ARTIFICIAL INTELLIGENCE INSTITUTE
SEOUL NATIONAL UNIVERSITY

AIIS
Artificial Intelligence Institute
Seoul National University

ARTIFICIAL

INTELLIGENCE

INSTITUTE

SEOUL

NATIONAL

UNIVERSITY

AIIS

Headquartered at Seoul National University, AIIS is a leading research institute established in 2019 to provide integrated support for AI research at the university and to broaden the AI research base.
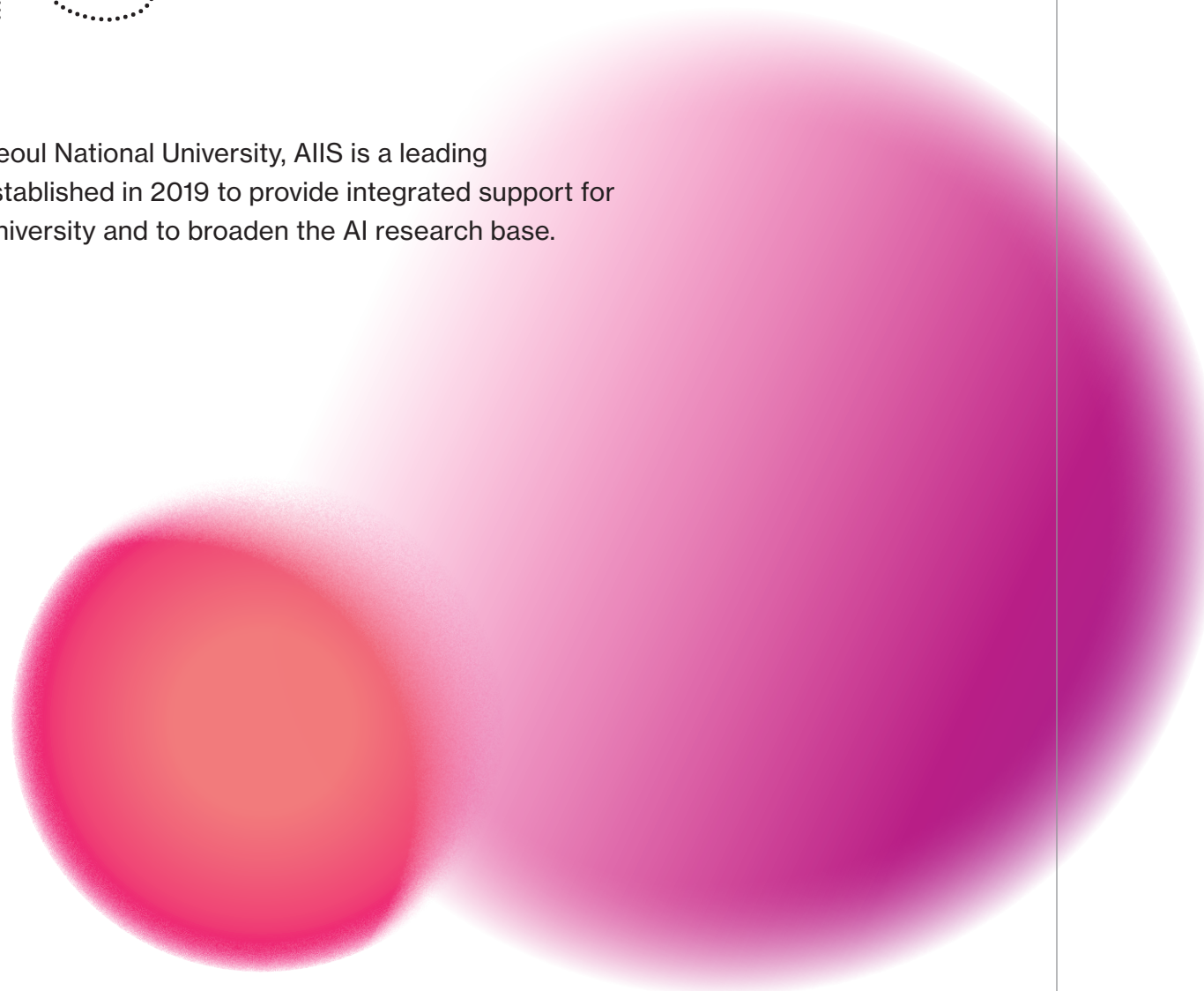
*AIIS: Artificial Intelligence Institute of Seoul National University
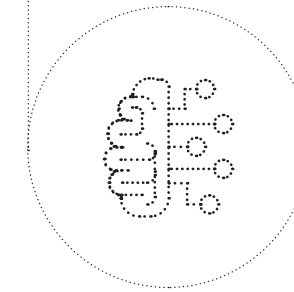
AI, beyond ML to human-level learning

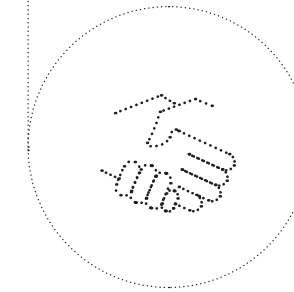With the advancement of machine learning into deep learning, machines have achieved learning capabilities comparable to humans. AIIS develops and disseminates human-level AI by leveraging Seoul National University's exceptional expertise and cutting-edge technologies.

AI, beyond virtual to real

While AlphaGo showcased AI excellence in the virtual world of games, AIIS focuses on real-world challenges, addressing complexity and uncertainty by applying rapidly evolving AI technologies.
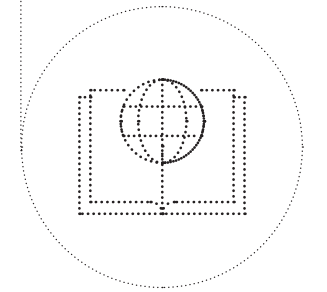
AI, beyond disciplinary boundaries

The development of AI is enabling another great leap forward in many fields that have begun to stagnate. AIIS is realizing applied research through a multidisciplinary approach by utilizing Seoul National University's strengths of excellent human resources and advanced technology across all fields.

AI for AII

AI serves as an academic tool for reshaping knowledge creation, an industrial tool for driving the Fourth Industrial Revolution, and a societal tool for transforming daily life. AIIS is conducting research to maximize the impact of AI in all these areas.

AI for All Research

AIIS not only leads core AI research into foundational technologies but also facilitates interdisciplinary collaborations to generate new knowledge through AI.
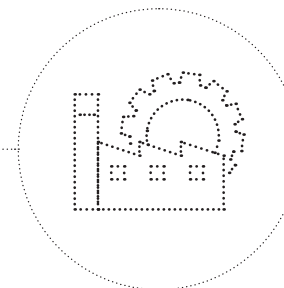
AI for All Industries

AIIS engages in numerous industry-academia partnership projects with domestic and global companies, supports research lab and student-led startups, and promotes AI applications in industry.
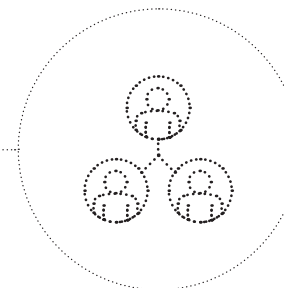
AI for All People

The evolution of AI technology is expected to have a transformative impact on society. AIIS is dedicated to establishing the legal and institutional frameworks essential for an AI-driven society, fostering social and economic progress, and conducting research to predict and mitigate potential challenges.

AI Researchers

Korea's largest AI research institute, AIIS is renowned for its world-class experts in core AI technologies.

