



Osaka Metropolitan University
Graduate School of Informatics

FACULTY MEMBERS



Osaka
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University

Graduate School of Informatics
Osaka Metropolitan University

Sugimoto Campus 3-3-138 Sugimoto, Sumiyoshi-ku, Osaka-shi, 558-8585, Japan
Nakamozu Campus 1-1 Gakuen-cho, Nakaku, Sakai, Osaka 599-8531, Japan
<https://www.omu.ac.jp/i/en/>



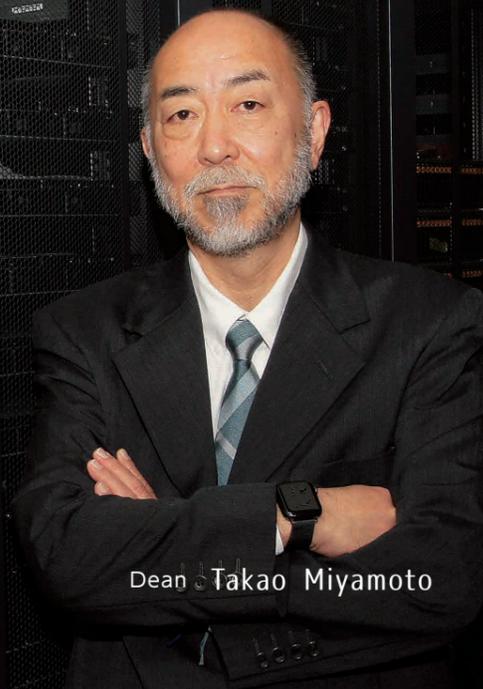
 Osaka Metropolitan University

Using Knowledge in Informatics to Create a Sustainable Society

In order to create a society (sustainable society) in which the global environment and natural environment are properly preserved, and development is being carried out to meet the needs of the current generation without compromising the needs of future generations, what is necessary is the further advancement of elemental technologies for information and communication, as proposed in Society 5.0, as well as "systematization capability" to combine elemental technologies for the solution of problems as a whole in an optimal way. Moreover, it is also necessary to understand social issues that are newly created through problem solving. Accordingly, it is essential to possess the ability to think systematically in order to understand the interactions between elemental technologies, while analyzing the psychological state of humans who respond to the development and innovation of information and communication technology as well as advanced human computer interface technology, predict changes in society as a whole, and gain new insights that go beyond mere technology and knowledge.

Informatics is a field of study that systematizes information as an academic discipline, independently interpreting information created from all disciplines, to create a new interdisciplinary field of research through not only the development of informatics itself but also the fusion of all disciplines with information as the core.

The Graduate School of Informatics consists of the Department of Core Informatics centered on information science, which pursues truth and principles related to information, and information engineering, which aims to establish technology that handles information; and the Department of Interdisciplinary Informatics centered on the application and development of information in the natural sciences as well as in the humanities and social sciences. With informatics consisting of core informatics and interdisciplinary informatics as the basis for the creation of new knowledge in a wide range of research areas related to information, we will train outstanding knowledge professionals. Specifically, we will develop human resources who have the ability to generate, collect, transmit, and store information sufficient to understand the roots of unknown challenges, the ability to acquire new knowledge through the multifaceted analysis of such information, and the ability to think systematically to formulate mechanisms and methods to encourage society to implement the wills and actions determined based on the acquired knowledge, and who can promote interdisciplinary and cross-sectoral education, research, and development in a wide range of natural sciences, humanities, and social sciences.



Dean Takao Miyamoto

Department of Core Informatics Faculty members



Intelligent Informatics



HONDA Katsuhiro Professor

Research theme

Soft interface between human and information

Research keywords

Soft computing
Data mining
Fuzzy theory

While technologies for collecting and accumulating a wide variety of data have been built, the development of technologies for analyzing those data and utilizing them for decision-making is insufficient. Data Mining is a technique for finding useful knowledge from data. We aim to create a human-friendly information society through research and development of systems that support user decision-making by making full use of multivariate data analysis and soft computing technology, including recommendation systems based on historical data on the Internet.



