Data-driven AI illuminates the future

Supported by the positive spiral of research and development at Hitachi's Lumada Data Science Lab, top data scientists are developing **ARTIFICIAL INTELLIGENCE SOLUTIONS TO HELP SOLVE SOCIETY'S CHALLENGES**

Hitachi has developed word-extraction AI that will accelerate material development.

Lumada Data Science Lab (LDSL) is a new global AI hub with a vision to develop cutting-edge technologies that help to solve societal problems.

Lumada brings together people with expertise in various areas to develop AI applications that will benefit society.

© Laurence Dutton/iStock/Getty Images Plus

Our dependence on digital technology increased markedly in 2020 when the COVID-19 pandemic forced millions to work from home and avoid physical contact. Governments and businesses had to rapidly adapt how they operate, and many began looking into how artificial intelligence (AI) can improve public safety, work efficiency and sustainability. But to many, the world of AI remains mysterious and complex.

SHINING A LIGHT ON DATA
In April 2020, Hitachi launched Lumada Data Science Lab (LDSL) as a global hub for data scientists, AI researchers and engineers to share their expertise to design, build and commercialize cutting-edge technologies that solve societal problems and improve quality of life. Lumada's vision is based on growing the capabilities of AI, sharing knowledge and datasets, and increasing trust in AI.

The name Lumada comes from the words "illuminate" and "data". As the amount of data being generated by the evolving Internet of Things increases, so too do the opportunities to turn this data into technologies that enhance our daily life and help businesses

improve. Through LDSL, Hitachi promotes AI knowledge and utilization to help organizations identify their needs and find innovative solutions.

There is an increasing demand for faster, better, stronger, safer and more sustainable products and production processes. AI technology can provide safer and speedier alternatives to humans, for example by operating overhead cranes more steadily. It can also improve working conditions by monitoring health and safety, such as checking whether an employee's posture is correct.

THIS WILL REDUCE THE TIME AND RISKS INVOLVED IN CREATING NEW MATERIALS

Surveillance cameras are ubiquitous, but it is impossible for security personnel to monitor every screen or watch hundreds of hours of video footage in sufficient detail to spot suspicious people or objects. Hitachi has developed an AI technology that can track people in real time on video surveillance
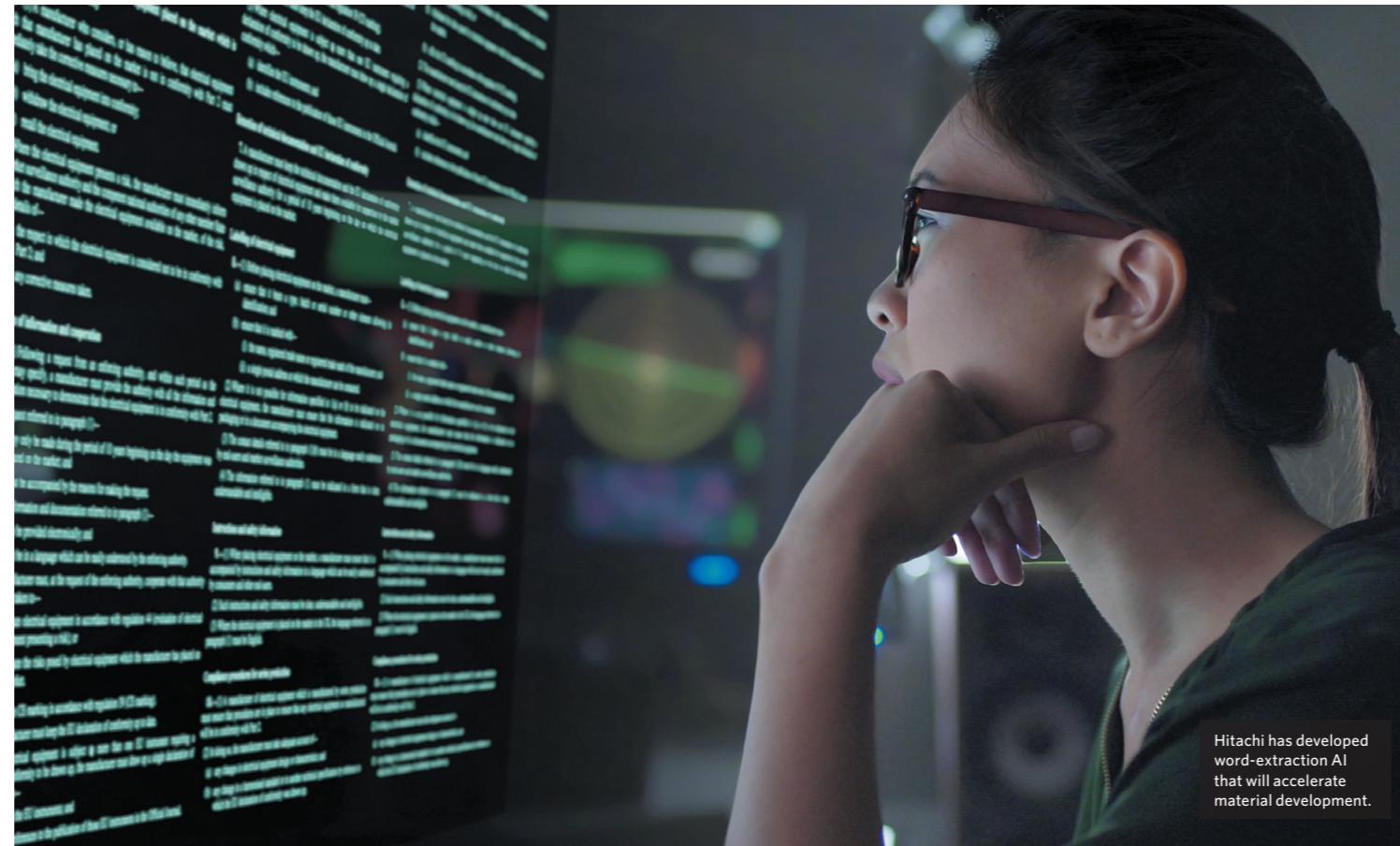
systems in busy public spaces, using video analytics to identify and assess risks. It can detect more than 100 attributes of a person, including age, clothing and actions. Using a witness description of clothes, belongings and body features, the AI can pick out an individual from hundreds of surveillance cameras, even when their face isn't visible.