X+AI Faculty
200+

AIIS-Affiliated Faculty
72 departments
300+ professors

Core AI Faculty
100+

AI Researchers
3000+

Core AI @ AIIS

Human-AI Interaction

Brain Cognition

AI Platform

AI Chips

Language and Cognition
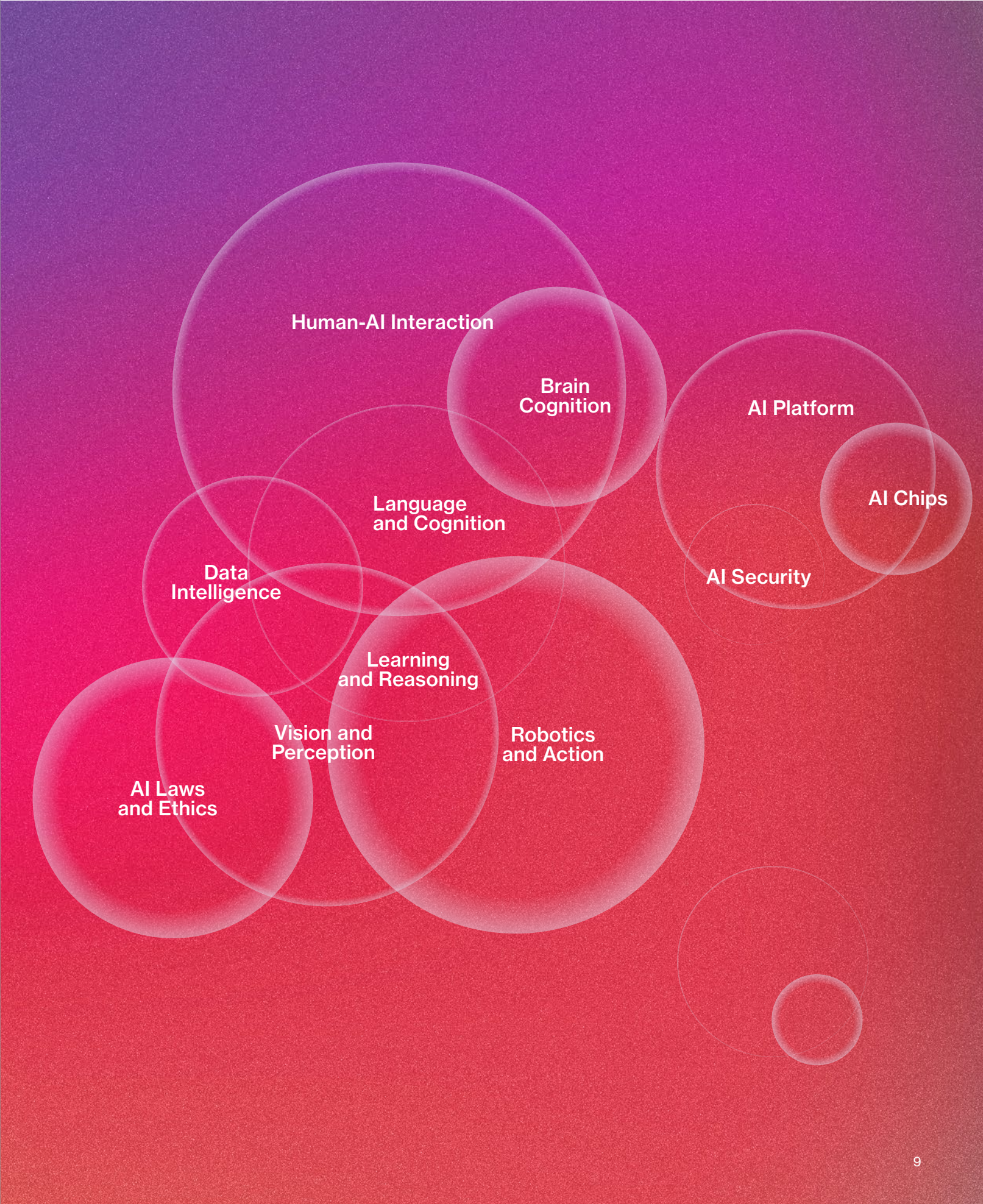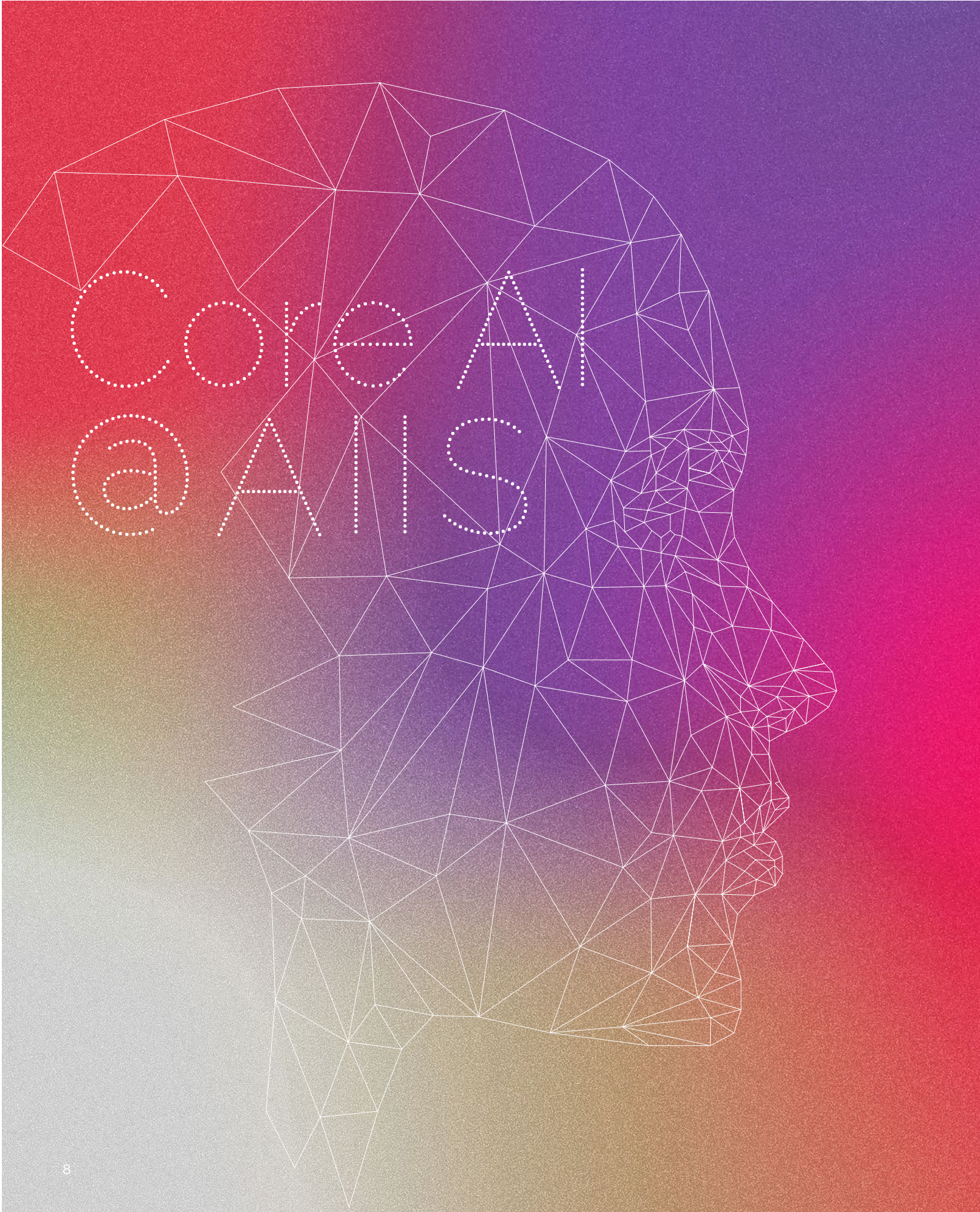
Data Intelligence