KISE Koichi Professor

Research theme

Intelligence augmentation through intelligent media processing

Research keywords

Intelligence augmentation
Artificial intelligence
Media processing
Human sensing

While the goal of Artificial Intelligence (AI) is to create machines that can replace humans, the goal of Intelligence Augmentation (IA) is to amplify human capabilities with the help of machines. I am challenging to realize intelligence augmentation through sensing human behavior and generating dynamic and intelligent media based on the results of sensing. In particular, I have recently been working on the analysis of human learning and the transfer of human experience.



MORI Naoki Professor

Research theme

Artificial intelligence for understanding human creation

Research keywords

Evolutionary algorithm
Machine learning
Artificial intelligence
Creation

After a long evolution, humans got intelligence and created lots of things. We try to make a computer system that understands and generates such people's creations! We use the latest technologies in image recognition and natural language processing based on artificial intelligence, machine learning, and evolutionary calculation. Our research topics are all exciting: manga, novels, picture books, photographs, starry sky, music, mahjong, and games!



NOJIMA Yusuke Professor

Research theme

Development of evolutionary multiobjective optimization methods and application to data mining

Research keywords

Computational intelligence
Evolutionary computation
Fuzzy systems
Data mining

Real-world optimization problems often have multiple objectives to be optimized simultaneously. There are trade-offs between the objectives, and there is no single optimal solution. For such problems, we are developing evolutionary multiobjective optimization methods that can efficiently search for multiple Pareto optimal solutions and provide them to users. We apply the methods to knowledge acquisition by considering the trade-off between accuracy and explainability.



UNO Yushi Professor

Research theme

Discrete Structures and Algorithms

Research keywords

Design and analysis of algorithms
Discrete structures
Network analysis
Computational complexity

The center of the recent ICT, such as search engines, block-chain, and so on, that supports infra-structures of recent society, consists of computer programs, and "algorithms" are principles how they works. Theory of algorithms is a new kind of mathematics that is required in computer science, and we study those theories for designing and analyzing correct and efficient algorithms and discrete structures for which such algorithms work.

We also model practical problems that have discrete structures, and implement computer programs based on algorithms that we develop to solve such problems.



YOSHIOKA Michifumi Professor

Research theme

Intelligent signal processing

Research keywords

Signal processing
Deep learning
3D data acquisition

Research topics are analysis of still images, self-position estimation and acquisition of environmental information from movies based on intelligent signal processing methods such as deep learning. Efficient model design that reduces calculation costs while maintaining accuracy are also interested.



HAYASHI Toshiharu Associate Professor

Research theme

Data assimilation, statistical learning

Research keywords
Data analysis
Mathematical finance
Statistical inference
in stochastic processes

Simulations are based on pseudo-models and often do not accurately reflect the real world. In inference based on data, it is possible to estimate only a few parameters. Applying data assimilation, the accuracy of the simulation can be improved, and it is possible to make higher-dimensional inferences. In addition to data assimilation, we are exploring the statistical aspects of machine learning methods.



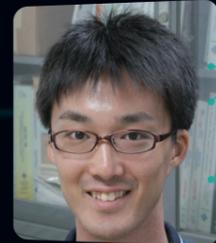
HOHJO Hitoshi Associate Professor

Research theme

Research on the value of information in social systems

Research keywords
Game theory
Social behavior
Information propagation
Decision-making support

We analyze various social problems and phenomena using game theory, stochastic models and simulations. Our research explores the value of information and its consequent impact on behavioral strategies. We are working on research with the aim of making support for deriving the best decisions among multi-agents in social systems and offer of mechanisms to improve social efficiency.



INOUE Katsufumi Associate Professor

Research theme

Image sensing

Research keywords
Pattern recognition
Computer vision
Signal processing
Multimodal analysis

Image sensing techniques have been focused on in various fields such as automatic driving and surveillance systems, game, etc. The advancement of these techniques has contributed greatly to the construction of a safe and secure society. To realize such society, in our laboratory, we research to analyze images and videos obtained from cameras as well as information obtained from various sensors by using signal processing and deep learning technologies.



