Work Plan and Methodology

I wish to investigate the problem of efficiently computing exact and approximate shortest paths in graphs, with the main focus being on shortest path query processing.

Strategies for computing answers to shortest path queries may involve the use of pre-computed data structures in order to improve the query time. Designing a shortest path query processing method raises questions such as:

How can these data structures be computed efficiently? What amount of storage is necessary? How much improvement of the query time is possible? How good is the approximation quality of the query result? What are the tradeoffs between pre-computation time, storage, query time, and approximation quality?