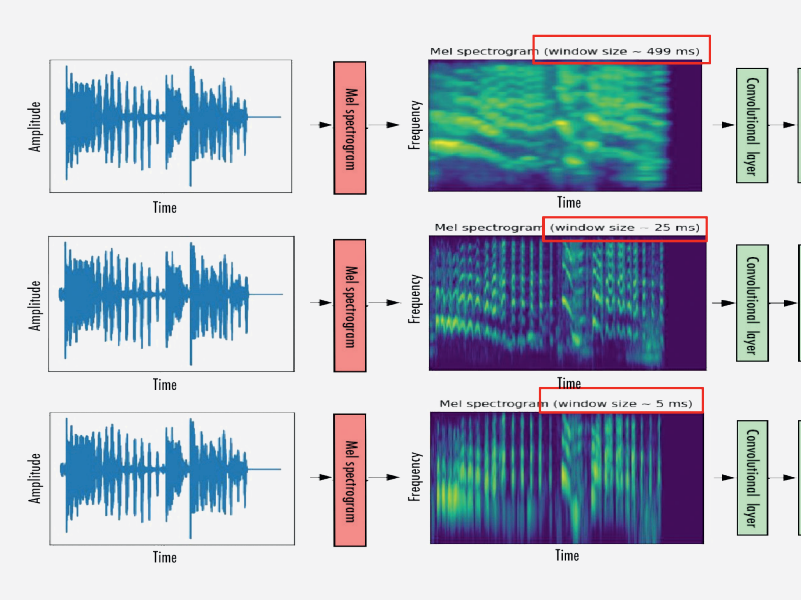
In an era where biodiversity is increasingly pressured by human activity and climate change, quantifying biodiversity is not just urgent—it's imperative.

Understanding the intricate web of life on our planet requires innovative methods. At RISE, we are approaching the issue through the modality of sound, something that has previously received less attention in AI research. Sound provides a rich, real-time stream of data from natural environments, offering insights into species presence, behaviors, and ecosystem health that are often unattainable through visual or other sensory data alone.

We have introduced novel AI technology designed specifically to harness the power of environmental sounds for biodiversity monitoring. Our work builds on a number of building blocks, each pushing the research frontier in AI-based sound analysis. First, we introduce the differentiable log-Mel spectrogram that dynamically adjusts spectrogram window lengths, optimized jointly with the neural network parameters. Second, we incorporate few-shot learning, which minimizes the need for extensive labeled data, allowing our model to rapidly adjust to new, unique environmental sounds. Third, our combination of active learning and adaptive change point detection enhances data preparation efficiency, reducing the burden on experts. Together, these contributions provide a strong platform for bioacoustic analysis and can be adapted to other application domains.

By bridging the gap between foundational AI research and practical applications in environmental science, our work not only advances technological capabilities but also provides vital tools for ecologists and conservationists. This dual contribution underscores the potential of AI to serve both the advancement of knowledge and the pressing needs of our planet.

*Scan QR code to dive deeper or contact **Olof Mogren and John Martinsson***



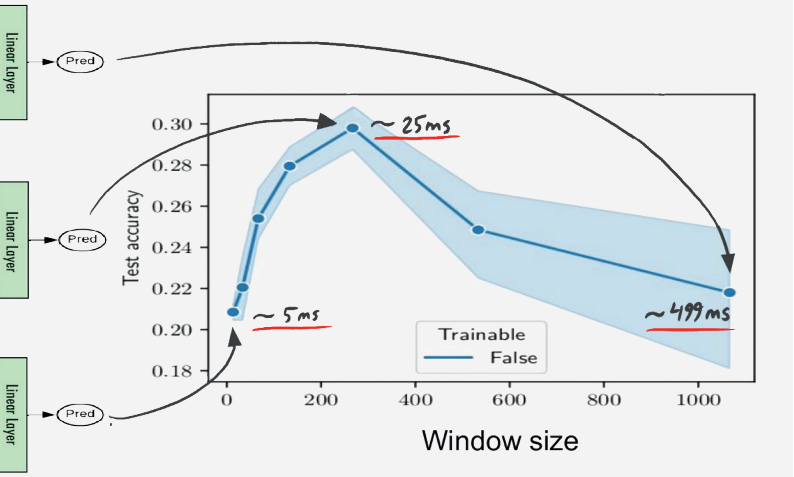
Picture: Foundational modelling research on DMEL with joint optimization of time window and neural network.

How we work

Research at RISE has the goal to contribute to the development of knowledge and the research frontier in AI. We do this through scientific publication, postgraduate education and teaching offers. These activities are important parts of ensuring our competence at the international top level.

Research areas include Deep Learning, Natural Language Processing, Computer Vision, Advanced Data Analytics, AI Platforms and Edge, and AI for science.

Our research reality is primarily shaped by the practical application and the specific needs of use cases. Our solutions often blend expertise and techniques from multiple focus areas simultaneously, resulting in hybrid approaches. We not only enable AI through applications for society but also publish our research in renowned scientific journals and conferences.



The state of AI and Science

AI, an engineering discipline, intersects with computer science and cognitive science. The advent of deep learning, inspired by neural processes, has driven breakthroughs in computer vision and natural language processing. Yet, these models falter with complex reasoning that requires abstract thinking or logical deduction, necessitating the integration of various AI technologies.

In the scientific arena, AI acts as a formidable catalyst. It models intricate climate systems and refines strategies for carbon capture and renewable energy. In chemistry, AI facilitates the prediction of molecular interactions and speeds up drug discovery. These roles highlight AI's versatility and its significant potential to drive scientific breakthroughs.

A new era has begun in which big companies and chatbots compete for our attention and data.

AI capabilities are growing rapidly, yet even if development were to halt today, we would still face years of hard work to leverage the already available opportunities.

AI Transformation: A Universal Challenge

In Sweden, we are accustomed to leading in technology, but in the ongoing AI revolution, many others are ahead. It is therefore crucial that our citizens, businesses, and public sector rise to the challenge to close this gap. A positive trend is that more people are recognising AI's potential, but significant investments in expertise, infrastructure and new AI applications are still needed.