IWAMURA Masakazu Associate Professor

Research theme

Pattern recognition technology and its application to support for the visually impaired

Research keywords
Character recognition
Object recognition
Deep learning
Visually impaired assistance

Suppose you are asked, "What's in this picture?" It may be easy for you, a human, to answer, but difficult for a computer. We research so that computers can do what humans can do, focusing on image-related topics. As a way to use computers that have become smarter, we focus on assisting the visually impaired. By making the "eyes" of computers the "eyes" of the visually impaired, we aim to realize a world in which the visually impaired can "see" their surroundings.



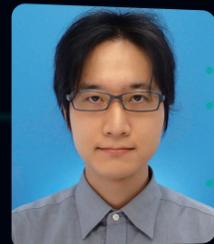
IWATA Motoi Associate Professor

Research theme

Learning support based on each learner's ability and preference

Research keywords
Intelligent media processing
Learning support
Comic computing
Data hiding

There are many ways to study, but finding the right one for you is not always easy. We are developing methods to achieve effective learning by customizing texts, videos, music, etc. for study based on the learner's vocabulary and preferences. I am also working on a data hiding method that can handle video images like QR codes, and image processing and image generation for cartoon images.



UBUKATA Seiki Associate Professor

Research theme

Flexible data analysis considering ambiguity and uncertainty

Research keywords
Soft computing
Data mining
Rough set theory

In the advanced information society, it is necessary to create value through analyses of big data, and it is essential to classify and summarize data automatically. The ambiguity and uncertainty, such that objects cannot be clearly classified by 0 or 1, are inherent in data. By utilizing soft computing techniques, which aim at realization of flexible information processing ability of human, we propose new analytical methods that can deal with the ambiguity and uncertainty inherent in data and aim at contributing to the society.



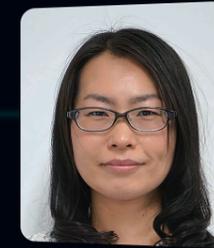
MASUYAMA Naoki Associate Professor

Research theme

Clustering algorithms capable of continual learning

Research keywords
Continual learning
Clustering
Knowledge extraction
Unsupervised learning

With the growth of IoT technology, it has become easy and continually to obtain a wide variety of data from numerous devices. In this laboratory, we are mainly engaged in theoretical research on clustering algorithms that can continually and adaptively extract useful information and its relationships. In addition, we are also working on real-world applications by applying clustering algorithms.



UTSUMI Yuzuko Lecturer

Research theme

Plant image processing

Research keywords
Computer vision
Pattern recognition
Image processing
Plant phenotyping

Yuzuko has an interest in image-based plant phenotyping. She is working on measuring plant traits using computer vision and pattern recognition techniques to clarify the correspondence between gene information and plant traits. She is also developing agricultural work support system by applying plant measuring.



OKADA Makoto Assistant Professor

Research theme

Natural language processing and knowledge processing and their applications

Research keywords
Natural language processing
Natural language understanding
Knowledge processing
Artificial intelligence

My research focuses on natural language processing, knowledge information processing using natural language processing, and their applications in combination with machine learning and artificial intelligence. With the advancement of computers, we are now able to communicate and work with languages. My goal is to enable computers to understand the meaning of language more deeply than ever before, to construct knowledge from linguistic information, and to use this knowledge to perform creative tasks and processing like humans.



KIYA Hironori Assistant Professor

Research theme

Games and computation

Research keywords
Combinatorial game theory
Algorithmic engineering
Imperfect information game
Algorithmic game theory

In combinatorial games such as Chess and Go, it is known that either the first or the second player can always win, but a game's "winner" itself is generally unknown. Thus, a natural interest in a combinatorial game is to decide which is the "winner" in a position. The "winner" of a game is sometimes efficiently computable, which is quite rare. For example, in Go and Chess, the computation of the winner belongs to a computational class EXPTIME-complete, in which efficient computation is believed not to exist. We are interested in which is the "winner" of a game and whether the "winner" of a game is efficiently computable.

