Abstract

Ahmed O. Idris

A Modal Shift Optimized Transit Route Design Model.

This paper proposes a modelling framework for generating optimal transit route designs that maximize demand attraction. The framework builds upon and extends the powerful capabilities of the existing microsimulation learning-based approach for transit assignment (MILATRAS), to tackle the route design problem. MILATRAS currently models transit assignment given a fixed set of transit routes and transit demand. The proposed work will add to MILATRAS a modal shift module to enable evaluating the impact of transit investments that usually target auto drivers. Modal shift barriers such as attitudes and habit formation will be captured in the model by specifying a threshold inertia against shifting between modes. The proposed approach to transit route design problem is divided into two main stages. Firstly, tools will be developed to generate a set of competing candidate route designs based on shortest path algorithms, service guidelines and constraints regarding several design aspects such as minimum stop spacing and maximum route length. Secondly, an optimization tool will be developed to Select the optimum transit route alignment and design characteristics, considering transit demand variability among both modes and routes. Such approach is more desirable for transit network planning than the previous approaches in terms of its practical realism for real-world applications. Further, it will not only optimize the overall cost for both passengers and the operator, but also the objective function will incorporate the desired level of modal shift between both competing modes. Furthermore, the interaction between the level of service of the transit route and the variability of demand will be captured.