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Hitachi Develops Technology for AI-Based Disaster Video Recognition

Achieves top level of accuracy in disaster video recognition task at international workshop TRECVID 2020

Tokyo, February 19, 2021 --- Hitachi, Ltd. (TSE: 6501, Hitachi) today announced that it has developed an AI technology that uses aerial footage taken by drones and helicopters to analyze disaster conditions with a top level of accuracy. In the event of a disaster, the technology enables precise recognition of the disaster site quickly, easily, and in much detail, even in places that cannot be immediately reached by people. In addition, the technology achieved top level of recognition accuracy in the disaster video recognition task DSDI (Disaster Scene Description and Indexing)(1) at TRECVID (TREC Video Retrieval Evaluation) 2020, a video recognition workshop hosted by the National Institute of Standards and Technology(2) in the United States. Going forward, Hitachi will promote social innovation supporting disaster responses using this technology and contribute to the realization of a resilient society as well as safety and security for people through collaborative creation with partners such as local governments, facilities maintenance and insurance companies.

In Japan and many other countries and territories, the growing damage to human lives and properties caused by natural disasters such as floods and landslides brought on by climate change has become a social issue. In the event of a disaster, there is a need for measures to mitigate damage, including rapid assessment of the situation and guidance along evacuation routes. To meet this global need, the introduction of unmanned aerial vehicles (UAVs) is being promoted to capture aerial footage, and AI-based automatic disaster video recognition is drawing attention. However, when analyzing disaster conditions from aerial footage, the amount of training data is limited depending on the disaster, which in turn impacts the recognition accuracy. In addition, objects that need to be identified can appear extremely small in footage of a wide area, or various objects and disaster conditions may appear simultaneously (for example, a single image includes a “flooded house,” a “collapsed bridge,” and a “landslide”). In such cases, precisely recognizing the situation on the ground has proved difficult.

In response to this, utilizing the expertise in video recognition technology that it has cultivated for crime prevention and manufacturing sites, Hitachi has developed a technology for AI-based disaster video recognition that can recognize natural disaster footage with high accuracy. Below are four strengths of the developed technology.

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1. The technology can simultaneously and accurately recognize multiple objects in a video.

2. The technology can identify small objects in footage of wide areas that humans would have difficulty finding.

3. The technology can accurately recognize disaster conditions, even when it is difficult for the AI to learn due to scarce training data samples.

4. The technology can reduce the risk of misrecognization or overlooking of disaster conditions that are difficult for even humans to judge by using an AI-learning method corresponding with training data samples that contain much erroneous information, including missed or misclassified information.

Through an industry-academia-government partnership with the National Institute of Informatics of the Inter-University Research Institute Corporation of Information and Systems and the National Institute of Information and Communications Technology, Hitachi jointly participated in DSDI at TRECVID 2020, an international video recognition workshop, and among all 17 teams, this technology achieved top level of recognition accuracy among the teams that did not use external data. In DSDI, participants rank and forecast the degree to which a large amount of test data applies to a given disaster condition or object, such as flooded houses, collapsed bridges, landslides, or piles of debris. The recognition accuracy of the AI is evaluated by comparing the forecast ranking with the actual ranking. The workshop has been held since 2001 with an aim to improve technologies for assessing and retrieving the meaning of footage. Even as various competitions related to AI technologies are conducted today, this workshop is one of the most prestigious and has a long history over which distinguished companies and universities from various countries around the world have participated.

(1) DSDI task: https://www-nlpir.nist.gov/projects/tv2020/dsdi.html

(2) National Institute of Standards and Technology (United States)

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, is focused on its Social Innovation Business that combines information technology (IT), operational technology (OT) and products. The company's consolidated revenues for fiscal year 2019 (ended March 31, 2020) totaled 8,767.2 billion yen ($80.4 billion), and it employed approximately 301,000 people worldwide. Hitachi drives digital innovation across five sectors – Mobility, Smart Life, Industry, Energy and IT – through Lumada, Hitachi's advanced digital solutions, services, and technologies for turning data into insights to drive digital innovation. Its purpose is to deliver solutions that increase social, environmental and economic value for its customers. For more information on Hitachi, please visit the company's website at https://www.hitachi.com.

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