System Informatics



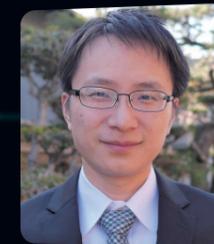
ATA Shingo Professor

Research theme

Creation of valuable services and applications over programmable platforms

Research keywords
Service platform
Programmability
Network infrastructure
Network operations and management

Our laboratory focuses on a creation of various services over programmable platforms and R&D on its underlying technologies. Toward smart society through ICT, it is important to develop an information platform which is capable to compose various functions freely and dynamically. We design a new platform which can control, deploy, and cooperate of computing resources, networking, and variety of data exchanged. Our aim is also its application to create practical services in the university.



CAI Kai Professor

Research theme

Cyber-physical control of multi-agent systems, with applications in robotic networks

Research keywords
Control theory
Cyber-physical systems
Multi-agent systems
Robotic networks

Our research focuses on mathematical modeling, control design, learning and optimization of large complex systems composed of interacting agents with discrete, continuous, or hybrid dynamics. Collaborating with world-leading universities and scientists, our work is being widely applied in autonomous robots, self-driving vehicles, mobility networks, logistic automation, and smart cities.



FUJIMOTO Noriyuki Professor

Research theme

High performance computing

Research keywords
Parallel programming
Accelerator
GPU computing
Discrete optimization

We are studying parallel programming for parallel computers that can perform multiple operations simultaneously. Most computers today, from smartphones to supercomputers, as well as PCs, are parallel computers. The number of operations that can be executed simultaneously tends to increase rapidly. In order to get higher performance out of them, parallel programming that explicitly specifies the simultaneous execution of multiple operations is necessary, rather than sequential programming that only specifies one operation at a time.



NAKANO Tadashi Professor

[Research theme](#)

Molecular communication: a new information and communication technology paradigm

Research keywords
 Information network
 Molecular communication
 Bio-inspired network
 Life science

We are interested in molecular communication – a new information and communication technology paradigm. Unlike current electromagnetism-based communication, molecular communication uses chemical signals or molecules as the carrier of information. Molecular communication allows a group of bio-nanomachines to communicate and cooperate. Potential applications of molecular communication include creating an artificial information network inside our body.



OHNO Shuichi Professor

[Research theme](#)

Analysis and applications of data indexed in time order

Research keywords
 Time series
 Signal processing
 Machine learning
 Communication

A time series is a series of data points indexed in time order. Time series arises not only in informatics and engineering but also in various fields. For example, a series of economic data like foreign exchange fluctuations is a time series. We are making researches on time series to extract important information and to predict future values of some phenomena. We are constructing models from time series, using machine learning. We are also developing signal processing technologies for future advanced information communications.



TODE Hideki Professor

[Research theme](#)

Enabling smart, fast, massive, and secure networking

Research keywords
 Intelligent networking
 Network quality control
 Content delivery system
 Broadband networking
 Secure networking

We are working on the realization of network mechanisms and controls that can provide ultra-high-speed, high-capacity, and low-latency information communication as well as smart and secure services as future networks. Our research is directly related to optical networks, wireless networks, network security, IoT and sensor networks, and edge computing, etc.



FUJIMOTO Manato Associate Professor

[Research theme](#)

Ubiquitous systems based on network and IoT technologies

Research keywords
 Ubiquitous
 IoT (Internet of Things)
 Wireless communication
 Sensing

Our laboratory is carrying out the researches on ubiquitous systems based on network and IoT technologies. Especially, we are targeting various fields toward making the our world "Hyper(or super)-Smart" by a cyber-physical system (CPS) that highly links the real world and cyberspace. In our laboratory, you will go through a parallel research experience across multiple technical areas in information engineering, from hardware to software, from communication networks to machine learning.