From Niche to Necessity

AI has quickly moved from being a niche interest into a mainstream necessity. AI applications are diverse, ranging from automating routine tasks to enabling groundbreaking new technologies and solutions. It's crucial that we do not solely rely on today's AI experts to drive the AI transformation. This responsibility cannot be placed on just a few. It is vital that everyone understands what AI is and how it can be applied across various domains. If we wait for others to provide the AI solutions for our specific needs, we will face stiff competition.

Leadership in a Time of Change

For leaders, it is essential not just to strive to understand what AI is, but also to actively create the best conditions for its adoption. This means ensuring adequate time, resources, and funding. As a leader, you must realize that significant changes and prioritizing AI over more traditional methods will be necessary, ideally starting at the next budget or recruitment.

RISE's Role in Society's AI-Transformation

At RISE, we are more than 3,000 employees working across nearly all sectors of industry and society. Our ongoing internal AI transformation provides us with a deep understanding of the challenges and opportunities

How we work

We are working to make our own processes more efficient while setting an example for other organisations. The goal is to introduce, utilise and establish AI as a tool and method in all our business areas to streamline and improve our processes throughout RISE. We use “AI for all” to reflect the approach we have when transforming ourselves and helping others to do so.

Externally, we aim to serve as a beacon of best practices, offering insights and guidance to organisations embarking on their AI journey. Through collaborative initiatives and knowledge sharing, we enable others to leverage AI effectively, fostering a culture of continuous improvement and innovation.

AI prompt: a lot of office people seen from above walking in a modern office district...(etc.)

that arise when AI is implemented in new operations, insights that are invaluable when working with our partners.

An additional advantage of our broad scope is that we can combine our AI expertise with other domain areas. This gives us excellent conditions not only to enhance our own operations and areas of interest but also to advance AI itself, with new AI models and cutting-edge applications in new domains.

The pace is fast and the future uncertain, but one thing is clear: AI transformation does not get easier by waiting until the field and the competition have advanced even further.

Scan QR code to dive deeper or contact ***Peter Nordström***

The state of AI Transformation

AI transformation involves integrating artificial intelligence into an organisation’s operations and strategy to enhance decision-making, automate tasks, and innovate products and services. This process can impact business models, workflows, and the competitive landscape, requiring cultural shifts and new skills within the organisation.

However, challenges such as limited data access, skill shortages, and cultural resistance can hinder successful adoption. Overcoming these obstacles demands both technological integration and significant cultural and skill adaptations within the workforce.

AI Policy

The EU has a profound impact on Sweden's digitalization, but a national policy is crucial for fostering AI adoption and value creation, particularly in the public sector. As Sweden's national research institute, RISE leads with over 150 AI projects that accelerate AI integration and several impactful policy initiatives.

The AI Agenda for Sweden, coordinated by RISE, involves a network of civil society, academia, government, and industry leaders. This group has developed a 25-point agenda for action aimed at accelerating AI's positive impact in Sweden. This proposal has been presented to the Swedish Parliament and Government, leading to numerous governmental assignments. The goal is for Sweden to be a pioneer in leveraging AI in a responsible, inclusive, and sustainable manner.

RISE also significantly influences AI regulations through our research, actively contributing our expertise to help shape and implement policies on digitalization. This includes feedback throughout the legislative process, involvement in international standardization as well as shaping implementation through regulatory sandboxes and policy labs. Our collaborations with Swedish governmental agencies, multinationals and SMEs strive to promote evidence-based policies.

On a European stage, RISE is active in organisations such as the Big Data Value Association and maintains dialogue with the EU Commission, monitoring and influencing policies related to AI, data, and digital infrastructure.
To ensure AI's safe integration into society, Sweden needs to accelerate the development of testing and certification capabilities, including CE marking of AI systems and cybersecurity solutions. As an example, RISE participates in three EU Testing and Experimentation Facilities, enhancing Sweden's reputation as a safe and innovative AI hub.

For a robust Swedish AI strategy, RISE recommends:

- *Targeted innovation calls:* Support R&D with potential for significant societal and economic impact, aligning national initiatives with EU priorities.
- *Fostering a democratic society:* Tackle issues like misinformation and climate change by facilitating a resilient society and sustainable development.
- *Embracing data access and sharing:* Emphasize FAIR principles to ensure privacy, integrity, and ethical use of data.
- *Broad digital skills:* Encourage a skilled AI workforce that complements technical skills with competences within ethics, sustainable development and safety argumentation.

In conclusion, Sweden's AI policy should create a supportive ecosystem that promotes innovation, upholds ethical standards, and prepares for coming possibilities, ensuring Sweden's leadership in sustainable, safe and secure AI advancements.

Scan QR code to dive deeper or contact ***Susanne Stenberg, Håkan Burden, and Jeanette Nilsson***

How we work

Our research projects investigate the alignment between existing and upcoming policies and the market introduction of AI-based services and products, as we aim to contribute to the possibilities of responsible AI development and usage.

We coordinate the AI Agenda, a network encompassing representatives from various sectors, including civil society, national authorities, municipalities, businesses, and trade unions.

At the EU level, we actively engage in collaborations to evaluate, implement and influence the European agenda.

AI prompt: a woman on a bus looks skeptically at surveillance cameras mounted in the ceiling, worrying...(etc.)

An eco-system for responsible AI, shaping tomorrow's possibilities.

The state of AI Policy

AI policy encompasses guidelines, standards, regulations, and strategies governing the development, deployment, and use of artificial intelligence technologies. It addresses ethical considerations, safety, socio-economic impacts, and privacy rights, aiming to promote innovation while mitigating risks.

In Europe, the recently approved AI Act and other regulations are reshaping the AI policy landscape, requiring organisations to comply with stringent requirements, including risk assessments and adherence to evolving standards. Rigorous testing and certification processes are also crucial to ensure AI systems are safe and ethical, demanding significant investments and focus from companies to meet regulatory demands.