AI Security

Learning and Reasoning

Vision and Perception

Robotics and Action

AI Laws and Ethics

Embodied AI

Research into AI with a Physical Body that Interacts with the Real World

We are researching next-generation human-level AI technologies with the goal of overcoming the fundamental limitations of internet-based generative AI. Our focus is on developing core foundational technologies for "embodied AI," which can interact with humans, and comprehend and act in the real world. Through these efforts, we aim to pioneer foundational technologies that proactively address the challenges of a low birth rate and an aging society.
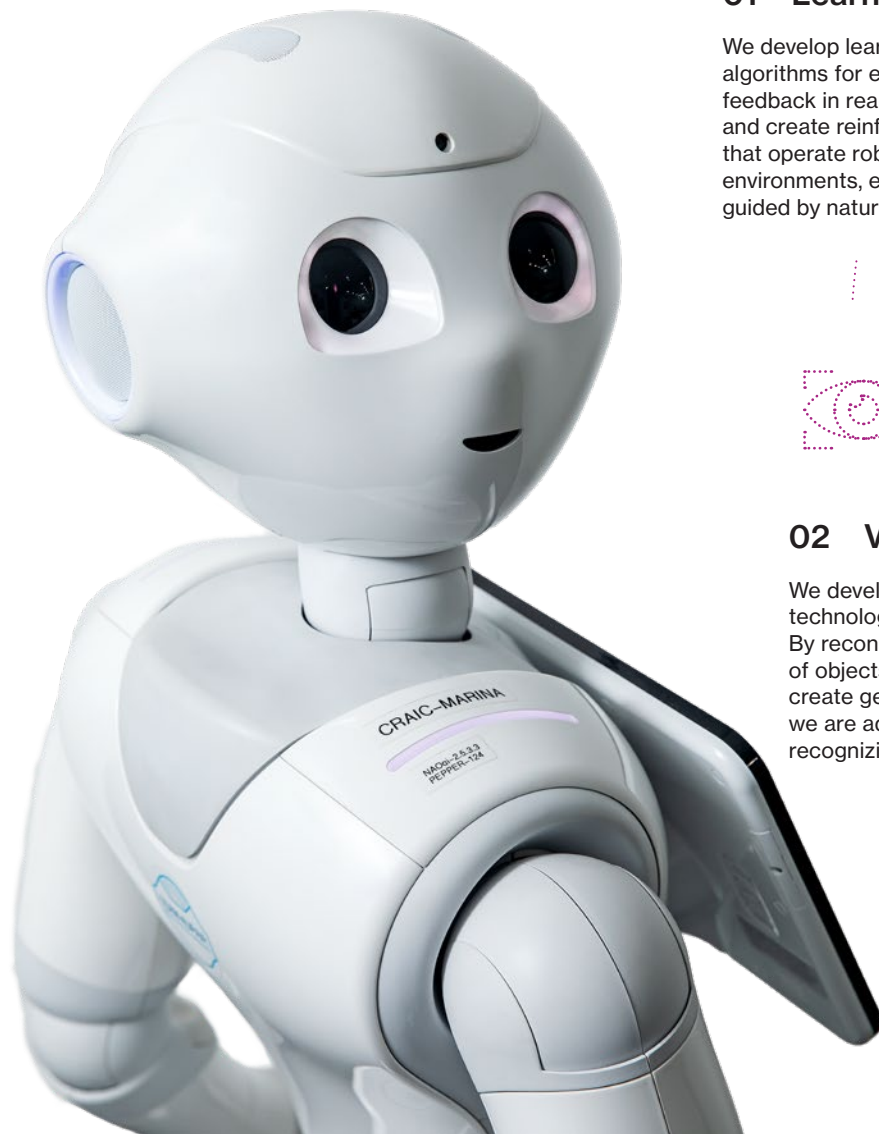
01 Learning and Inference

We develop learning and inference algorithms for embodied AI based on user feedback in real-world environments, and create reinforcement learning policies that operate robustly across diverse environments, enabling AI to perform tasks guided by natural language instructions.
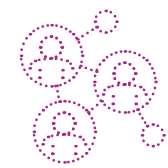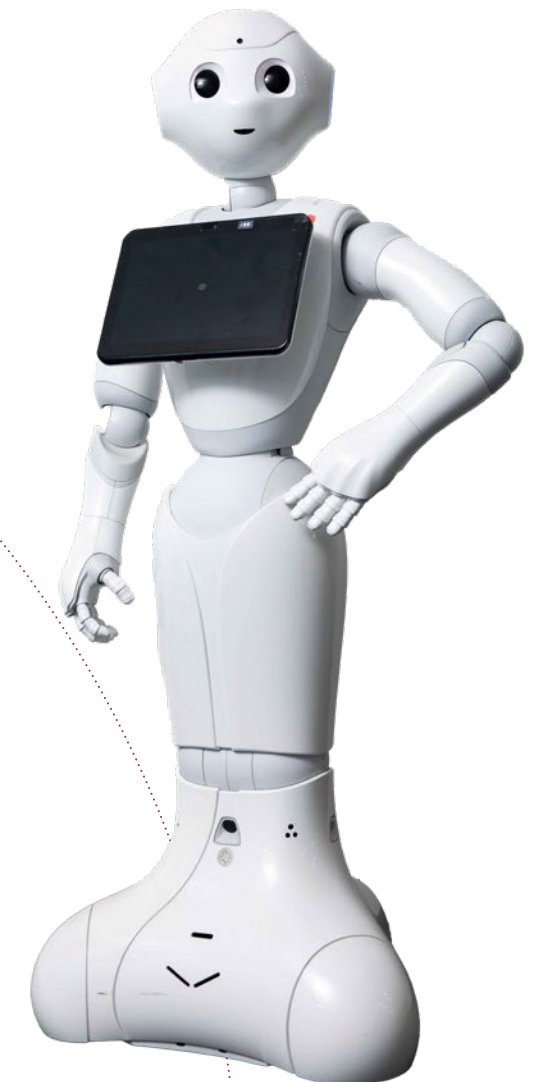
02 Vision and Perception

We develop 3D situational awareness technology using images/videos. By reconstructing the 3D characteristics of objects and background features to create generative models of objects, we are advancing systems capable of recognizing various real-world scenarios.

03 Language and Cognition

We aim to enable complex, high-level language comprehension based on neurophysiological studies of language-cognition, with a focus on understanding abstract concepts and utterance intentions. Building on this foundation, we develop models capable of collecting and classifying language-concept neurocognitive data.

04 Robotics and Behavior

We design learning algorithms to enable "learning-by-doing" through real-world interactions. We also develop shared control algorithms for convergence learning using remote operation methods. By integrating these two research approaches, we aim to demonstrate and implement various task execution capabilities of real-world robotic systems utilizing embodied AI.

05 Social Impact

We explore reliability analysis methods and the societal impact of introducing embodied AI technologies, as well as strategies to address related challenges. Through these efforts we aim to establish a sustainable evaluation framework for embodied AI.