Although the ethics of the use of such technology is still subject to much debate, the technical challenge is considerable and many teams around the world are developing the technology. Hitachi researchers tested their technology at Vienna International Airport. "Using real-time person tracking, the video analytic software could detect a target person

within seconds," says Tomoaki Yoshinaga, a senior researcher at LDSL. "It could then track them in real time on surveillance cameras as they moved through the airport."

Hitachi has also developed an action-detection AI that can autonomously identify suspicious behaviour or left baggage and alert security.

WORLDWIDE WORD SEARCH
Advanced materials is another area in which Hitachi's AI is improving accuracy and reducing costs. Making a material with the perfect properties requires much research, testing and tweaking. "Data collection involves a lot of time, money and resources," explains Tadashi Takeuchi, a senior researcher at LDSL,

"which is often wasted due to the trial-and-error nature of material development."

To resolve this, Hitachi has developed a word-extraction AI that scans vast reams of text from previous experiments, patents, reports and open-access data and picks out keywords and relations, such as a material with a specific value of a desired property. Using a 'weakly supervised' machine learning model, the AI can be trained using keywords and relations extracted manually from just 100 documents before applying an algorithm to millions of documents.

Hitachi is working on word-extraction technology with Teijin, a leading global company in the fields of materials and healthcare. Teijin has much

experience in developing high-performance materials, pharmaceutical products and home medical-care solutions, and is now exploring contributions to future society by providing new innovative solutions by integrating their skills and IT technologies. Together, Hitachi and Teijin are planning to build a cyber-physical system, which will gather data from all previous experiments at Teijin and in the wider world, analyse it and then transform the findings into valuable information, such as predicting material properties or suggesting proper experiment conditions. This will reduce the time and risks involved in creating new materials.

Word-extraction AI can
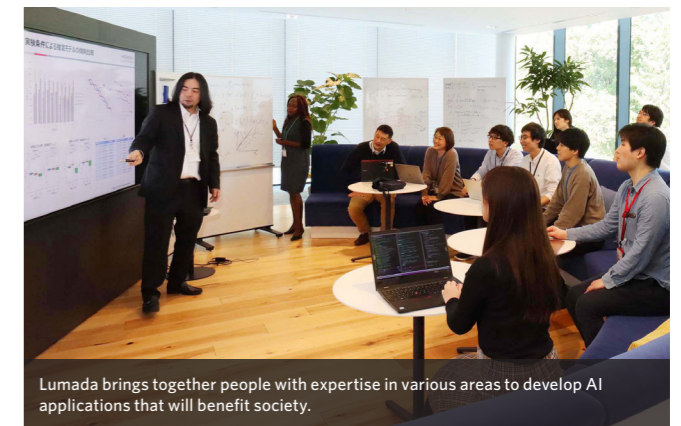
benefit companies in other fields. Voice-recognition technology can now be applied to audio-visual data, video conferences and phone calls. This could help staff at call centres to find answers to questions as they come in over the phone, thereby reducing customer waiting time.

A BRIGHT FUTURE FOR LUMADA
The collaborative, open approach to research and development at Lumada has many other impacts. Its data-driven AI technology is helping to improve food safety, prevent mechanical failures, reduce energy consumption and resolve social issues such as childcare provision. "There's increasing interest in the ethics of AI," adds

Tatsuhiko Kagehiro, director of LDSL, "which is why we're developing our technology with an emphasis on growth, sharing and trust, so we can continue to turn data into insights that drive digital innovation."

The facility opened at Hitachi's Central Research Laboratory in western Tokyo with around 100 world-class data scientists and there are plans to double this number by April 2021. ∎

HITACHI
Inspire the Next

◌ LUMADA

www.hitachi.com