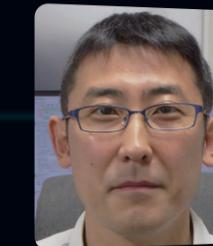
NAKAJIMA Shigeyoshi Associate Professor

[Research theme](#)

Moving image, static image, signal, medical data, artificial intelligence, artificial life

Research keywords
 Image
 Medical data
 AI
 AL

I process moving images, images, and signals of medical data as well as normal subject data. As an example, I analyze the signal data of an accelerometer attached to the body to objectively measure gait ability by machine. Another example is gait authentication of persons with moving images. I employ artificial intelligence and artificial life as analysis methods.



TANIGAWA Yosuke Associate Professor

[Research theme](#)

Creation of new capabilities and value of wireless networks

Research keywords
 Intelligent networking
 Network control
 IoT (Internet of Things)
 Wireless networks

Not only short-distance, high-speed wireless networks such as Wi-Fi but also medium-low speed, long-distance ones like TVWS-WLAN, Wi-Fi HaLow, and LPWA are developed. On the other hand, wireless networks are expected to be leveraged in new fields such as medical, manufacturing, and agriculture. In order to achieve performances required in each field, we aim to realize a wireless network that creates new capabilities and value through adaptive cooperation among different types of wireless networks as well as refinement of each elemental technology and network.



KATSUMA Ryo Lecturer

[Research theme](#)

Research on advanced services using mobile devices

Research keywords
 Mobile computing
 Sensing
 Advanced services
 Ad-hoc networks

In recent years, mobile devices such as smartphones, smart watches, and wearable computers have become widespread. Many of them are designed to be able to sense a variety of environmental information such as images, sounds, and accelerations, as well as to enable wireless communication. I am researching advanced services by using these sensing and communication functions. In detail, it covers several issues such as power saving, sports support, traffic safety, and brand-new entertainment suggestions.



TRAN Thi Hong Lecturer

[Research theme](#)

A research on software and hardware platform for decentralized blockchain system

Research keywords
 Blockchain
 Decentralized application
 Encryption
 Super smart society

This study focuses on two main research themes. The first is the development of decentralized blockchain applications for Society 5.0. For example, development of smart healthcare systems, industrial blockchain ecosystems for self-driving cars, anti-counterfeit drug management systems, etc. The second is the design of ultra-low power high processing rate hardware architectures for securing Blockchain networks.



UENO Atsushi Lecturer

[Research theme](#)

Development of systems and methods to realize human intellectual functions

Research keywords
 State representation
 Reinforcement learning
 Natural language processing
 Deep learning

We are studying simultaneous learning of state representation and behavior that imitates human behavior learning. In addition, as natural language processing of "miscellaneous sentences", we are studying information extraction from SNS or product reviews, and artificial intelligence for the "Werewolf game".



KONDO Daishi Assistant Professor

[Research theme](#)

Designing and implementing highly secure network architecture

Research keywords
 Network security
 Network and service management
 Future network

Nowadays, many companies are subject to cyber attacks such as targeted attacks and distributed denial of service attacks, which affect users of their services. We are conducting research to solve these social issues of network security. We are also working on securing future network architecture.

Department of Interdisciplinary Informatics Faculty members



ABE Kota

Professor

Research theme

Distributed algorithms, distributed data structures, and infrastructure software for distributed systems

Research keywords

Distributed systems
Distributed algorithms
Distributed data structures
Infrastructure software

A distributed system is a system in which multiple computers connected by a network provide some kind of service. Distributed systems use distributed algorithms, which are algorithms that simultaneously run on multiple computers while communicating with each other. In our laboratory, we are studying distributed algorithms and infrastructure software for distributed systems.



ISHIBASHI Hayato

Professor

Research theme

Research on secure and user-friendly information infrastructures

Research keywords

Network architecture
Network management
Network security

Information infrastructures, that is, information networks such as the Internet and various services provided on them, are essential for our daily lives and have become indispensable to our society. However, it is not easy to ensure the secure and reliable operations of increasingly enormous and complex information infrastructures. Therefore, we focus on the architectures, operations, and management of information infrastructures, aiming to develop their security and robustness along with user-friendliness.