Multidisciplinary Research in 5 Core Research Areas
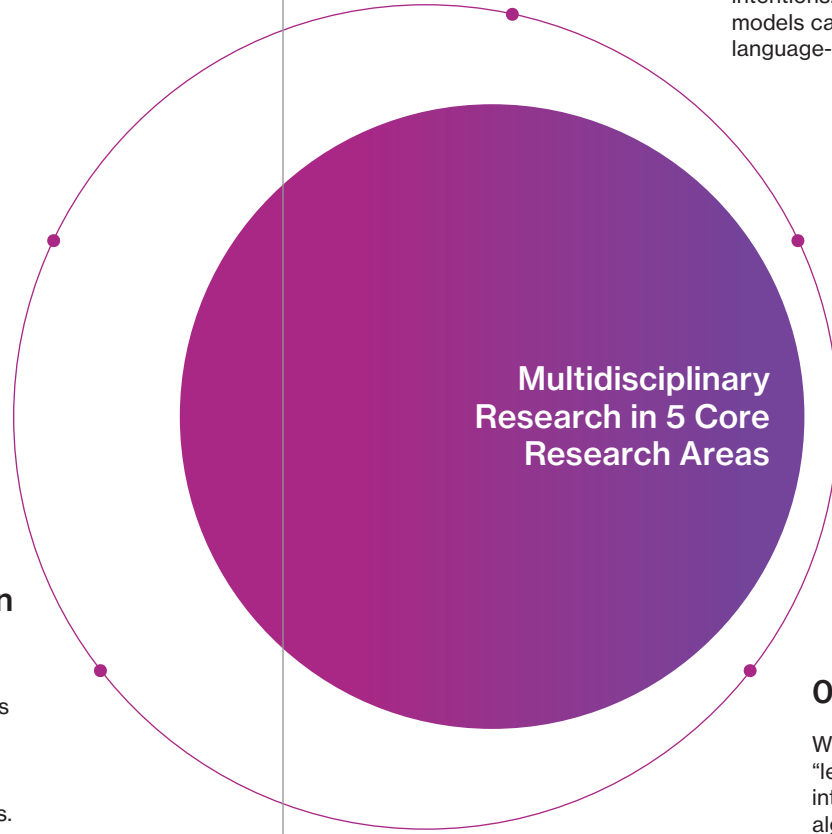
Next-generation AI

01　AI that Learns in a Self-directed Way

Current AI technologies are specialized for specific domains and tasks, making adaptation to new environments challenging. Furthermore, reliance on externally provided data limits the scope of learning.

To address these limitations, we aim to develop general-purpose AI capable of recognizing problem situations, formulating target hypotheses, and generating its own data for self-directed learning.
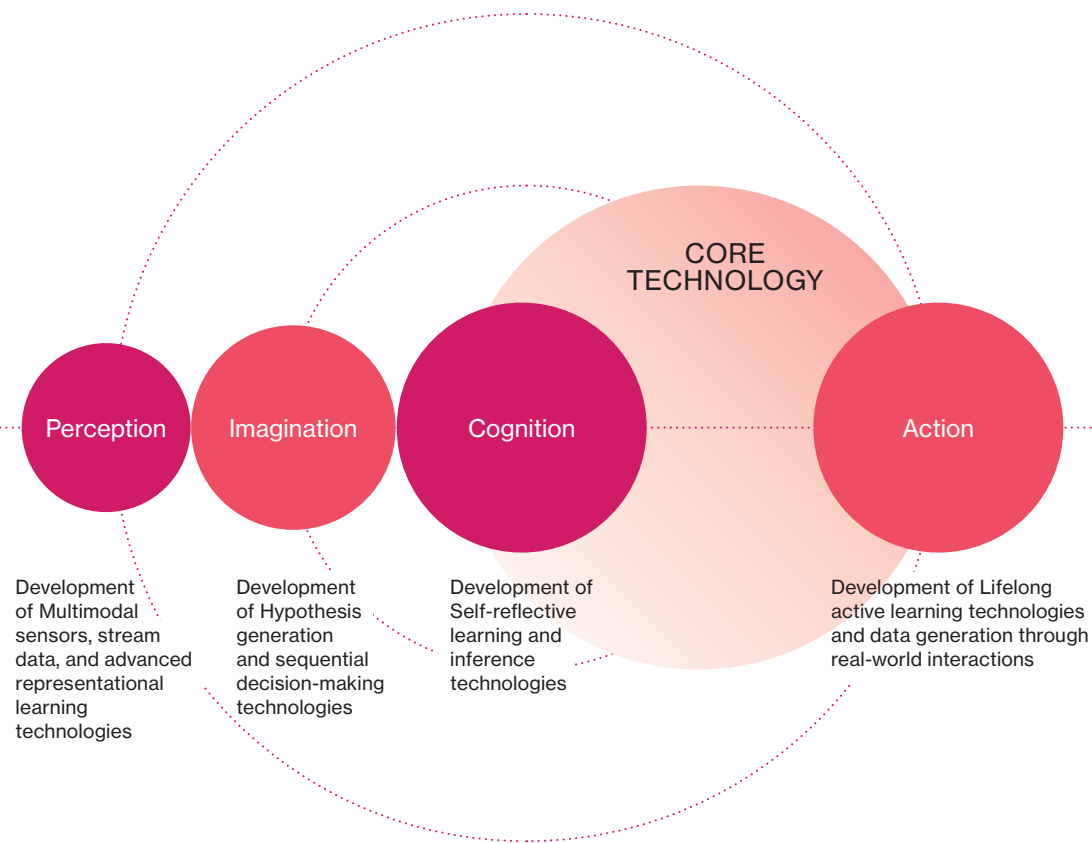
CORE
TECHNOLOGY

Perception

Imagination

Cognition

Action

Development of Multimodal sensors, stream data, and advanced representational learning technologies

Development of Hypothesis generation and sequential decision-making technologies

Development of Self-reflective learning and inference technologies

Development of Lifelong active learning technologies and data generation through real-world interactions

02　Robots that Adapt to Continuously Changing Environments

One limitation of current robotics technology is that it can only be applied to highly structured environments such as manufacturing plants. It is very difficult to utilize robots in places such as recycling/waste disposal sites where they have to pick up and handle objects that they have never seen before or that are highly deformed, or restaurants where the surrounding environment changes frequently.

We aim to overcome the limitations of existing industrial robots and secure a new paradigm for robot reinforcement learning with source technology that will enable the utilization of robots in various industrial fields with unstructured, complex, and continuously changing real-world environments.

