IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, November 2024

Leveraging Machine Learning for Spatiotemporal Data Modeling and Exploring Spatiotemporal Patterns Using Data Mining Techniques

Mr. Chilamakuru Nagesh[1] and Dr. Manoj Kumar[2]
Research Scholar, Department of Computer Science & Engineering[1]
Research Supervisor, Department of Computer Science & Engineering[2]
Shri Venkateshwara University, Gajraula, Amroha, Uttar Pradesh, India

Abstract: *Spatiotemporal data is collecting from four corners of selected region, spatiotemporal data are often highly noisy and sparse consequently extract useful knowledge from such noisy and sparse data is challenging; Another challenging problem is integrating multiple-model data There are three different factors involved in ST data: location, time, and text. Those heterogeneous factors are highly coupled to reflect people's activities in a collective way, yet they have totally different modes, sizes, and allocations. How to effectively integrate those different data types for knowledge acquisition remains another challenge with the reference cube structure is still unsolved. Furthermore, still its time-consuming process to store a huge volume of spatiotemporal data which are rapidly accumulated and processing queries on the vast amount of spatiotemporal data is highly difficult in terms of space or time complexity. To address these issues, an extensive collection of approaches has been proposed i.e., we recommend to utilize intelligent classification algorithms that can improve spatiotemporal data sparsity for effective classification, Impalement Novel technique for handling huge volume of continued unstructured data set for query processing, finally we need to design effective multi-dimensional data integration framework for fast analysis and aggregation of spatiotemporal data. As a result, our work will explore in the field of spatiotemporal data mining for improving the efficiency and effectiveness of data mining tasks such as clustering, prediction, anomaly detection, and pattern mining when dealing with spatiotemporal data. We conduct a systematic survey on the major research into trajectory data mining, providing a panorama of the field as well as the scope of its research topics. Following a road map from the derivation of trajectory data, to trajectory data preprocessing, to trajectory data management, and to a variety of mining tasks (such as trajectory pattern mining, outlier detection, and trajectory classification), the survey explores the connections, correlations, and differences among these existing techniques. This survey also introduces the methods that transform trajectories into other data formats, such as graphs, matrices, and tensors, to which more data mining and machine learning techniques can be applied. Finally, some public trajectory datasets are presented. This survey can help shape the field of trajectory data mining, providing a quick understanding of this field to the community*

Keywords: multi-dimensional data, data integration framework, intelligent classification, clustering, prediction.