IZUMI Masao

Professor

Research theme

Recognition and identification of human action and environment from video images

Research keywords

Pattern recognition
Machine learning
VR / AR

We are conducting research to systematize various applications by combining image/video processing and 3D information reconstruction. And trying to widen ranges of applications by recognizing human action, understanding the environment, and systematizing it in combination with VR and AR.



IWAMURA Koji

Professor

Research theme

Optimization of production plan and forecast of order volume for production systems

Research keywords

Production systems
Production plan
Simulation
Optimization

Advanced production systems (factories) are necessary in order to manufacture products more cheaply, quickly, and with higher quality than other companies in the global competitive environment. My topics of research are methodologies for production plans to operate production systems efficiently by using mathematical optimization and simulation. I also research methodologies for forecasting the order volume of production systems by using time series models and artificial intelligence, based on POS data at retail stores.



OHTA Masaya

Professor

Research theme

Development of software and hardware for information and communication systems

Research keywords

Information and communication
6G&IoT
Artificial intelligence (AI)
Augmented reality (AR)

The first is research on the next generation communication systems 6G and IoT, where we are studying modulation and demodulation algorithms and circuit implementation techniques for transmitting large amounts of data at higher speeds. The second is research on image recognition, where we are developing a high-performance picking system for logistics using artificial intelligence, and the third is research on educational systems using augmented reality, where we are developing an AR tool that allows anyone to easily conduct experiments on electricity and information.



SUGANO Masashi

Professor

Research theme

Propose methods and applications to build an intelligent environment by utilizing data collected through sensing.

Research keywords

Sensor networks
IoT (Internet of Things)
Virtual reality
Smart cities

I am researching methods for realizing the Internet of Things (IoT), which uses sensor networks to connect all kinds of things to a network and utilize the sensed data, and applications for utilizing the collected data in fields such as medicine and education. In particular, I am interested in rehabilitation that combines VR (Virtual Reality) and sensors, and the use of data to realize smart cities.

Department of Interdisciplinary Informatics Faculty members



SETA Kazuhisa

Professor

Research theme

Developing "intelligent systems" to amplify "human intelligence"

Research keywords

Learning support for thinking skills
Metacognition
Intelligent learning support systems
Human-computer interaction

I am researching technologies that aim to support learning of higher-order thinking skills. I am interested in those areas where the subject matter is not clearly defined, such as in math or science, but is vague and latent. I believe that it is important for both humans and computers to look at what we are processing from a higher level viewpoints and understand why it is working the way it is, so from this perspective I am trying to develop Intelligent Systems to amplify Human Intelligence.



NAKASHIMA Tomoharu

Professor

Research theme

Development and application of intelligent systems

Research keywords

Machine learning
Soft computing
Robocup

My research interests center around the development and application of intelligent systems such as machine learning and soft computing. I am also interested in the application of the intelligent systems to real-world problems such as health care, social welfare, and industry.



MAJIMA Yukie

Professor

Research theme

Making tacit knowledge explicit of nursing skills and development of a learning support system for training nursing art skills

Research keywords

Nursing system engineering
Healthcare system
Educational information system
Educational engineering

We are working on the development of a learning support system that visualizes and formalizes the "prowess" of skilled nurses in nursing techniques so that anyone can acquire skilled techniques. For visualization, we use sensors and devices for measurement and analysis. The analyzed data is processed into formal knowledge that can be easily understood by learners. Our goal is to create a learning support system that will motivate students to learn, increase their learning efficiency in a fun way, and nourish their humanity.



MIYAMOTO Takao

Professor

Research theme

Information security, information systems engineering, information networks

Research keywords

Information security
Information systems engineering
Information networks

We are researching on information security, including the development of operation management systems to efficiently monitor multiple network devices and numerous information systems, and also the unauthorized intrusions detection into information systems.