1

2

3

Pre-collected
Data

Additional
Learning Signals

Performance of Various Tasks,
Application of New Tasks
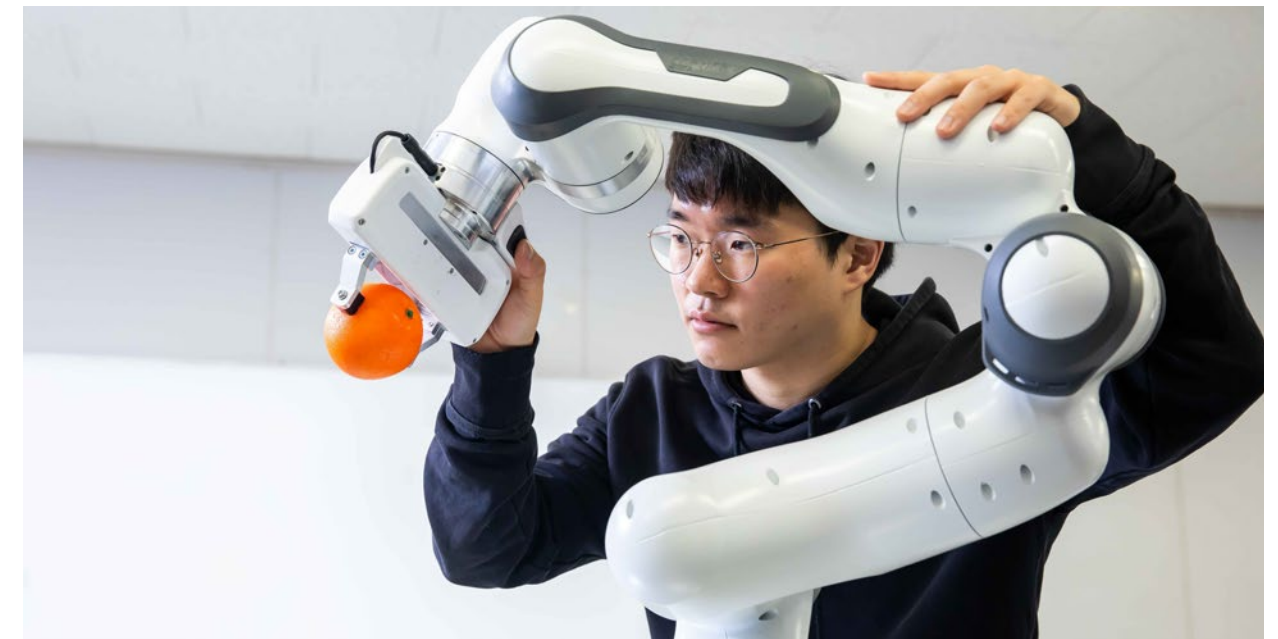
03　Research into Improving Video Quality and Converting to a 3D Metaverse

The popularity of one-person media content is growing across all age groups.
Expanding such videos into the metaverse requires various advanced technologies.

We have defined five key areas of meta-learning technology and aim to develop
deep learning models and standard datasets for each domain.

Meta-Learning

Multimodal
Conversational AI

3D Restoration
and Motion
Generation

Video Quality
Enhancement

Video
Storytelling

Continuous
Learning

ddpm_inv.py LDM-SRtuning
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LQ image　　SR result
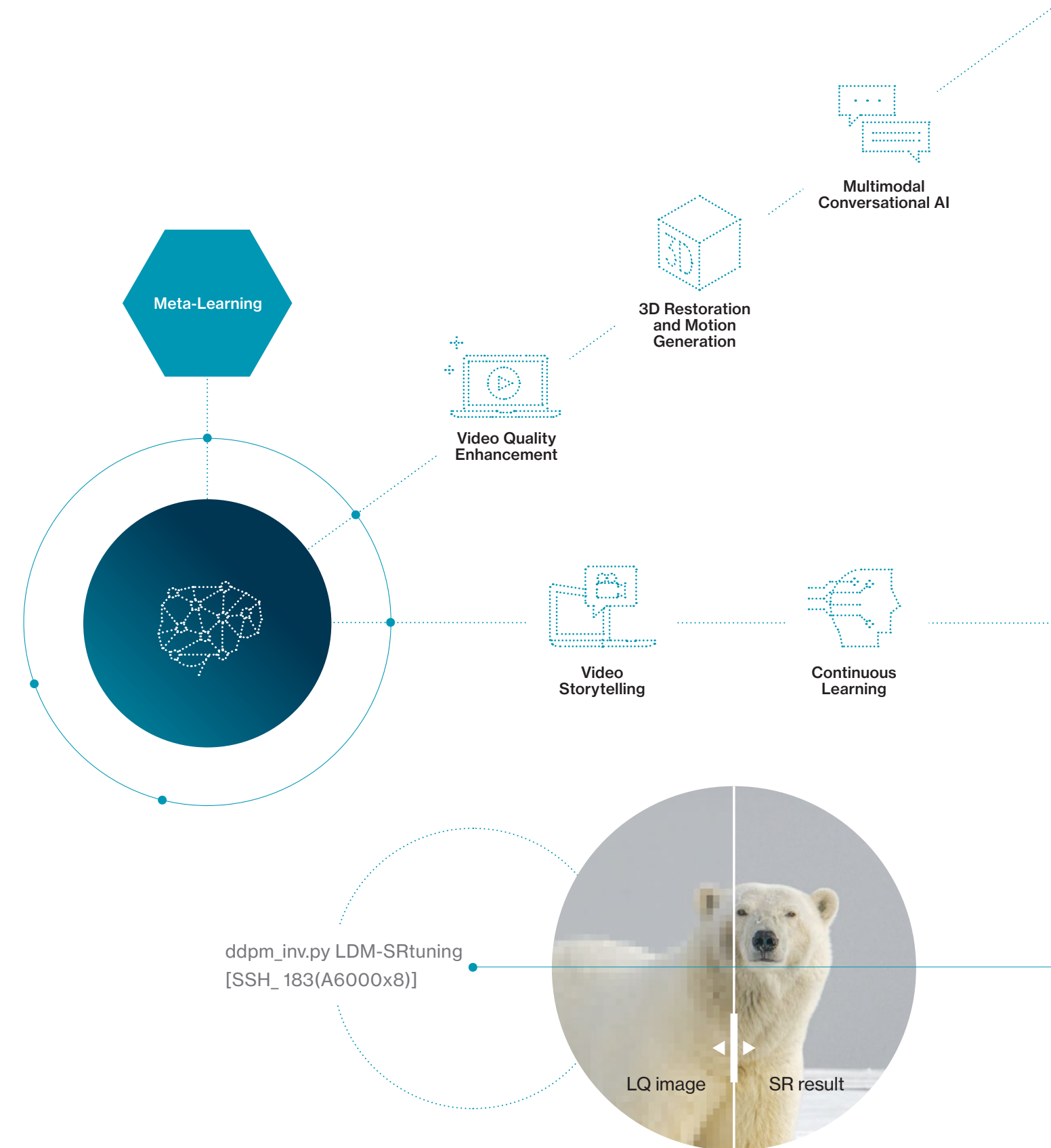
Hyperscale AI

Hyperscale AI Research to Develop Korean Language-based Super-intelligent AI

The rapid advancement of AI has primarily focused on English, resulting in a lack of Korean-centric research, even in Korea. To address this gap, the Seoul National University AI Institute and NAVER are collaborating on the Hyperscale AI Project.

This will empower Koreans with access to world-class AI technology in their native language, and the goal is to surpass the current capabilities of GPT within three years.

