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Application of GPS data for benefits of air quality assessment and fleet management

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In the modern digitizedsociety, traffic data can be easily collected for use in roadway development, urban planning and vehicle emission. These data are then further parameterized to support traffic simulation and roadside emission calculations. With the commercialization of AGPS/GPS technology, GPS data are widely utilized to study habit and travelling behaviors.

GPS on franchised buses can provide not only positioning information for fleet management but also raw data to analyze traffic situations. In HK, franchised buses account for 6% of RSP and 20% of NO_x emissions among the whole vehicle fleet. Being the most heavily means of public transport, the setting up of bus travelling trajectories and service frequency always raise concern from citizens. On this basis, there is an increasing interest and as well as to design and realize an effective cost benefit fleet management strategy.

In this study, data collection analysis is carried out on all bus routes (i.e. 112) in Shatin district, one of the 18 districts in Hong Kong. The GPS/AGPS data through Esri ArcGIS investigate the potential benefit of GPS data in different emission scenarios (such as engine type over whole bus fleet). Building on the emission factors from EMFC-HK model, we accounted for factors like travelling distance, idling time, occupancy rate, service frequency, tire and break emissions. Through the simple emission developed model we demonstrate how GPS are data are utilized to assess bus fleet emissions. Further amelioration on the results involve tuning the model with field measurement so as to assess district level emission change after fleet optimization.