Dynamic path generation for the Proactive Route Guidance approach

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Abstract

The presented proactive route guidance approach aims at integrating a system perspective: eliminating congestion on the road network, and a user perspective: minimizing distance travelled. The approach assigns paths to users so as to minimize congestion while not increasing their distance travelled too much. By limiting the set of paths considered for an origin-destination pair to those that have a relative difference in length with respect to the shortest path, the path's so-called Travel Inconvenience, which is below a given threshold, a maximum level of inconvenience is ensured and a certain level of fairness is maintained. An important feature of the approach is that it only solves linear programming models. The models require a complete enumeration of all those paths that are allowed by the maximum travel inconvenience level for each origin-destination pair. The generation may be very time consuming when big instances and/or high values of maximum travel inconvenience are considered. The aim is to present a dynamic method able to generate only a limited number of paths for each origin-destination pair. The impact of the dynamic approach on the number of generated paths and computational time will be shown in an extensive computational study carried out with different Maximum Travel Inconvenience values, network topologies and demand patterns.

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