Xinyu Jiang
04/17/2021
109036441
Paper Review for April 20

Paper Review

<Summary>

The paper “JUST: JD Urban Spatio-Temporal Data Engine” introduces the problems managing spatio-temporal data, like large information volume, complex data structure and unique query method. To manage massive spatio-temporal data efficiently and conveniently, the author implements JD Urban Spatio-Temporal Data Engine (JUST). Therefore, the rest of the paper will analyze the JUST based on the author's point of view.

To effectively manage spatio-temporal data, the author builds JUST engines based on GeoMesa. There are four significant features of JUST: high efficiency, strong scalability, data update supports and easy to use (Li, 2020). To decrease the search response time, the author introduces a data compression storage mechanism that reduces the size of data storage while improving query efficiency by reducing disk IO. In addition to that, in order for the software to be easy to use and update, the spatio-temporal data is written in HBase keys, every information only related to itself and not related to anything else. Also, the database of Just is written in SQL which allows users to create spatio-temporal data tables and indexes through very simple SQL statements so that anyone with a SQL foundation can use JUST with zero learning costs (Li, 2020).

<Strengths and weaknesses>

The paper successfully integrates spatio-temporal data and solves the data management problem by proposing a new searching algorithm. For example, the new indexing method no longer uniformly encodes time and space, but first divides the time into buckets, and in each bucket, encode the space separately. During the querying period, the algorithm first finds those

Xinyu Jiang
04/17/2021
109036441
Paper Review for April 20

corresponding time zones, and then in each time zone, generates a spatial coding range (Li, 2020), so that the generation cost is twice faster. However, JUST does not provide temporary adaptation and dynamic changing functions. Since the base algorithm uses spatio-temporal data to generate the optimal path to the destination, if an unexpected things like temporary road blockade happen, the algorithm have not collect enough data, so that it could not react immediately

< Are the evaluations convincing?>

The essay provides a lot of different methods managing spatio-temporal data. To prove the performance of JUST, the author also provides testing cases with three different databases: trajectory, order and synthetic, the result shows that JUST is significantly better than other spatio-temporal data management software in time-consuming and accuracy perspective. Therefore, I think the evaluation is convincing.

<Other applications>

As mentioned above, JUST does not provide temporary adaptation and dynamic changing functions, if the road is blocked, the algorithm needs to collect enough data to give another path suggestion. To solve that problem, developers could add a blockage mark function that allows users to mark the block area so that the algorithm could generate a new path to users without having to go through that block road.

References

Xinyu Jiang
04/17/2021
109036441
Paper Review for April 20

1. Li, R., He, H., Wang, R., Huang, Y., Liu, J., Ruan, S., . . . Zheng, Y. (2020). JUST: JD Urban spatio-temporal data engine. 2020 IEEE 36th International Conference on Data Engineering (ICDE). doi:10.1109/icde48307.2020.00138