

Democratizing data science in Japan

The Center for Innovative Research and Education in Data Science, Kyoto University

Home to more than 2,000 shrines and temples, Kyoto, Japan, conjures up the ancient past like few other places in the world. Yet juxtaposed with this history is a city at the forefront of education and innovation. Some of Japan's most famous technology companies are based in Kyoto. So too are some of its leading universities, beginning with Kyoto University, the second-oldest national university in Japan.

Kyoto University is home to over 20,000 students—with about 10% coming from overseas—and to some of the country's top researchers, including Tasuku Honjo, who last year became the sixth Kyoto University scientist to be awarded a Nobel Prize since 2000. Besides undertaking cutting-edge research, the university provides a world-class education. Anticipating that all its graduates will be exposed to data science in the workplace regardless of their field of study, one of its newest education efforts, the Center for Innovative Research and Education in Data Science—founded in 2017 within the Institute for Liberal Arts and Sciences—has designed a new curriculum that trains all students in the basics of data science, including artificial intelligence and big data, no matter their major.

Data science for all

Many of the memory-processor components in your smartphone were probably built in Japan. On the other hand, many of the applications on that phone probably were not. Japan is renowned for its high-tech manufacturing, but, as a government advisory council of industry and academic leaders concluded in May 2016, it is falling behind in data science. By December of the same year, Kyoto University was one of six universities selected by the Japanese government to change the way data science is taught in Japan.

Data science is becoming omnipresent. No matter the industry—economics, journalism, medicine—data scientists are in demand. Today, a university is failing its students if it does not educate them in this important field.

"Japan is very strong technologically, but not at the level of data management. Our society needs more people who have competence in data science," says Hiroshi Tamura, a professor at the center.

All students graduating from Japanese universities can expect their mastery of a subject to match that of students from any university around the world. However, compared with their peers overseas, Japanese students take considerably fewer courses outside of their specialty. So, while their proficiency in their chosen subject matches that of other students, they may lack a certain breadth in their overall knowledge.

Akihiro Yamamoto, director of the center, says, "The Center for Innovative Research and Education in Data Science is trying to change this by designing a wide range of courses that teach data science to all students, regardless of their major." The center has university-wide support, with each school being asked to nominate a data scientist to



Members of the Center for Innovative Research and Education in Data Science.

Clockwise from top right:

Hiroto Sekido, Hiroshi Tamura, Makoto P. Kato, Kenshiro Ichimura, Akihiro Yamamoto (Director), Naoto Nakano, Satoko S. Kimura, Masayuki Kimura (ds.k.kyoto-u.ac.jp/en/introduction/ member).

teach the classes. The subject also appeals to the students—about half of last year's first-year students enrolled in its classes.

Preparing students for the future

The Center for Innovative Research and Education in Data Science provides a new vision for data science education. At universities around the world, students are required to take courses in nonmajor subjects such as creative writing or computer programming, not because they will become professional writers or programmers, but because these skills are expected for many jobs. Kyoto University sees data science similarly, and is committed to providing a new model for Japanese education that will enable its graduates to continue the university's long history of producing leaders in their respective fields.

The unique learning environment offered by the university, together with its world-class researchers, state-of-the-art facilities, and historical legacy, offers a rare opportunity for students to walk in the footsteps of some of Japan's greatest philosophers, thinkers, and scientists. There they can join the next generation of Japan's brightest minds, changing the world through data science. You are invited to join them too.

For more information: ds.k.kyoto-u.ac.jp/en



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