International Airport Review Awards 2017

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Categories: (i) Technological Solutions
(ii) Airside Operations

Entry Title: Automated Airfield Ground Lighting Scanning and Inspection System

Summary:

A Machine Learning Driven Solution for AGL Maintenance

Airfield Ground Lighting (AGL) system is one of the key assets to Hong Kong International Airport (HKIA). A common and worldwide practice to conduct integrity checking of AGL relies on manual and visual inspection. However, this method hardly scale with over 12,700 nos. of light fittings for frequent inspection due to short maintenance window.

Airfield Ground Lighting Scanning and Inspection System (AGLSIS) is an award-winning innovation that was jointly developed by Airport Authority (AA) and D2V. It is the world’s first automated system to conduct scanning and inspection of AGL. The system is comprised of advanced high-throughput scanning machine installed on a rover as well as a remote computer server. The system leverages techniques in Big Data processing and Machine Learning for the fully automated high-throughput AGL integrity checking.

Our Smart Engineering Solution and Its Impact

The system was successfully tested and implemented in HKIA which is now patent pending. Economically, this system can significantly save over 83% of inspection time, hence the airport’s maintenance window can be efficiently utilized. Additionally, the highly accurate inspection results help enhancing runway safety, while its high-throughput inspection capability addresses the ever-increasing demands to accommodate for more aircrafts, passengers and cargos.

AGLs scattered on the large field in an airport. The tires of aircrafts repeatedly impose significant pressure and wearing on these lights and change the surface conditions of these lights. Therefore, the AGLSIS is designed to mount on a vehicle, and performs high-throughput scanning and robust processing to identify the defects on these lights. More specifically, through the high-throughput scanning the system collects vast amount of image data on AGLs. The specially-designed processing pipeline leverages the imaging positions and their optical relations hence facilitates automatic labelling to work around the drawback on making use of large amount of data as commonly encountered in Big Data application.
**Innovation that Addresses Challenge**

The fast pace of airport operation is not uncommon around the world. Taking HKIA as an example, in every 53 seconds there was an aircraft arrived in or departed from HKIA in Y2016-17. The frequent inspection of AGLs is necessary yet occupies the precious time for runway operation. As such, in line with HKIA’s continuous commitment to strive for higher processing efficiency in airport operation, AA and D2V jointly invented AGLSIS as part of the continuous effort to help contributing in the elevation of the efficiency in airport maintenance.

The impact of AGLSIS is that the highly efficient and accurate automated scanning and inspection of AGL offers an intelligent solution for airport to inspect these lights more frequently yet with lesser time. Additionally, the large amount of processed data as collected on these lights can help facilitating more detailed inspections amid various environmental disturbances. The unprecedented benefits brought by AGLSIS help contributing to a new standard in airport maintenance quality. This intelligent system therefore sheds light on how innovative technology can shape a “smart” airport. (total : 490 words)

Attachment :

Please refer to the additional sheets (total : 3 pages) and Powerpoint (Total : 34 slides)