AI at RISE – a network of 500 researchers, 150 projects, 70+ AI ambassadors for all areas.

What is AI at RISE?

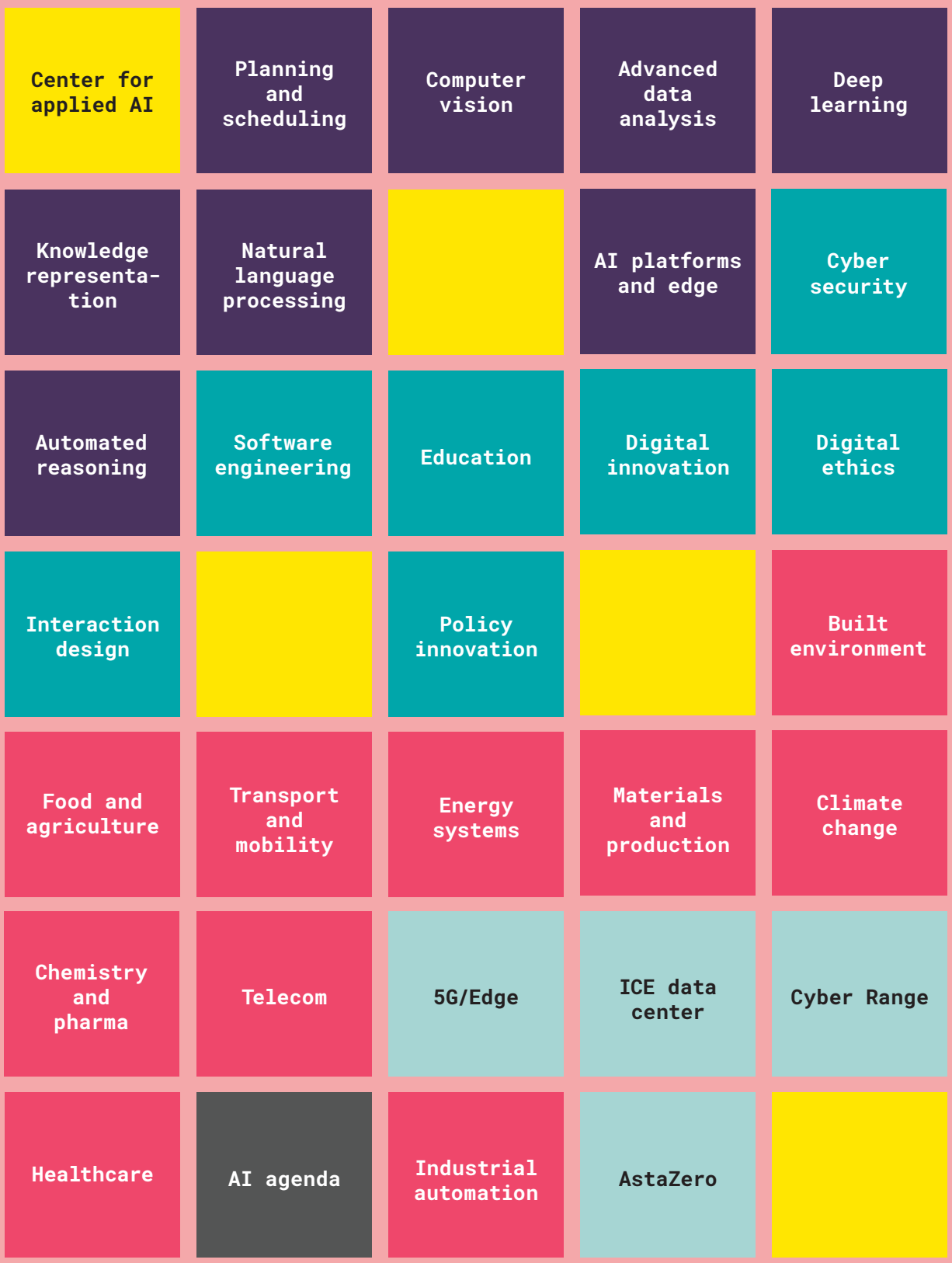
AI at RISE represents the unified AI efforts of RISE, Sweden's national research institute, which houses 3,300 experts in various technological, industrial, and societal domains nationwide. As a neutral research and innovation partner for both industry and the public sector, RISE transforms research knowledge into innovative products, services, and value creation, boosting competitiveness and sustainable development. Our approach integrates leading expertise and broad capabilities to address today's major challenges and opportunities through AI.

What is the Center for Applied AI at RISE?

The Center for Applied AI spearheads a research program in key AI areas, offering essential expertise for applied AI initiatives across RISE. It also coordinates and supports AI integration in all domains. The center includes 50 AI researchers across various research and working groups and manages a network of over 70 AI ambassadors for different domains, in addition to the primary AI at RISE network of 500+ researchers. Several of our team members are featured in this report.

Our Approach to AI Transformation

AI acts as the vanguard of digitalisation, unlocking new possibilities in all sectors. Effective AI deployment requires collaboration, blending AI and domain expertise to define clear, forward-looking visions for an AI-driven future across fields as diverse as drug development, energy management, and public administration. Incorporating ethical and policy expertise ensures AI is implemented safely and responsibly. RISE's in-house recruitment capability uniquely positions us to drive AI transformation throughout Sweden.



We make AI happen.

AI does not happen in silos

Meet some of our collaborators and partners!

