To Reviewer 3

Thank you very much for reviewing this article and thank you for your valuable comments and suggestions. We have read the paper "Self-organized natural roads for predicting traffic flow: a sensitivity study". This paper has a great inspiration for our future research. Thank you again for your advice. And we have responded and revised one by one according to your comments. The details are as follows.

Point 1: If there is not obvious correlation coefficient between the newly designed stroke and traffic flow, what's the purpose to design the new stroke? If you read the paper "Self-organized natural roads for predicting traffic flow: a sensitivity study", as a new topological relationship of road network, the stroke is expected to better predict traffic or pedestrian flow, instead of being able to "predict traffic flow to some extent". If the new stroke in this paper cannot better predict traffic flow than previous work, how do the author judge the advantages of this work?

Response 1:

Thanks for your valuable comments.

At present, in the study of road network, the original segments of road network are usually merged into strokes for the analysis and application of road network. However, in these studies, scholars mainly study the application of road network data (such as road selection, traffic flow analysis), ignoring the process of stroke construction (for different road networks, scholars use a common threshold for stroke construction). As we all know, a reasonable and effective data processing is the basis and key of data use, which will directly affect the results of data analysis. Therefore, a reasonable stroke construction process has an important impact on the analysis and use of road network data. In the process of stroke construction, the selection of angle threshold is the first problem to be considered. Because of the different road network structure, the optimal angle thresholds for constructing stroke are different. The purpose of this paper is to determine the optimal angle threshold for different road networks in stroke construction.

A reasonable method for constructing stroke can better serve the analysis and application of road network data, such as road selection and traffic flow analysis. In order to verify the effectiveness of this method, we design a set of comparative experiments in Chapter 3.2. Because of the privacy of traffic flow data and the difficulty of obtaining it, the comparative experiment designed in this paper is road selection. We take Monaco's road network as an example, generating strokes using both the thresholds calculated in this paper and commonly used (60°) in other studies. Then the same proportion of roads in the two road networks is selected. Our results demonstrate that our proposed algorithm has better connectivity and wider coverage than those based on a commonly used angle threshold.

Compared with other stroke construction algorithms, the proposed algorithm has strong applicability and can be applied to different structures of road networks. And when determining the threshold of deflection angle, some scholars choose visual method or enlarging the threshold interval (5°) to determine the optimal angle threshold [1-2], which lacks certain objectivity and accuracy. The threshold interval chosen in this experiment is 1°, which guarantees the accuracy of the experimental results to a certain extent. At the same time, we introduce Douglas algorithm to
simplify the curve, and find the optimal angle threshold range for constructing stroke in different road networks. This ensures the objectivity of the experimental results. In the literature [1], the author sets the angle threshold at $45^\circ$ to construct the stroke of Sweden's National Highway Network (Road Network I) and Gävle urban street network (Road Network II). And according to the results of stroke construction, the relationship between stroke and traffic flow is studied. However, from the experimental results, it can be seen that the critical points of the relationship between road network I, network II and traffic flow occur at $15^\circ$ and $30^\circ$, respectively. If the author can take into account the differences between the two networks and then select different angle thresholds to construct stroke, the experimental results may be more satisfactory.

Therefore, considering the road network structure characteristics, the stroke construction method has certain research significance for the application of road network data. In the future research, we will continue to analyze the impact of traffic flow and people flow on stroke construction.


Thanks again for your careful work and valuable suggestions.