MURAKAMI Harumi

Professor

Research theme

(1) Records of personal lives, (2) Information retrieval in libraries

Research keywords

Information retrieval
Artificial intelligence
User interface

By recording personal lives (accumulating information related to people), I am conducting research to support "understanding people (self and others)" and "life (living well)" from the perspective of informatics. My research focuses on extraction and organization of information (text) as well as web intelligence and lifelogs. My academic fields span computer science, library and information science, and cognitive science/psychology.



MORITA Hiroyuki

Professor

Research theme

Applied research on data science

Research keywords

Data science
Simulation
Social science

My research interests focus on social data science. The field includes various data such as POS data collected at retail stores and person trip data. Therefore, it is necessary to utilize better methods depending on the type and characteristics of the data and the purpose required. I have been engaging in effective research in society by developing optimal methods while focusing on practicality.



WATANABE Shinji

Professor

Research theme

Evaluation of information technology and its application to economics and business

Research keywords

Information systems evaluation
Technology management
Information economy

We are researching the application of information technology to economics and business. We use data science methods to analyze the success factors of DX (Digital Transformation) using blockchain technology and AI, patents, information system evaluation, and business models. We are also analyzing the application of information technology to entertainment and sports.

Department of Interdisciplinary Informatics Faculty members



AOKI Shigeki

Associate Professor

Research theme

Research on the development and operation of information systems and information security

Research keywords
Information systems engineering
Information security
Pattern recognition

We develop various information systems used by students and faculty members on campus. We research methods for planning, constructing and operating safe and secure information systems. In addition, we research methods for analyzing information stored in the information systems by applying pattern recognition technology.



UESUGI Tokuteru

Associate Professor

Research theme

Design of new materials, optimization of processes, and automation of measurements using materials informatics

Research keywords
Data science
Materials engineering
Machine learning
First-principles calculations

Efforts to utilize large amounts of data related to materials engineering are called materials informatics. Our research focuses on designing new materials, optimizing material manufacturing processes, and automating material measurements. We are developing methods to reduce the cost of materials development by using first-principles data and machine learning, systems to optimize factors in the manufacturing process that affect material properties, and artificial intelligence to automatically analyze metallographic images.



ONISHI Katsumi

Associate Professor

Research theme

Research on the efficient use of computers in a network environment

Research keywords
Research on the efficient use of computers in a network environment
Distributed processing
Mathematical optimization
Computational resource management and operation

Our research focuses on combinatorial optimization problems, such as the problem of finding an efficient route for a salesperson to visit a destination, and on finding an appropriate solution more quickly by efficiently using multiple computers. Our goal is to make it easy for those who need to handle optimization problems by using an environment that is widely available and easy to obtain, rather than a dedicated environment that is expensive and requires special skills for use.



KOJIMA Atsuhiko

Associate Professor

Research theme

Development of educational information systems and databases for digital humanities

Research keywords
Educational information systems
Programming education
Databases for digital humanities

We are developing systems for creating effective video teaching materials with teacher avatars using 3DCG and VR, and a system for conducting psychological experiments which enables many subjects use simultaneously by server-based tablet applications. In addition, we have developed "Nakao Sasuke Slide Database", a database on digital humanities field which makes it possible to search academic photographic images from a map.



SAGA Ryosuke

Associate Professor

Research theme

Development of technologies for data utilization and social implementation

Research keywords
Data engineering
Management information systems
Information visualization
Service science

We are researching methods for data utilization and methods for deploying them as systems. Depending on the environment, we select technologies using the latest artificial intelligence as well as classical methods, and create a total design that takes into account the final social implementation. For example, we are developing a recommender system for online shopping, extracting cause-and-effect relationships and reasoning from text to evaluate services, and visualizing information to help understand large-scale data.