ABB	Gjuteriföreningen
AI Sweden	Högskolan i Halmstad
Alfa Laval	Holmen
Arbetsförmedlingen	Husqvarna
ASSA ABLOY	ICA
AstraZeneca	Karolinska institutet
BillerudKorsnäs	Karolinska universitetssjukhuset
Bolagsverket	KTH
Business Sweden	Läkemedelsverket
Cetasol	Länsförsäkringar
Chalmers	Lidingö kommun
Cytiva	Linköpings universitet
DIGG	Linneuniversitetet
DTU	Luleå tekniska universitet
E.ON	Lunds universitet
Energimyndigheten	Mälardalens universitet
Ericsson	Meta
evroc	Mittuniversitetet
FMV	Northvolt
Formas	Örebro kommun

Öresundskraft	Sobi
Österby Gjuteri	Stiftelsen för strategisk forskning
RedHat	Stockholms stad
Region Halland	Swedish Olympic Committee
Region Stockholm	Telia
Region Västerbotten	Tetra Pak
Region Västmanland	TietoEvry
Rörstrands museum	Tillväxtverket
Rymdstyrelsen	Treyd
Saab	Umeå kommun
Sandvik	Uppsala universitet
SCA	Vasakronan
Scan	Västra Götalandsregionen
Scania	Vattenfall
Siemens	Vetenskapsrådet
Sjöfartsverket	VINNOVA
Skanska	Volvo Cars
Skatteverket	Volvokoncernen
Skolverket	
Smurfit Kappa	

+ many more...

Voices on AI: opportunities & challenges.

"New tech solutions contribute to sustainability in agriculture, boosting animal welfare, farmer profitability, and reducing the carbon footprint across the entire supply chain."

/Anna Rydberg

"Generative design is paving the way for smarter, more efficient engineering, delivering groundbreaking solutions that are as sustainable as they are revolutionary."

/Erdzan Hodzic

Image reimagined in Photoshop where the AI tool combined these people into one picture and generated new outfits when asked to extend the image.

"Trustworthy AI assistants can autonomously monitor industrial systems, identify areas for improvement, and offer effective remedies, while maintaining clarity and robustness under diverse conditions."

/Sepideh Pashami

"We're in the midst of the greatest modern challenge—climate change. It's causing extreme weather events globally. AI offers solutions to mitigate and adapt to future disasters."

/Olof Mogren

As AI-generated content increases, distinguishing truth from falsehood gets challenging. Collaboration among law, regulation, and technology is essential for sustainable and responsible progress.

/Carl Heath

Diverse perspectives illuminate the true impact of AI.

This selection of highlighted projects provides a glimpse into the diversity of expertise and perspectives found within RISE.

AI prompt: a closeup of an agricultural machine taking samples from the soil...(etc.)

Testing AI and robotics innovations for agriculture

Agriculture and food production in Europe are facing a series of challenges such as climate change, import dependency, antibiotic resistance, and reduced profitability. To support the development towards a sustainable and profitable agriculture, new technologies need to be tested and verified.

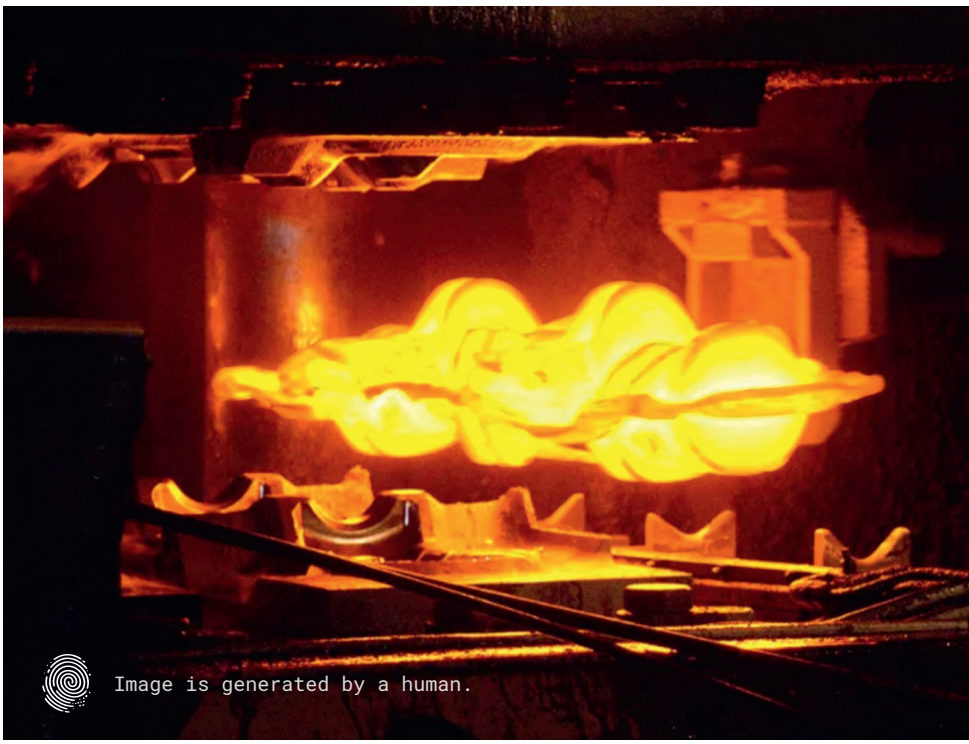
AgrifoodTEF, an EU-funded project joined by RISE, offers free testing for companies. With physical and digital facilities across Europe, it validates AI and Robotics solutions in real-world conditions, aiming to maximize the impact of digitalization in agriculture.

/Anna Rydberg

DynaSty: Reducing climate footprint with AI

In steel hardening, components are exposed to a carbon-rich atmosphere in an oven, allowing carbon to diffuse into the steel surface. These components are then cooled in an oil bath, hardening the surface. The hardening process, dictated by specific recipes, significantly contributes to the industry's carbon footprint. Committed to meeting EU climate goals, efforts have intensified to minimize this impact.

In the DynaSty project, we developed a "digital twin" simulator of the carbon diffusion process, optimizing recipes to maintain steel quality while cutting carbon emissions by up to 50%. This breakthrough has led the industry to adopt these new, more sustainable recipes.



/Anders Holst

Language technology benefits our multilingual society

In today's interconnected world, the importance of multilinguality continues to grow, a fact that is particularly noticeable in Sweden where over 150 languages are spoken. At RISE, researchers are dedicated to advancing the field of language models with a strong focus on multilingual capabilities. Our research explores efficient methods for training models across multiple languages by harnessing cross-lingual similarities and developing techniques that require less computational power. Recognising the vast potential of language technology, our team is committed to developing innovative tools that are accessible and beneficial for all members of Swedish society.