Hello! How can I help you?
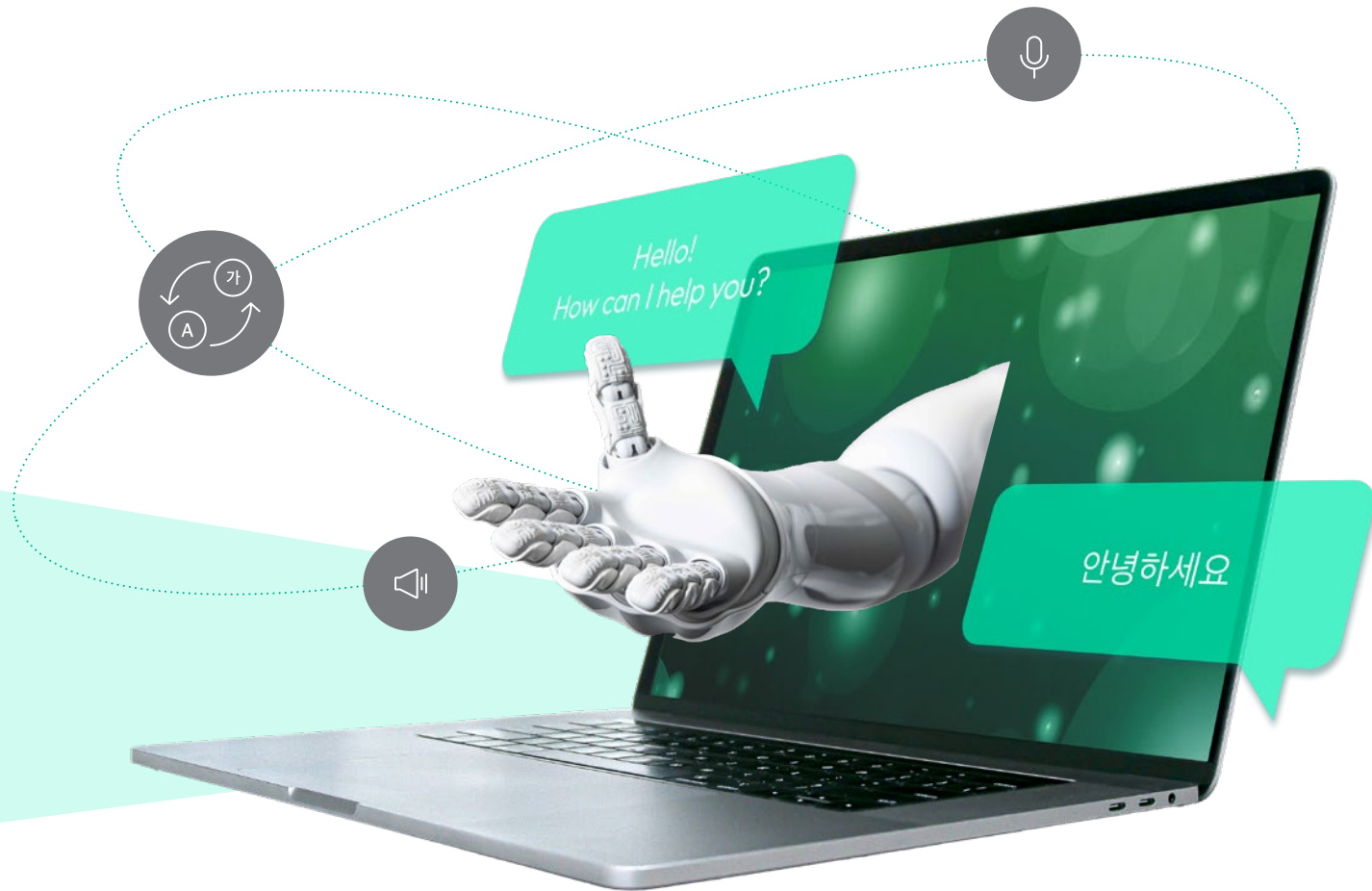
안녕하세요

SNU X NAVER

Hyperscale AI
Research Groups

SNU & NAVER Hyperscale AI Joint Research Center

Hyperscale Server Support

NAVER is investing in supercomputers and GPU servers worth hundreds of billions of won and other large-scale computing resources.

Hyperscale Expertise

More than 100 AI experts from Seoul National University will participate.

Hyperscale Data

NAVER, which has the most Korean language data in the world, is providing hyperscale data.

NAVER

A joint industry-academy research project between SNU and NAVER to develop the world's best Korean language-based AI

Diversity in X+AI@AIIS

Bio + AI

Humanities, Social Sciences + AI

Medicine + AI

Manufacturing + AI

Commerce + AI

Construction + AI

Finance + AI

Climate, Environment + AI

Various Disciplines and AI Meet to Create Super-intelligent AI

AIIS serves as a hub of innovation, enabling researchers to apply AI to their respective fields, foster new knowledge, and transform ideas into reality.

Manufacturing and AI

We use AI in manufacturing to autonomously predict, detect and resolve events ocurring in factories, ensuring efficient and timely responses.
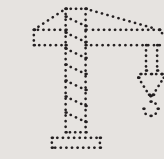
- Smart Factory AI Research Center
- Autonomous Driving Innovation Center

Construction and AI

We apply AI and robotics technologies to improve the productivity and safety of construction environments by flexibly addressing uncertainties.

- Smart Construction AI Research Center

Healthcare and AI

We pursue innovation in medical services by utilizing AI for disease diagnosis and prognosis prediction.

- Health and Care AI Research Center
- Medical Video AI Research Center

Climate Environment and AI

We conduct research to analyze and predict changes in climate and the environment using AI.

- Climate and Environment AI Center

Humanities, Social Sciences and AI

We conduct research on developing AI equipped with the ability to think and reflect, fostering human-like intellectual qualities.

- AI Ethical, Legal, and Social Issues Research Center
- AI Digital Humanities Research Center

Commerce and AI

We focus on enhancing the value of the commerce sector by integrating AI technology to connect people and data seamlessly.

- Intelligent Commerce Research Center
- Logistics AI Leading Center

Bio and AI

We focus on building bioinformatics data and developing learning algorithms to advance data-driven life science research.

- New Drug Development AI Research Center
- AI-FOOD Leading Center

Finance and AI

We facilitate financial decision-making through AI and deliver data-driven services tailored to customers' needs.
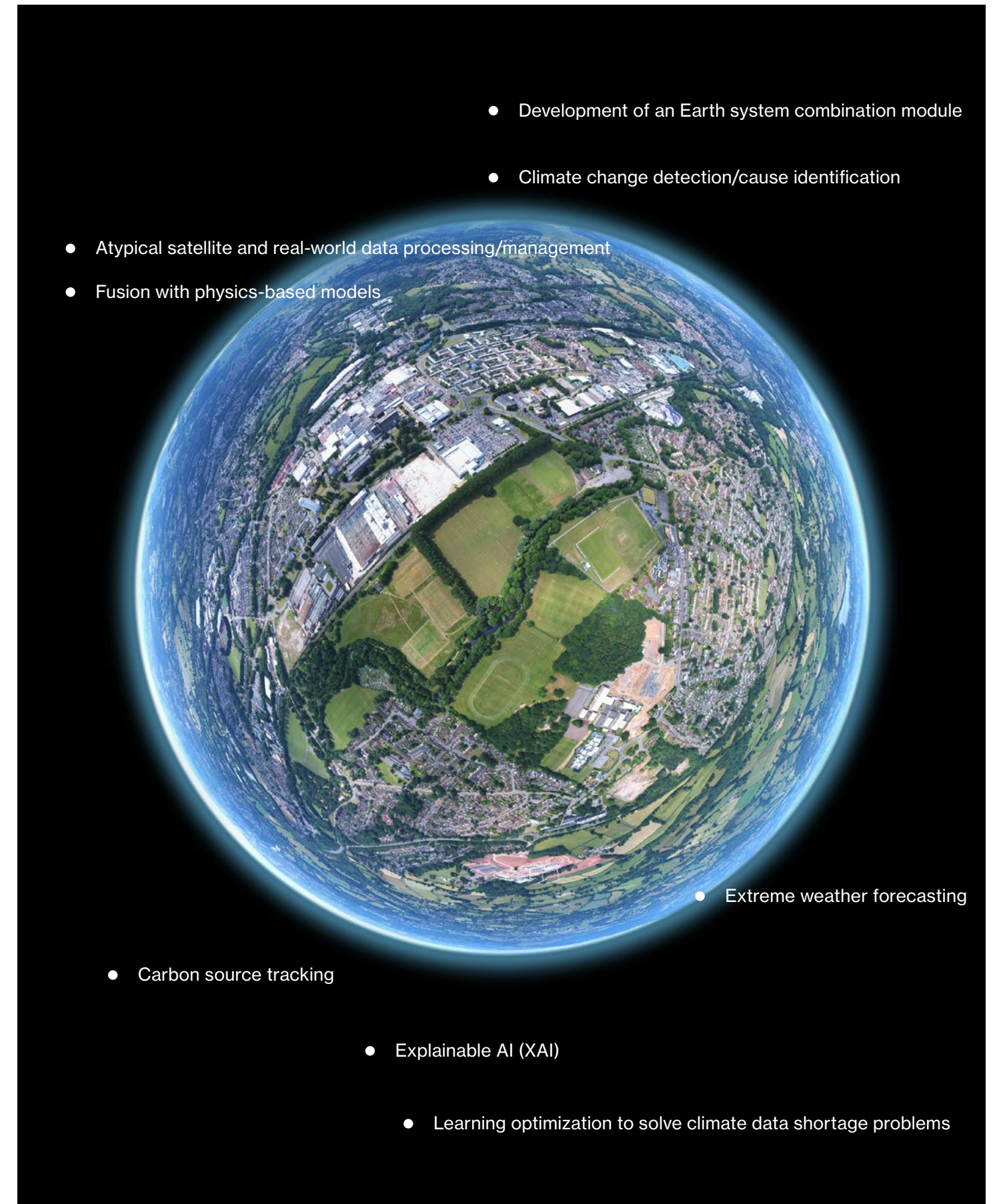
- Financial Management AI Center

