

Service reliability measurement using automated fare card data - application to the London Underground

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This paper explores the potential of using automated fare card data to quantify the reliability of service as experienced by passengers of rail transit systems. The distribution of individual passenger journey times can be accurately estimated for those systems requiring both entry and exit fare card validation. With the use of this information, a set of service reliability measures is developed that can be used to routinely monitor performance, gain insights into the causes of unreliability, and serve as an input into the evaluation of transit service. An estimation methodology is proposed that classifies performance into typical and nonrecurring conditions, which allows analysts to estimate the level of unreliability attributable to incidents. The proposed measures are used to characterize the reliability of one line in the London Underground under typical and incident-affected conditions with the use of data from the Oyster smartcard system for the morning peak period. A validation of the methodology with the use of incident-log data confirms that a large proportion of the unreliability experienced by passengers can be attributed to incident-related disruptions. In addition, the study revealed that the perceived reliability component of the typical Underground trip exceeds its platform wait time component and equals about half of its on-train travel time as well as its station access and egress time components, suggesting that sizable improvements in overall service quality can be attained through reliability improvements.

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