THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學
Institute for Entrepreneurship 企業發展院
Issue | Aug 2020

Technology Frontier

News Bite on PolyU's Innovation

Intelligent Transportation System and HKeTransport Platform

Advancing smart mobility development in a smart city

Hong Kong has an efficient road and public transport system. To reap the most benefits from this, road and transport users need an integrated platform to navigate their way and plan their trips. In light of this, researchers from the Department of Civil and Environmental Engineering and the Department of Land Surveying and Geo-informatics devised an Intelligent Transportation System for motorists and the HKeTransport platform for public transport users respectively in the past. They have updated both systems in recent years for real-time features.

Ir Prof. William Lam

Hong Kong is well-known for its fast-paced lifestyle and getting around the city is easy. According to a report in 2018, Hong Kong's public transport was ranked number one among 24 global metropolises[1]. That being said, over 10% of commuters in the city still prefer the flexibility and privacy of driving a car[2]. Whether operating a private vehicle or taking public transport, we have no time to waste and appreciate ways to cut back on travel time or go around the gridlock. That explains why the government and service providers have been looking for solutions to help passengers and motorists plan their trips ahead. Experts at PolyU have been partnering with some of them to achieve this.

Ir Prof. William Lam from the Department of Civil and Environmental Engineering, and Dr Lilian Pun-Cheng from the Department of Land Surveying and Geo-informatics led their research teams to design an Intelligent Transportation System (ITS) for motorists and the HKeTransport portal for public transport users about a decade ago. As information technology has been advancing drastically since then, their systems have also been updated with state-of-the-art real-time functions towards the goal of making the city smart.

Intelligent Transportation System

In early 2010s, the electronic toll collection company Autotoll Limited and PolyU worked out a solution for the government to detect traffic speeds and predict travel time on major routes in the city. Prof. Lam and his team thus developed an ITS that integrates traffic data from different sources to

The results generated by the Intelligent Transportation System are displayed on major traffic sign boards.

Dr Lilian Pun-Cheng

The interface of HKeTransport

estimate real-time traffic condition with an accuracy of 95%. The results are displayed on traffic sign boards and the website of the Transport Department as colour-coded speed map and journey time so that motorists may then take alternative routes to avoid congestions.

"From 2018 to 2020, different types of traffic detectors were installed on strategic routes of Hong Kong to further enhance accuracy of data capture. We devised a sophisticated filter system to eliminate contradicting or abnormal data, and used complex traffic models and advanced machine learning algorithms to combine the limited data collected from different sources, so as to estimate the current traffic speeds for the whole territory of Hong Kong. Such information is updated once every two minutes on traffic sign boards," added Prof. Lam.

HKeTransport

Public transport is the only or preferred way of local travel for the majority of commuters in Hong Kong. Despite the ubiquity of trip planning apps and websites available these days, there was none around the turn of the millennium. In 2002, PolyU was among the first to provide a public transport route search service for its students and staff, known as EasyGo. Meanwhile, the Transport Department was looking to develop a multi-modal public transport route search platform, and Dr Pun-Cheng's team was commissioned to build the system based on EasyGo.

The resulting platform, known as HKeTransport, was launched in 2009, covering different modes of transport, such as MTR, buses, green mini-buses, ferries and trams. The results are sortable by different criteria, such as time, fare and number of interchanges. Dr Pun-Cheng said, "Nowadays, transport operators have their own real-time vehicle tracking system and our job is to combine data from all sources in real time, and show journey times (including waiting time) and fares of the countless combinations of different transport modes between a starting point and a destination. The sheer volume of data is overwhelming and the system has to handle them at the blink of an eye. There are also other challenges to address, such as concession fare and interchange fare discount, and crises or accidents that disrupt transport services." Users can even view video images along the route on HKeTransport to see the real-time traffic condition for themselves.

Both our ITS and HKeTransport have been incorporated under one roof with other functions in HKeMobility, a comprehensive one-stop mobile app provided by the Transport Department, so that both road users and public transport passengers can quickly access the information they need.

Seamless mobility is not only a primary social concern, but is a prerequisite for urban efficiency. All through the years, PolyU has made significant contribution in this regard, laying a strong foundation for smart city development in Hong Kong.

[1] *Sum, Lok-kei. "Hong Kong tops global report on public transport but loses out to Singapore and Paris when private transport also taken into account." 22 Aug 2018. South China Morning Post. Retrieved from https://www.scmp.com/news/hong-kong/community/article/2160875/hong-kong-tops-global-report-public-transport-loses-out.*

[2] *Transport Advisory Committee. Fig 2A on p.22, "Report on Study of Road Traffic Congestion in Hong Kong." December 2014. Retrieved from https://www.erp.gov.hk/download/Full_Eng_C_cover.pdf.*