

**A Novel Representation and Compression for Queries on Trajectories in Road Networks**

**Abstract:**

Recording and querying time-stamped trajectories incurs high cost of data storage and computing. In this paper, we explore several characteristics of the trajectories in road networks, which have motivated the idea of coding trajectories by associating timestamps with relative spatial path and locations. Such a representation contains large number of duplicate information to achieve a lower entropy compared with the existing representations, thereby drastically cutting the storage cost. We propose several techniques to compress spatial path and locations separately, which can support fast positioning and achieve better compression ratio. For locations, we propose two novel encoding schemes such that the binary code can preserve distance information, which is very helpful for LBS applications. In addition, an unresolved question in this area is whether it is possible to perform search directly on the compressed trajectories, and if the answer is yes, then how. Here we show that directly querying compressed trajectories based on our encoding scheme is possible and can be done efficiently. We design a set of primitive operations for this purpose, and propose index structures to reduce query response time. We demonstrate the advantage of our method and compare it against existing ones through a thorough experimental study on real trajectories in road network.

**Existing System:**

Recording and querying time-stamped trajectories incurs high cost of data storage and computing. In this paper, we explore several characteristics of the trajectories in road networks, which have motivated the idea of coding trajectories by associating timestamps with relative spatial path and locations. Such a representation contains large number of duplicate information to achieve a lower entropy compared with the existing representations, thereby drastically cutting the storage cost.

**Proposed System:**

We propose a novel representation, a lossless compression for both spatial path and timestamps, and an errorbounded compression for locations. Such representation and compression can achieve high compression ratio under a small error bound and can support queries efficiently. The first challenge of this work is to design a good representation with small entropy (i.e. the representation contains large amount of duplicate information) to facilitate storing and querying trajectories in road networks, considering both space overhead and efficiency. This means that, from the compression perspective, it prefers entropy of a trajectory representation to be low; and from the querying perspective, it aims at being able to support query processing efficiently.