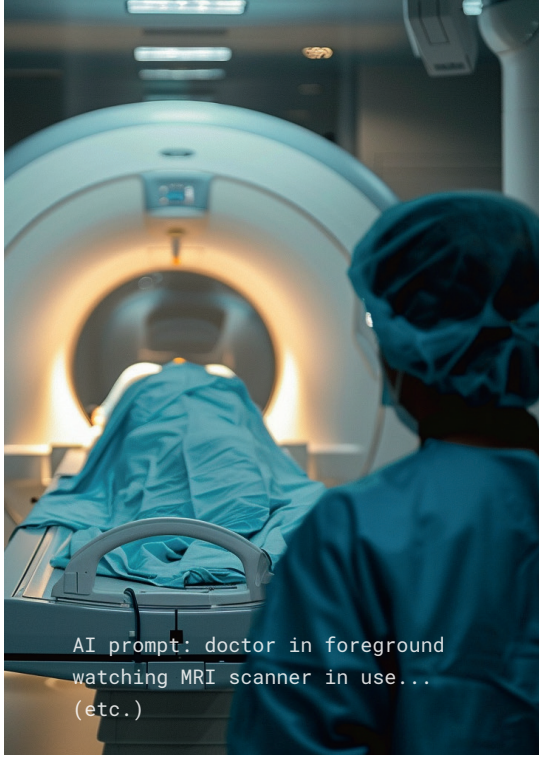
/Evangelia Gogoulou

AI – a resource in medical assessment

A group of researchers and doctors at RISE, Karolinska Institutet and Karolinska University Hospital are working together in a pilot project using artificial intelligence to find and interpret pathological changes in the adrenal gland that may indicate tumors and metastases.

“The adrenal gland is important to study precisely because it is a common location for metastases of lung cancer, melanoma, and other cancers” says Vitali Grozman, senior physician at the Department of Radiology at Karolinska University Hospital.

/Fehmi Ben Abdesslem


AI prompt: doctor in foreground watching MRI scanner in use... (etc.)


AI prompt: cause and effect pictured as a complex marble run track...(etc.)

AI technologies are linked together for complex challenges

At RISE, we are committed to advancing the integration of AI technologies to tackle complex challenges. Our extensive research and practical applications have consistently demonstrated that a unified approach to AI can lead to innovative solutions. A prime example of this is one of our collaborative projects with Ericsson.

In this project, we explored enhancing fault management within telecommunication network operations by integrating machine learning with reasoning methods. This represents a Hybrid AI approach, where several AI methodologies are synergistically combined. This allows for a streamlined process that automates the entire sequence from initial alarms and diagnosis to planning repair actions.

/Anders Holst

Predictive condition assessment of power cables

The health of underground cables can be compromised by factors such as age, faulty connections, and unfavorable soil conditions, among others. We have developed a tool utilizing machine learning to prioritize maintenance work on power cables by analyzing historical outage data. This predictive tool allows network operators to schedule maintenance more effectively, thereby reducing costs and enhancing customer satisfaction by minimizing downtime. The initiative, in collaboration with Göteborg Energi and several other Swedish energy companies, has improved the sustainability and reliability of electrical network operations through smarter, data-driven asset management.

/Claes Sandels

AI for circular fashion

The textile industry contributes up to 10% of global greenhouse gas emissions. Our project automates the second-hand textile industry by creating a dataset of 30,000 annotated clothing items for AI models. This enhances damage detection and valuation, boosting consumer trust and market participation. Our user-friendly AI aids volunteer-operated sorting facilities and supports the EU Waste Directive 2025's goals for sustainable, recyclable textiles, promoting a circular economy and reducing waste.

/Farrukh Nauman

Data-driven decision support for the Swedish Olympic sailing team

Competitive sports events like the olympic sailing competitions are an underexplored yet fascinating proving ground for data-driven analyses and decision support. AI-based prediction and visualization methods, being developed for the Swedish Olympic Sailing Team, are invaluable tools for training, strategy development, and during competitive events. Advanced sensors capturing environmental conditions, weather data, and movement information contribute key insights to enhance strategic decision-making on the race course.

/Laura Marimon Giovannetti and Sepideh Pashami

Accelerating pharmaceutical innovation with AI

AI is transforming research, notably in pharmaceuticals, where new drugs now reach clinical trials in under a year, much faster than the previous 3-4 years. RISE develops AI methods that predict safety-associated risks in early structure design, aiding pharmaceutical companies in quickly and accurately advancing drug candidates to regulatory tests for human trials. These methods excel in sifting through thousands of potential candidates, expediting the delivery of new medicines to patients. These innovations are also applied in the Mistra Safechem program, where RISE collaborates with the chemical industry on safe, sustainable processes.

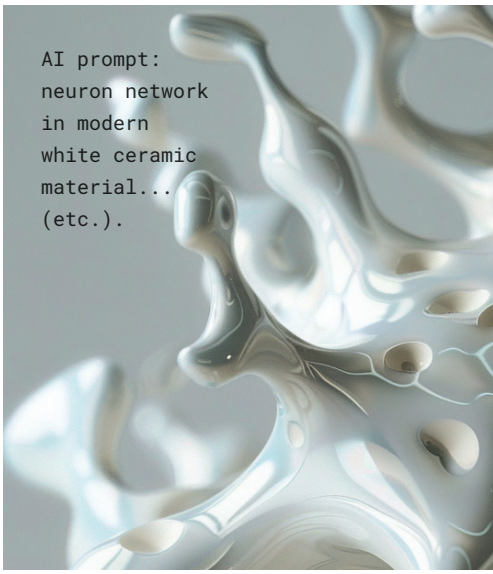
/Ian Cotgreave

Autonomous realization of embedded AI

FASTER-AI aims to integrate Machine Learning (ML) into telecom hardware and time- and safety-critical tasks for airborne systems and vehicles. Unlike current AI development environments tailored for cloud providers, our approach focuses on built-in systems' needs. We streamline ML integration in three core areas: 1) identifying suitable neural architectures for domain-specific hardware, 2) providing a multi-stage cross-compiler for combining traditional logic & ML, and 3) offering software tailored to ML-driven applications' requirements.

