

IET International Travel Award-Final Report

16/09/2022

The IET International Travel Award has awarded my recent attendance as visiting researcher at the Department of Information Engineering at the University of Hiroshima in Japan from **17th August to 15th September 2022** in Hiroshima, Japan. This visit aims to engage with skillful engineers, technical specialists, and researchers who have high-level knowledge of information engineering, Artificial Intelligence, science, and excellent skills in Information and Communication Technology (ICT) to compete in the international market. I have obtained the knowledge and skills by being part of this university's state-of-the-art research and developments.

The research work done during this visit is an implementation of a real-time AI model for a project of MAZDA corporation company in Japan, which is Bag-Breakup detection in the exhaust pipe of the car. This phenomenon is caused during the cold starting of a car engine (starting at the same or lower temperature than the outside temperature), hot exhaust gas impinges on the wall of the low-temperature exhaust pipe, causing Condensate to form, Condensate accumulates in the exhaust pipe and causes pipe corrosion, or scatters and adheres to the sensor, causing it to fail. Currently, research is being conducted with videos taken under various experimental conditions (wind speed, period, etc.). Previously, they exploited the Resnet DL detector, which obtained mAP at 89% and real-time 10 fps. I contributed to this job by proposing recently released the latest real-time detector, YOLOv7. As a result, we improved mAP, which achieved 96.8% with real-time detection up to 20 fps. In addition to showcasing my research, I also had the opportunity to gain more insight into the new equipment/ instrument developed for the AI prediction of surface integrity evolution induced by a wide range of experiment processes. For instance, Prof. Bisser introduced the novel concept of object detection, emphasizing the importance of localization for the targeted classes in the images.

Overall, attendance at the university of Hiroshima is an awe-inspiring experience that provides an excellent experience, a fantastic networking platform, and valuable feedback from a broad skillful community. I want to thank IET for the IET International Travel Award in support of visiting the university of Hiroshima. This award gives me the prestigious opportunity to disseminate my research work in this event and have valuable discussions and networking with peer students and researchers, which is of great importance for my future career development as an independent researcher. The contribution of IET has been well acknowledged in this visit.

Sincerely,

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Visiting the castle of Hiroshima