L and N stands for the set of links and nodes in the network. In this part,

Crossing keeps a simple formula as its definition as follow.

$$Cross = \sum_{i,j \in L} f_{cross}(i,j) \quad (1)$$

$$f_{cross}(i,j) = \begin{cases} 1, & i,j\ cross \\ 0, & else \end{cases} \quad (2)$$

Valid range is two-tuples which easy to get, and described as follow.

$$VR = \left[\max_{i,j \in N} |x(i) - x(j)|, \max_{i,j \in N} |y(i) - y(j)| \right] \quad (3)$$

The formula of consumed time and error rate will not give out.

Two traditional methods, manual trim and Graphviz®, were measured in our experiments, although it is not professional for network demonstrating. Each model mentioned above was tested singly in our experiments, and a compounded one.

4.4. Results

	crossing	valid range	consumed time	error rate	balance degree
Manual trim	0.08	[957, 710]	1.5~2.5 hours	5~7%	10.579
Graphviz®	0.02	[20000+, 18000+]	32.50 seconds	0%	183.29
Shortest tree	0.02	[459,450]	>1.65 seconds	0%	20.531

5. Conclusions

In this paper, we proposed a network structure presentation approach. In our approach, we designed an algorithm system called shortest tree and realize an auxiliary model to adjust the demonstration. Next, we improve the visual effectiveness by auxiliary model to obtain an acceptable result. Experimental results tested from our data set showed that this novel approach was effective and robust compared to traditional approaches.

In our future work, we will improve our approach to make it applicable to other kinds of networks. We also plan to adopt our approach for network structure optimizing applications.

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7. References

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