Our method is efficient for existing hardware and adaptable to future architectures and releases, ensuring accurate and time-critical decisions in various industries. We are convinced that the FASTER-AI method is the most sustainable and future-proof path towards digitization and value creation for existing critical infrastructure.

/Björn Forsberg



Distributed Artificial Intelligent Systems

In the DAIS project we explore edge AI components that are self-organizing, energy efficient, and private by design, for example using privacy-preserving federated learning methods for speech emotion recognition.

/Anders Lindgren

Satellite imagery framework

RISE has been commissioned by the European Union's Satellite Centre (SatCen) to conduct a feasibility study. It will provide an overview of the potential of a common framework for artificial intelligence in applications based on satellite imagery data. The results will be presented at the end of 2024. The feasibility study will be produced within a public contract concluded with the SatCen and jointly financed by the European Defence Agency and the SatCen.

/Tobias Edman

AI-driven image analysis for collectors

In this project we created a simple and user-friendly service where visitors everywhere can upload images of Rörstrand's porcelain objects and receive immediate responses. Through state-of-the-art image analysis, which recognizes patterns and objects and has shown impressive accuracy in many applications, each uploaded image will open a portal to information and insights about the artistic heritage. We have also developed a platform where enthusiasts can contribute with porcelain items. This, in combination with porcelain experts, empowers our AI-based solution.

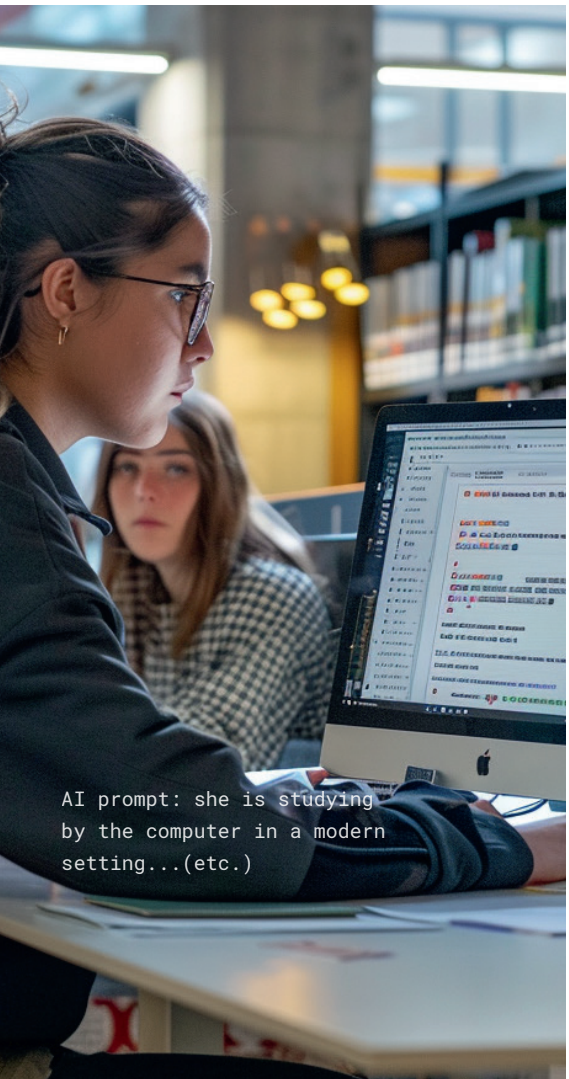
/Olof Mogren

AI aids in spotting and predicting timber defects

Did you know that Sweden is the world's second-biggest exporter of pulp, paper, and sawn wood products? Timber is a significant industry.

This project is a lab study where log cross-sections from spruce and pine with varying degrees and types of defects were scanned with a NIR camera in a lab setup. The aim was to train the AI to detect wood species and accurately identify and predict the proportion of damaged wood. This forms the foundation for developing an industrial prototype.

/Thomas Grahn



Generative AI in education

AI, ChatGPT, and DALL-E are on everyone's lips right now. If you want an introduction to what this is and how it can affect learning and education, this project might be extra interesting for you.

Now, if you have already started your exploration on your own, you have the opportunity to, together with some of the experts from RISE and other AI-interested colleagues from different parts of the country, explore and apply the possibilities of generative AI.

During the masterclass, you will have the opportunity to broaden your understanding of what AI could mean for schools and teaching, and explore a number of services to grasp the possibilities.

/Mikael Kring

We couldn’t resist including these brief introductions to a couple of more projects. You can find more detailed information about them and more on our website.

Prediction of maintenance needs for small houses

In this project we develop an AI model that can predict risks and maintenance needs in small houses and generate individualized maintenance plans for small house insurance customers.
/Kaisa Svennberg

Software development copilots

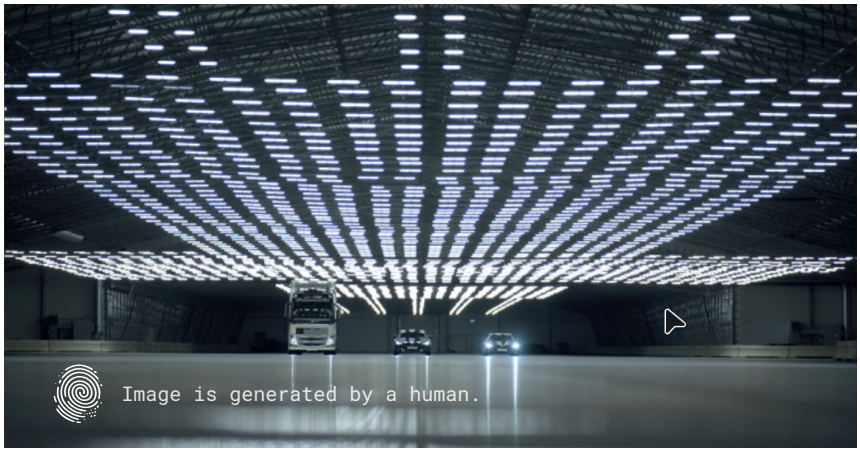
AI assistants for development of complex industrial software systems. Opportunities for improved coding efficiency, reviewing and adherence to requirements.
/Stella Riad

