

November 24, 2020
Japan Weather Association
Spectee, Inc.
Fukui prefecture

Demonstration of Artificial Intelligence <Road Surface Differentiation Technology> in Fukui Prefecture—A joint project of Japan Weather Association, Spectee, Inc., and Fukui Prefecture

Introduction

Japan Weather Association (hereinafter referred to as JWA), Spectee, Inc. (hereinafter referred to as Spectee) and Fukui prefecture will conduct a demonstration project on differentiation of road surface conditions^{*1} in real time using Artificial Intelligence (AI) based on images obtained from road surface condition surveillance cameras between December 2020 and August 2021. The project aims to improve; traffic safety, snow removal work, antifreeze spraying work, as well as work efficiency, through determining whether the road surface is frozen or snow-covered in real time.



Motivation of the demonstration project

In recent winters, we have noticed an increase in snow damage as well as a large number of cars getting stuck in the snow due to heavy snowfalls and blizzards. Nearly every year, heavy snow damage occurs even in the regions where snow fall is rare. The temperature reductions and heavy snowfall lead to snow-covered and frozen road surfaces which in turn

cause vehicles to get stuck or be involved in accidents. Hence, these conditions create significant problems for road management. For example, during heavy snowfall in Fukui prefecture in February 2018, approximately 1,500 vehicles were stranded for many hours on Japanese National Route 8, which caused severe disruption to the lives of people living in the prefecture.

Owing to the high cost of measuring equipment for winter disaster prevention information and delays in technical development, human observation has been relied upon until now. In contrast, installation of road surface condition surveillance cameras and live cameras which are cheaper than the measuring equipment has been promoted by road managers and other related personnel.

Under these circumstances, JWA and Spectee have been focusing on using camera images since 2019, but are now planning to implement a joint project that utilizes the latest AI technology to acquire various types of winter disaster information and develop a service to provide this information in real time.

Therefore, a demonstration project to verify the accuracy of <the road surface differentiation technology> will be jointly implemented by JWA and Spectee based on their technological advancements in Fukui prefecture. This project enables to accomplish a more comprehensive overview of road conditions by analyzing installed camera images.

From the result of this project, JWA and Spectee aim to promote appropriate road management, traffic, and automatic driving for every road management entities and municipalities. It is expected that the successfulness of this project will determine the deployment of the same technology nationwide.

Comment from Hirofumi Tsujimoto, JWA Managing Director, General Manager of Business Division:

Information about snow and ice on the roads during winter is important to ensure safe traffic conditions and road management, but information on road surface conditions have conventionally been obtained using expensive meteorological instruments and visual monitoring. This demonstration project will verify the effectiveness of the AI-driven road surface differentiation technology jointly developed by JWA and Spectee through application of the technology to road management in Fukui Prefecture. This technology differentiates road surface conditions automatically and in real time, so I hope it will enable efficient snow removal work and antifreeze spraying work in snowy and cold regions and also serve to enhance JWA's forecast information.

Comment from Kenjiro Murakami, CEO of Spectee:

Observations using measuring equipment installed at fixed points can bring limited information to detect the road condition while snowing. The drastic weather changes in recent years require a rapid initial response based on real time data, therefore I believe this AI-based automatic road surface detection using camera will contribute to collect comprehensive data which is necessary to direct an initial response, and also can be an essential technology for MaaS (Mobility as a Service).

Comment from Toshiaki Ogawa, Director of Department of Public Works, Fukui Prefecture:

Fukui Prefecture is often hit by very heavy snowfalls. Heavy snowfall in February 2018 closed the Hokuriku and Chubu Jukan Expressway, resulting in up to 1,500 vehicles being stuck for many hours on Japanese National Route 8, due to the vast amount of time required to remove snow from prefectural roads. Therefore, the road surface differentiation technology jointly developed by JWA and Spectee will be demonstrated in the Fukui Prefecture, would help investigate means of linking the findings to streamline the antifreeze spraying and snow removal work implemented by the prefecture.

*1 What are road surface conditions?

The condition of the road surface changes depending on rainfall, snowfall, and temperature, resulting in conditions such as dry, wet, slushy, frozen, and snow-covered road. The coefficient of sliding friction between tires and the road surface differs depending on the road surface conditions. It becomes especially small when the road is frozen or snow-covered (the road becomes slippery), making it necessary to spray antifreeze and/or remove the snow. Therefore, ascertaining the condition of the road surface appropriately and in real time is extremely important for ensuring safe and secure road traffic.