Climate + AI

Climate Change Research using AI

We leverage AI techniques for climate predictions and monitoring, tracking of carbon emission sources, and analysis of climate change causes.
To this end, we have devised an AI-based ultra-high-resolution global climate model that integrates non-standard satellite data, observational data processing, and physics-based Earth systems. In addition, we are optimizing the model through learning approaches to address the issue of insufficient climate data.

Research Topics

- Development of AI-based climate prediction systems
- Creation of AI-driven extreme event prediction systems
  (e.g., heatwaves, heavy rainfall)
- Design of deep learning-based global data assimilation systems
- Development of deep learning-based coupled models
  for the atmosphere, ocean, sea ice, and land
- Implementation of satellite data-driven carbon emission source tracking systems
- Machine learning models for carbon emission and absorption prediction
- AI-based climate change detection techniques
- Optimization of learning methods to address data insufficiencies

- Development of an Earth system combination module
- Climate change detection/cause identification
- Atypical satellite and real-world data processing/management
- Fusion with physics-based models
- Extreme weather forecasting
- Carbon source tracking
- Explainable AI (XAI)
- Learning optimization to solve climate data shortage problems

Medicine + AI

Advanced Medical Care using AI

We are conducting diverse research to facilitate the successful integration of AI into healthcare. Our efforts include collecting and systematizing unstructured medical data, effectively utilizing distributed medical data, verifying and evaluating AI-based medical technologies, and addressing ethical issues such as data privacy protection.

Research Topics

- Development of AI-driven liquid biopsy technology for Alzheimer's disease

- Establishment of AI and big data platforms for deriving new drug candidates

- Evaluation and interpretation of the entire drug development and approved drugs

- Development of a bleeding image recognition and quantification system for medical professionals

- Enhancement of tomographic medical imaging, multi-modality techniques, diagnostic assistance technologies, and performance assessments

- Creation of machine learning models for predicting periodontal disease, tooth loss, and other oral conditions

- Automated integration of diverse digital datasets for advancing digital healthcare systems

- Simplification, automation, and intelligence-driven optimization of digital diagnosis and treatment processes
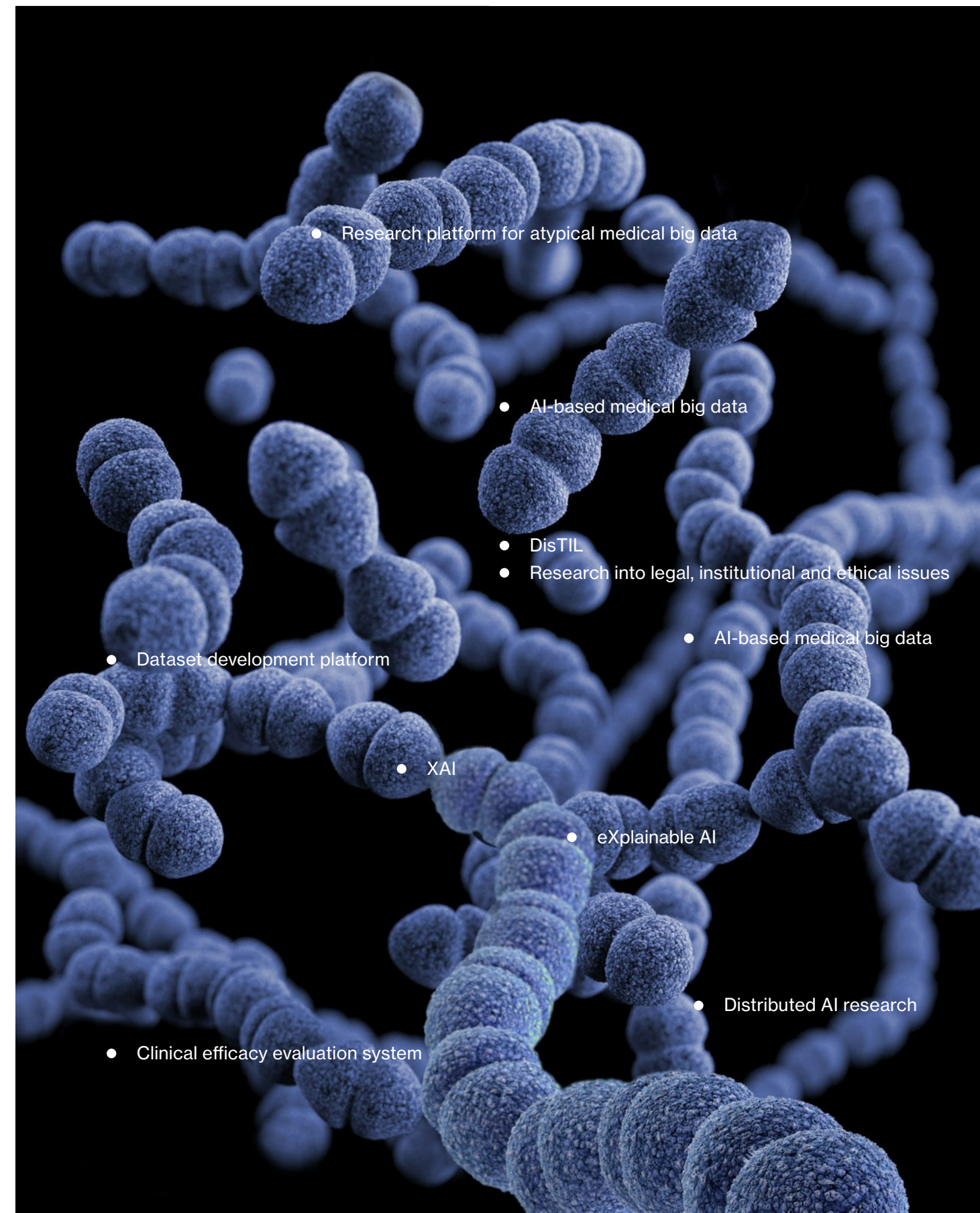
- Research platform for atypical medical big data
- AI-based medical big data
- DisTIL
- Research into legal, institutional and ethical issues
- AI-based medical big data
- Dataset development platform
- XAI
- eXplainable AI
- Distributed AI research
- Clinical efficacy evaluation system

Humanities /
Social Sciences + AI

Research on Applying AI to the Humanities and Social Sciences

The Center for Trustworthy AI (CTAI) conducts interdisciplinary research that bridges the humanities, social sciences, and engineering. The CTAI proposes ethical, legal, and socially aligned AI reliability concepts, along with the evaluation indicators and technologies needed for their implementation.