Language technology for pharmacovigilance

We explore automation of drug safety operations involving unstructured data using natural language processing in collaboration with the Swedish Medical Products Agency (Läkemedelsverket). We study aspects of explainability, efficient modelling and training in on-prem settings with sensitive data.
/Luise Dürlich

Strengthening cybersecurity with AI

Cybersecurity and AI initiatives at RISE include enhancing system robustness against adversarial attacks, advancing the development of secure federated learning systems, and improving capabilities for detecting and responding to AI-driven threats. These efforts are designed to safeguard data integrity and ensure reliable AI operations across various platforms.
/Shahid Raza



AstaZero - a state of the art testing facility

AstaZero, owned by RISE Research Institutes of Sweden, is the world’s first full-scale independent testing facility for future automated transport systems. It serves as a neutral and open research organisation, specializing in AI-driven vehicle solutions and advanced safety systems. Key partners and financiers include Volvo Group, Volvo Cars, Veoneer, Scania, the Swedish Transport Administration, Region Västra Götaland, Vinnova, Borås Stad, and the EU’s European Regional Development Fund.
/Peter Janevik

Intention prediction

Intention recognition infers an agent's intent from past actions, crucial for predicting behaviors such as driving maneuvers. RISE has developed advanced hybrid AI algorithms for these capabilities for autonomous and human-driven vehicles.
/Björn Bjurling

Regulatory sandboxes for AI

Regulatory sandboxes is a tool that can be used to explore new innovative products and services that stand in conflict with existing laws and regulations. RISE is a natural collaborative partner for those curious about regulatory sandboxes for AI.
/Niklas Thidevall, Susanne Stenberg

Measuring biodiversity from space

By combining remote sensing and machine learning, a method is developed to measure and monitor grazing pressure in natural pastures using satellite images, which enhances traditional monitoring methods and contributes to the conservation of biodiversity.
/Per Peetz Nielsen

Increased process efficiency

The project aims to automate the quality inspection process by using AI for increased efficiency and accuracy to respond to the increasing demand and quality requirements from customers. When errors are identified more efficiently and earlier in the process, it leads to increased environmental and economic sustainability.
/Mats Tallfors

Understanding climate change

We are partners in the Swedish Centre for Impacts of Climate Extremes (climes) which studies climate extremes and support societal resilience. Our focus is on monitoring and analyzing extreme weather events and their impacts.
/Olof Mogren

RISE-GPT Test & Demo

RISE-GPT T&D is an offer where companies and the public sector can explore the possibilities with generative AI, such as chatbots and transcription, within new application areas while complying with regulations.
/Joakim Börjesson

More info on projects can be found here: www.ri.se/ai

AI is changing the way we live and learn, join us for the journey!

Talk to us at the center for Applied AI at RISE

Your interest in artificial intelligence is important to us, and we look forward to hearing from you. Do you have questions, feedback or just want to share your thoughts on AI? Contact us and we will get back to you.

www.ri.se/en/ai-center/about-the-center-for-applied-ai

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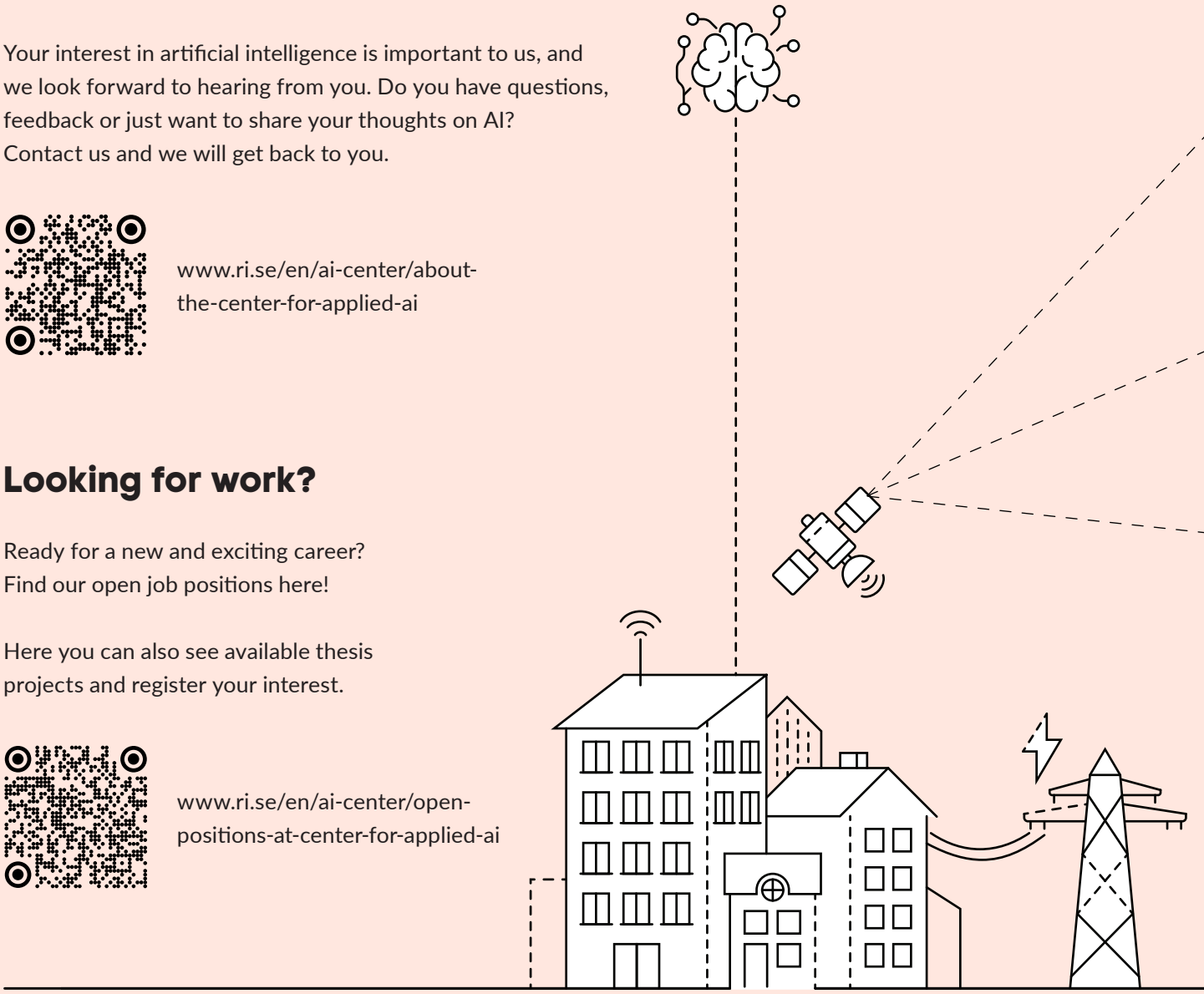