NAGATA Yoshikatsu

Associate Professor

Research theme

Integration of historical information on a spatial information system and analysis of regional diversity

Research keywords
Digital humanities
Regional information
Spatial information system

Modern life is present on the historical background of local communities. Spatial information on past events, place names that reflect the original natural and social environment, and the history of communities including the migration of residents compose important units for an integrated spatio-temporal information system to contribute to understanding and respect to regional diversity. This research aims to build a spatial information infrastructure to be passed on to the next generation.



HAYASHI Yuki

Associate Professor

Research theme

Intelligent interaction support for advanced intellectual activities

Research keywords
Intelligent learning support system
Multiparty multimodal interaction
Metacognitive learning support
Creative activity support

Our modern society is filled with complex issues that cannot be solved by one person. The focus of my research is to propose learning support systems that foster learners' advanced skills to face out the complex issues. For example, we are analyzing and modeling learning activities such as critical thinking, collaborative problem solving and metacognition, and developing intelligent learning support systems as "training wheels" to enhance the target skills.

Department of Interdisciplinary Informatics Faculty members



HIRABAYASHI Naoki

Associate Professor

Research theme

Development of efficient and flexible design and operation methods for production systems

Research keywords
Real-time production scheduling
Facility layout
Optimization methods
Meta-strategies

We are working on the development of various production management methods. In particular, we are studying real-time production scheduling methods for efficient and flexible production in uncertain environments, and facility layout methods to decrease material handling costs dynamically.



MASUDA Seiko

Associate Professor

Research theme

Creating livable communities for all people through the use of information and communication technologies

Research keywords
Community assessment
Research on dementia education
Information education for health and welfare professionals

Together with health and welfare professionals, we are conducting research on the practical application of local information. We are also engaged in research on dementia education using robots and other means, with the aim of creating communities where people can continue to live even if they suffer from dementia.



MORINAGA Eiji

Associate Professor

Research theme

Development of an integrated optimization methodology for production systems in a broad sense

Research keywords
Computer-aided conceptual design
Integrated design of production systems
Autonomous and distributed production management

In the future, it will be even more important to view everything as a "system" and pursue the integrated optimization of the entire system, rather than the individual optimization of its components. From this point of view, I am working on the construction of methodologies for the design, analysis, control, operation, and management of systems from the perspective of design and production in the broad sense.



YANAGIMOTO Hidekazu

Associate Professor

Research theme

Research and development of knowledge processing systems

Research keywords
Machine Learning
Natural Language Processing
Artificial Intelligence

As the Internet becomes more and more common, a wide variety of contents such as linguistic data, images, videos, and numerical data are being distributed. There is an increasing need to smoothly process the knowledge required by users from such diverse large-scale data. In our laboratory, we use the latest technologies such as natural language processing and machine learning to realize data analysis based on the structure behind the data through intelligent information processing, and to apply these technologies to a wide range of real-world applications.



YOSHIDA Daisuke

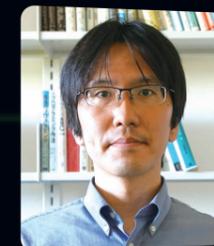
Associate Professor

Research theme

Application of geospatial information to disaster prevention and mitigation, infrastructure maintenance and management, etc.

Research keywords
Geographic information system (GIS)
Global navigation satellite system (gnss)
Disaster prevention and mitigation
Drones

In cooperation with local governments (especially Osaka Prefecture and Osaka City) and private companies, we are researching methods to efficiently and safely maintain and manage various urban infrastructures, such as bridges and seawalls, by using ICT such as drones and geographic information systems (GIS).



KUSUNOKI Yoshifumi

Lecturer

Research theme

Development of data analysis methods based on mathematical modeling techniques

Research keywords
Data analysis
Mathematical optimization
Machine learning
Decision aiding

Data analysis techniques, which are used in a wide variety of fields and organizations, are required to be diversified and sophisticated. On the other hand, modeling techniques and algorithms based on mathematical optimization have been studied to solve various problems in society. These techniques are also effective in developing advanced data analysis methods. The goal of this project is to propose new approaches to data analysis, artificial intelligence, and decision aiding using the techniques of mathematical optimization.