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Location Tracking Prediction of Network Users Based on Online Learning Method With Python

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ABSTRACT

Aiming at the problem that the precision and recall rate of traditional prediction methods are low and its low prediction efficiency, a Python-based trajectory tracking prediction method of online learning network user location is proposed. First, troubleshooting terminal programs of online learning network user by programming in Python (computer programming language) structure, the location trajectory data of online learning network user is spatially processed. In this way, features of time-related, spatial correlation, social relationship correlation, and user preference characteristics are extracted respectively to realize feature normalization processing. Second, on this basis, the cosine similarity is used to calculate the similarity of user behavior trajectory. According to K-MEANS (hard clustering algorithm), the time dimension is considered. Finally, the clustering result of users' behavior trajectory based on the sign-in data is compared with a preset threshold to predict the online user location trajectory. The experimental results show that the proposed method normalizes the user's trajectory, combines the time segment, and compares it with the preset threshold, which does not only improve the prediction efficiency but also obtains higher and more feasible precision and recall rate.

KEYWORDS

Location Tracking, Online Learning, Python, Web User

1. INTRODUCTION

Due to the development of Internet technology, more and more people communicate through the Internet. People gradually establish social relationships between people in the network, which forms a network of social relationships. As a result, social networking service platforms have emerged to serve people to better connect on the network. Early social networking sites quickly emerged, such as Renren.com, the intranet, and quickly networked a large number of users. With the development of social networking, various of social networks emerge. The network is the mapping of people's real life networks., and the way people communicate has presented a new model. Because the network has narrowed the distance between people and even ignored people's geographical space distance, some people also put forward the concept of global village. Because of the relationship between people in the network, it breaks through the geographical restrictions of people's communication.

There are more and more people using social networks around the world. A new virtual society is forming in the network, and relevant researchers have also proposed a small-world theory.

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With the rapid development of the Internet, more and more people use the Internet to search and learn information, conduct entertainment activities, and learn online. The Internet has become an indispensable part of people's lives. At the same time, people's communication methods have also undergone tremendous changes, and they have also facilitated and enriched people's leisure life and helped people understand the world better (Chen, Chen & Wu, 2016; Van, Pool & Van Paassen, 2017).

In recent years, more and more scholars have used users' check-in data to study the laws of human movement. When using a location-based social network, the user is more concerned with the person or thing they are interested in. This requires the service system to filter out unrelated people or things, and find out what people with common interests, or help users find out where they may be interested. To achieve these functions, we need to analyze the user's behavior trajectory to find users with similar user behavior trajectories. After exploring what the people are interested or where they may go, they can better serve the users and help people understand the world around them better (Wang, Zhang & Yi, 2017).

A trajectory tracking method of online learning network user location based on neighbor propagation clustering is proposed by X. L et al., (2017). The method simplifies the joint probability data association algorithm by using linear programming adaptive iterative solution for m optimal joint events. On this basis, the distance matrix between the positional trajectories of online learning network users is predicted based on Kalman (Kalman filter) filtering and extrapolation. The association analysis is performed on the online learning network user location trajectory segment based on the neighbor propagation clustering method, and finally the online learning network user location trajectory tracking prediction is implemented according to the association analysis result.

A Markov chain-based trajectory prediction method of online learning network user location is proposed by (Wen, 2017; Liu, Fu & Deng, 2013). Firstly, the ARIMA model (time series model) is integrated to predict the geographic location of the online learning network user at the next moment, and obtain the cumulative retention time prediction value of the user. Then calculate the mean square error between the real value and the predicted value of the online learning network user position, and finally get the accumulated learning time of the online learning network user movement. In addition, the Markov chain principle is integrated to calculate the probability distribution of online learning network users reaching all locations, and the position tracking prediction of online learning network users is realized.

An online tracking method for online user position trajectory prediction based on splitting ideas is proposed by (Liu, Fu & Zhao, 2013; Liao, Wang & Wan, 2016). Based on the relevant concepts and problems in the known online learning network, the overall framework of online learning network user location trajectory tracking and prediction is designed, including online learning network user segment collection, overlay network construction, network filtering and maximum tight subgraph discovery. Because the number of online multi-proximity users and the number of users in each neighborhood cannot be determined in advance, a very tight subgraph mining strategy is proposed based on splitting. Mining multi-user location neighborhood relationships, based on multi-user location neighborhood mining results, to achieve online learning network user location trajectory tracking.

A trajectory tracking method of online learning network user location based on massive log data is proposed by (Zhang, 2017; Liu, Liu & Fu, 2015) . This method is based on Alibaba's CNZZ (Data website) mobile statistical product and collects a large amount of log data from about 50 million online mobile APP users. The user behavior characteristics of online learning mobile APP are analyzed from five aspects: fragmentation, time period features, user stability, user activity, and user usage. The BP neural network was used to cluster the collection of user behavior characteristics, and the online learning network user position trajectory tracking was achieved based on the cluster analysis results.

There are deficiencies in above methods, such as low prediction accuracy, low recall, and poor prediction time. Therefore, a Python-based trajectory tracking prediction method of online learning network user position is proposed. This method tries to make a breakthrough on the basis of summing up previous research results. The specific research framework is as follows.

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