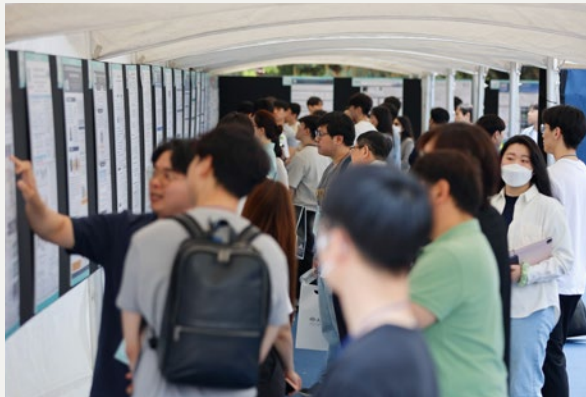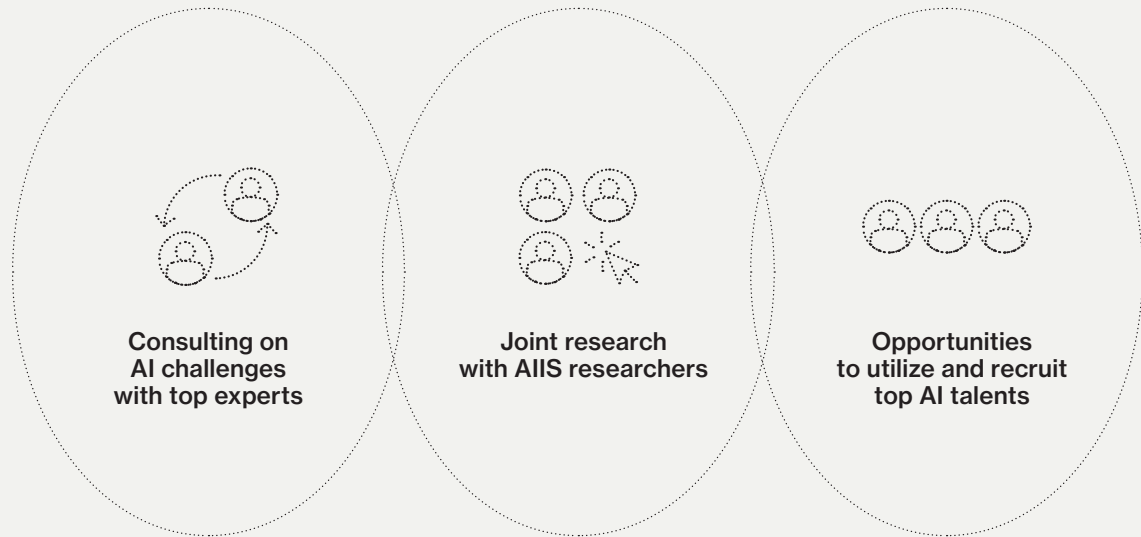## Research Topics of the Center for Trustworthy AI

- Standardization of AI reliability verification systems across domains
- Establishment of global databases for AI reliability guidelines
- Core technologies for AI fairness, safety, transparency, and robustness
- User perception and evaluation of AI reliability
- Research on human-AI interaction

CTAI

- Trustworthy AI
- Fairness
- Safety
- Security and privacy
- Explainability and transparency
- Rigidity
- Basic models
- Human-AI interaction
- AI-media communication

AIIS Membership

Universities can conduct more impactful research through businesses
to address real-world problems, while businesses find
AI-driven solutions to their challenges through universities.

**Consulting on
AI challenges
with top experts**

**Joint research
with AIIS researchers**

**Opportunities
to utilize and recruit
top AI talents**

DONATION
YOULCHON FOUNDATION

The Future society will be led by AI.
Nongshim Group's Youlchon Foundation supports scholarships
and research funding to invest in our future.

Scholarships

• AI for All Fellowship

Continuously supporting graduate students to expand
their studies with AI

• AI Star Awards

Scholarship for top talents in the field of
AI core technology (core AI)

• AI Young Researcher Scholarship

Scholarship for potential talents in the field of
AI application technology (X+AI)
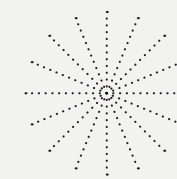
• AI Research Fellowship

Scholarship for researchers participating
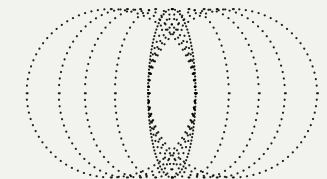in Youlchon Foundation research projects

Research Support

We support competitive AI research that drives
innovation and has a positive impact on society.
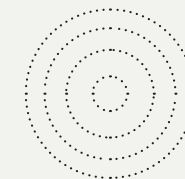
Core AI

AI + X

Young Professor AI

SNU AI CEO

We cultivate industry leaders and professionals capable of driving digital transformation through the integration of AI and industrial technologies. In addition, we have established a human networking platform to advance AI industry-academia collaboration.

Faculty from the Seoul National University AI Research Institute – world-renowned in AI research

Lectures featuring real-life cases from current corporate representatives (executives)

Networking opportunities among trainees for collaborative projects

AI-based corporate problem-solving projects

NAVER TV's 'AI for All' Series

AI terminology is simplified and presented in an accessible manner, ensuring even complex concepts are easy to understand.
In collaboration with NAVER and EBS, the content is offered free of charge to all citizens, exclusively on NAVER TV.

AIIS Colloquium Series

Seoul National University AI professors deliver lectures on applying AI across diverse fields, broadcast live on YouTube.
These lectures are open for all to participate, listen, and engage in discussions.

Engage with AIIS

Affiliated Faculty

300+

Researchers

3000+

Linguistics
French Language and Literature
Economics
Sociology
Mathematical Sciences
Statistics
Biological Sciences
Brain and Cognitive Sciences
Civil and Environmental Engineering
Mechanical Engineering
Naval Architecture Engineering
Energy Systems Engineering
Engineering Practice
Agricultural Biotechnology
Fashion and Textiles
Education
Liberal Studies
Public Health
Dentistry
Medicine
Philosophy
Western History
Communications
Psychology
Physics and Astronomy
Chemistry
Business Administration
Nursing
Aerospace Engineering
Industrial Engineering
Computer Science Engineering
Electrical and Computer Engineering
Consumer Studies
Food and Nutrition
Physics Education
Physical Education
Public Administration
Graduate School of Law
Environment Planning
Intelligent System Convergence
Advanced Convergence

Join AIIS

AIIS pursues interdisciplinary research and is open to research in all fields. In addition to AI source technology researchers, we welcome applications from researchers in any field who wish to expand their research scope by utilizing AI.

Collaborate with AIIS

AI-driven innovation is transforming all academic disciplines. AIIS serves as a bridge, facilitating groundbreaking research that integrates AI across various fields.

Partner with AIIS

AIIS collaborates with leading domestic and international companies to conduct joint research and projects. We welcome partnerships with organizations seeking to engage with Korea's premier AI research institute.

Give to AIIS

AIIS highly values donors who hope to build the future of the nation through cutting-edge AI research. We look forward to your meaningful contributions.