



## **DelayFlow Centrality for Identifying Critical Nodes in Transportation Networks**

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## *ABSTRACT*

In an urban city, its transportation network supports efficient flow of people between different parts of the city. Failures in the network can cause major disruptions to commuter and business activities which can result in both significant economic and time losses. In this paper, we investigate the use of centrality measures to determine critical nodes in a transportation network so as to improve the design of the network as well as to devise plans for coping with network failures. Most centrality measures in social network analysis research unfortunately consider only topological structure of the network and are oblivious of transportation factors. This paper proposes a new centrality measure called DelayFlow that incorporates travel time delay and commuter flow volume. We apply the proposed measures on the Singapore's subway network and its about 2 million commuter trips per day, and compare them with traditional topology based centrality measures.

Keywords. Network centrality, transportation network.