Sign up to our newsletter on AI

The Center for Applied AI publishes a newsletter in Swedish about the latest in AI research and development. The topics span from why human values are important to advanced AI systems to AI trends and signals and how that affects us. Keep updated and sign up for a subscription!

www.ri.se/en/ai-center/newsletter-om-ai

RISE Learning Machines Seminars

We gather both Swedish and International domain experts in AI every Thursday at 15.00 and you are most welcome to participate. Btw it is free! Scan QR code to sign up!

www.ri.se/en/learningmachinesseminars

Find us on LinkedIn

Keep updated on our activities, meet the people behind the center and get the latest on our projects.

www.linkedin.com/showcase/ai-and-computer-science-at-rise/

Practice what you preach.

This State of AI by RISE report harnesses the combined intelligence of two easily accessible AI models, ChatGPT and Midjourney. These tools have helped us curate the content and align the tone across the articles.

Here you can see how we crafted the prompts to guide the AI tools. The prompts are engineered in a fashion to comply with RISE's overall Brand and Visual Identity spiced with a few new ingredients that makes this unique for the Center for Applied AI at RISE.

We hope you find this inspiring and we do encourage you to try them out for yourself!

Prompt guideline for AI generated text content

Wow Factor: Start strong to capture attention. **Be Bold:** Lead the way and talk about the actual impact. **A prestigious area at RISE:** Maintain an esteemed tone. **The Good Guy Approach:** Show ethical standpoints and ensure a positive conclusion. **Drive Action:** Keep writing concise and avoid unnecessary explanations.

Prompt guideline for AI generated imagery

Future: Embrace a visionary approach and ensure human presence in the images. **Documentary:** Authentically depict reality, emphasizing natural light. **Norm-critical:** Steer clear of stereotypes. **Interesting Compositions:** Use angles that evoke a sense of awe.

It worked!

For creativity's sake:

Tools like Midjourney enable users to explore creative ideas visually, generating images that might never have been imagined otherwise. Similarly, ChatGPT assists in brainstorming, writing, and problem-solving, pushing the boundaries of human creativity and innovation. We find that the best approach is to iterate in steps, integrating sometimes disruptive ideas from the AI, tweaking them, and then iterating again.

In the name of efficiency:

In this report, AI tools have excelled at adjusting the tone across a series of texts, managing large volumes of content effectively, and quickly suggesting contextual imagery. We used these suggestions as drafts to inspire and provoke reactions from human contributors, who then completed the work. These suggestions are effective in this way but often do not provide a complete solution on their own and require iterations to fully take shape.

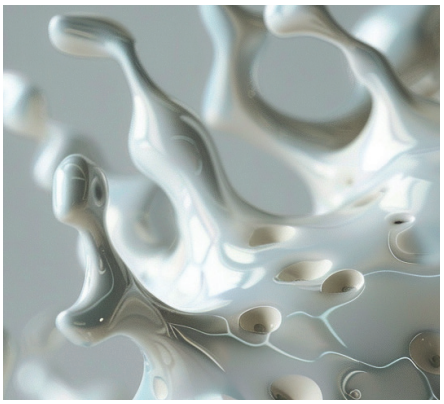
...On the other hand...

Don't get lazy!

We've strived to push the boundaries in creating this document, occasionally asking AI to help develop arguments and provide facts. However, amusingly, it turned out that half of the time the information and "facts" provided were incorrect. You cannot solely rely on what you receive; the time you save initially might eventually be spent verifying and sourcing accurate information to support the statements.

We are not redundant yet.

Despite their capabilities, AI systems often require human oversight to ensure the accuracy and quality of the content they produce.
AI typically lacks the depth of contextual understanding that humans possess. Humans can interpret complex social, cultural, and emotional contexts and nuances that AI might overlook or misinterpret. Therefore, we utilised human expertise to finalize both the imagery and text content in this report.



Above is a selection of AI-generated imagery featured in this report. All these images were created using Midjourney in collaboration with Anna Karlsson at Already Tomorrow. Given that most of the imagery in this report is AI-generated, we have chosen to highlight those that are not. Can you spot them?

The State of AI by RISE.

2020-2024 and beyond

RISE RESEARCH INSTITUTES OF SWEDEN

RISE is Sweden’s research institute and innovation partner. Through international collaborations with the business community, academia and the public sector, we contribute to ensure the competitiveness of Swedish commerce and industry and a sustainable society. Our approximately 3,300 employees drive and support all types of innovation processes. RISE is an independent, state-owned research institution offering unique expertise and around 130 test and demonstration environments for future-proof technologies, products and services.