川崎地質株式会社
Kawasaki Geological Engineering Co.,Ltd.

"Deployment of 'Zinrai Deep Learning' has made it possible to bring objectivity to the data. Allowing cavity responses to be detected with greater accuracy."

Mr. Shigeharu Yamada
General Manager, Maintenance
Kawasaki Geological Engineering Co., Ltd.

Deployment of AI in analysis of under roadway cavity survey data brings objectivity to analysis results and halves work time.

At a glance
Country: Japan
Industry: Engineering
Founded: 1943
Website: kge.co.jp

Challenge
■ Wanted to bring objectivity to data analysis where judgements are currently made using the human eye

■ Wanted to cut the huge amounts of time and cost involved in image analysis

Solution
Worked with Fujitsu to deploy Zinrai Deep Learning in less than one month

Benefit
■ Achieved analysis that is not variable using AI without overlooking abnormal responses

■ Deploying AI halved total image analysis time

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Customer

Established as a pioneer in geological surveying in 1943. A one-stop shop providing surveying, analysis, reports, and consulting based on its physical exploration technology and site measurement technology. Rapidly expanding its support area in response to the ever widening and increasing demands of the times, broadly responding to a wide variety of geotechnical issues on land and at sea.

Products and Services

■ Zinrai Deep Learning

How to improve accuracy and efficiency in analysis work where oversights are unacceptable

Detecting cavities within a huge volume of data requires experience. An inexperienced person can overlook a cavity which is not clearly identified as an abnormal response. Work is crossed checked by a veteran in order to prevent oversights. Overlooking cavities can impact on road safety, so analysis is the part that the company puts most effort into. The company currently has a number of veterans and so is able to perform the work without any issues in terms of manpower. However, as Mr. Sakagami says, "Even in terms of manpower, it will be difficult to keep doing things this way forever. That is why AI caught our attention. We chose it as one of our technical people had a knowledge of AI and said it was likely to be able to detect cavities. However, we didn't end up deploying it as there was no application commercially available on the market."

Deploying AI to detect abnormal responses maximized effectiveness of AI

Kawasaki Geological Engineering knew that deploying AI in a short period of time was beyond its capabilities alone, and was already working together with Fujitsu Traffic & Road Data Service Limited, and it was from them that the company learned about 'Zinrai Deep Learning'. In the course of discussions, the company found out that deployment was possible in less than a month. Speed was the deciding factor in the decision to deploy the system. Kawasaki Geological Engineering suggested to the Fujitsu side that the scope of use of AI be focused on the stage prior to a person making the final decision, namely that it be concentrated on extracting abnormal responses thought to be possible cavities. The company worked in close communication with Fujitsu and succeeded in efficiently accelerated the deep-learning process.

Mr. Sakagami continues, "We had been working with Fujitsu Traffic & Road Data Service Limited for some time and they knew our operations well. I think that the speedy AI deployment and ability to increase the amount of highly-accurate training data were due to the fact that they had a profound understanding of our operations. The technical communications were also performed very smoothly."

Time taken to extract abnormal responses cut to one-tenth, total analysis time by technicians also halved

The primary objective of the deployment was "To eliminate overlooking of abnormal responses. The main prerequisite was that all abnormal responses be captured." (Mr. Sakagami).

This was the condition on which the AI development was started. Apparently, a huge volume of quasi-training data was created and read into 'Zinrai Deep Learning' in one go and the system took shape in under a month. Then new training data was provided and tuning performed cutting primary identification time to one-tenth. Then abnormal responses were detected with almost 100% accuracy and the work time was halved including the time taken for another check to then be done by human eyes and the final decision made as to whether there was a cavity or not.

Mr. Shigeharu Yamada, the company's General Manager, Maintenance, says, "Frankly, our in house technical people were somewhat skeptical, but now they are very impressed and say 'We had no idea AI could do all this'." However, Mr. Sakagami says at the same time, "It does not mean we don't need people, we will still need expert technical people in future too. I think developing AI and technical staff are two sides of the same coin." What is important is how you make use of AI.

Mr. Yamada states, "Deployment of 'Zinrai Deep Learning' has made it possible to bring objectivity to the data. Allowing cavity responses to be detected with greater accuracy from detection of abnormal responses allows analysis time to also be cut to around one fifth." Of course efficiencies have also been achieved. The analysis work time has been cut to under half and costs reduced and Mr. Yamada states that "this has also produced the result of being able to win orders for a many more jobs."

Mr. Sakagami and Mr. Yamada are both in agreement that achieving such remarkable results is thanks to the support of Fujitsu. Mr. Yamada, comments, "They are on the same page when they talk to us. If the data provided is insufficient they ask us whether we have another specific type of data. It all went so smoothly because they understand our technology and make suggestions that are useful and well thought out."

The company is also working on the following concept. Currently, the company's dedicated vehicles go to the site and take measurements, however, if sensors are mounted on the patrol vehicles local governments use on a daily basis, analysis can be performed more easily. If checks are performed on an ongoing, daily basis, it will become possible to detect dangerous cavities more quickly.

Mr. Sakagami says, "As geological survey professionals, we don't just detect cavities, we also conduct in depth investigations of what caused the cavity. We pride ourselves on being able to prevent cavities occurring once we have determined the cause." We are sure the company will continue to use the technology it has developed together with 'Zinrai Deep Learning' to contribute to creating communities where people can live with peace of mind in future too.

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