

# Project Proposal

I propose a thorough investigation of how discrete mathematics, notably graph theory, is applied in the context of Google Maps. Our daily lives rely heavily on maps to guide us through the complexity of the world. The complex computations required to perform the seemingly straightforward process of determining the fastest route, however, use sophisticated mathematical ideas. Algorithms can find the shortest paths, the busiest locations, and particular companies in each area thanks to the methodical framework provided by graph theory. The robust Dijkstra algorithm is used by Google Maps, the most popular mapping service on the planet, highlighting the importance of discrete mathematics in contemporary navigation systems.

Due to its significant social impact and significance to the information technology industry, we decided to investigate the use of discrete mathematics in Google Maps. In today's fast-paced world where effective navigation is essential, it is critical to comprehend how graph theory affects the performance of mapping software. By investigating this subject, we hope to provide light on the complex algorithms behind Google Maps and other comparable services. This knowledge offers insights into how technology melds with mathematical principles to improve our daily experiences in a way that is not only intellectually engaging but also incredibly useful.

The shortest path calculation, real-time traffic forecasting, and user customization features will all be covered in this presentation's examination of the usage of graph theory in mapping systems. It will examine the Dijkstra algorithm, which considers traffic patterns and road conditions to optimize routes. The talk will also go into the sophisticated technologies required to collect and process traffic data as well as the difficulty of real-time traffic forecast. It will also go into how mapping services let users customize their routes, such as avoiding toll roads or choosing paths that are kind to the environment. A clearer grasp of the connection between discrete mathematics and navigational experiences is the main goal of the lecture.