**The Path for High-Speed Trains in the United States**

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**Abstract**

The 41,000-mile interstate highway system (IHS) whose construction was endorsed by President Eisenhower in 1956, ushered America into a new dawn. Over 60 years on, this massive network of roads designed to transport people and goods across the country has grown to become one of the most widely used. The IHS though comprises only 2.6% of all roadway lane miles in the US, accounts for 26% of the nation’s vehicle travel. Between 1956 and 2018, the number of owned vehicles rose from 74 million to 274 million. This extreme use and huge demand, of course comes with its detriments as the Transportation Department reports that over 54% of interstates are over 50 years old and 27% need repair or replacement.

In the phase of the increasingly high usage and limited future capacity of the interstate system, a possible alternative proposed is the high-speed train. High-speed trains under regular conditions and infrastructure can travel at speeds topping 125mph. This transport option will not only enable consumers to reach destinations across the country faster compared to cars but will also reduce road congestion and greenhouse gas emissions in the long run. However, one major question that comes up with fast trains is their feasibility. In what areas or routes should these trains be implemented.

This paper tackles the problem of feasibility by building a minimum spanning tree (MST) of city hubs considering demand across the routes as the key factor or cost. One notable observation made was that cities that had higher weights(demand) were not necessarily proximate as compared to an MST with distance as the cost. The paper implements this MST using the Prim’s algorithm, a greedy algorithm that starts the tree from nodes with lowest cost and builds on till there are no nodes left.