

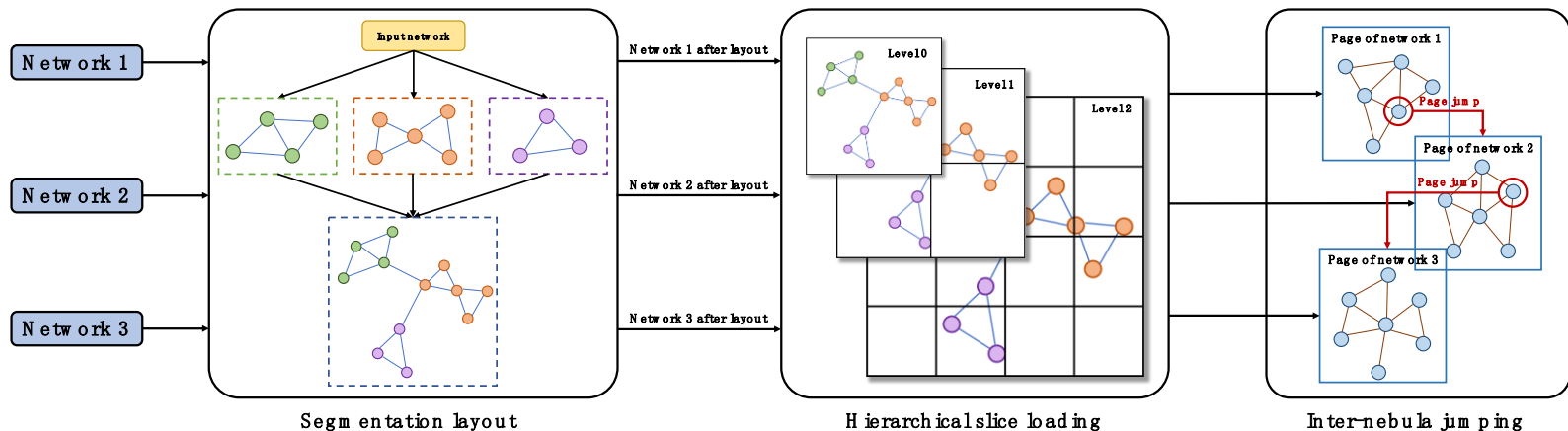
VSAN: A New Visualization Method for Super-large-scale Academic Networks

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Problems & Ideas

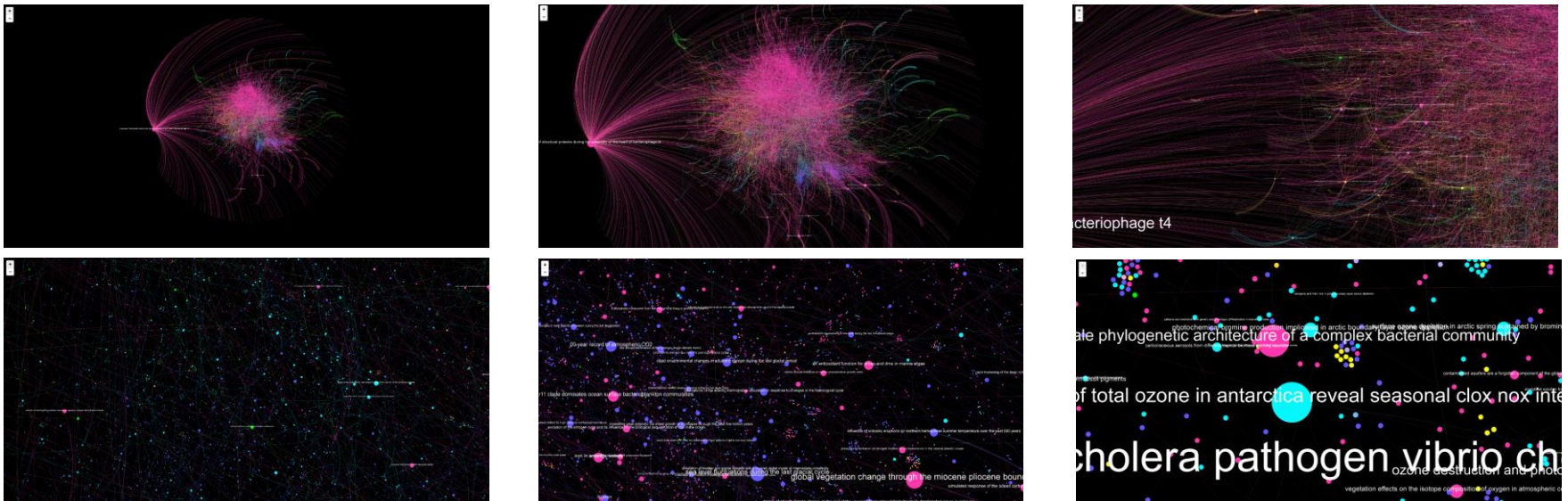
- Problems of conventional visualization methods:
 - Classical graph layout algorithms are unable to handle super large-scale academic networks with millions of nodes.
 - Traditional SVG methods cannot render super-large-scale academic networks in real time, which seriously affects the user experience.
- Ideas: Segmenting the large network and then laying out subgraphs using the force-directed model, and rendering the graph in advance and displaying it in a map-like manner.



Overall framework of VSAN. The segmentation layout method helps to get the layout of the super-large-scale academic network. The hierarchical slice loading approach enables fast interactive presentation of the network. In addition, users are able to jump between different pages of networks by clicking nodes in nebula graphs.

Main Contributions

- Contributions:
 - A graph layout method based on stitching together layouts of different communities that breaks the scale bottleneck of the force-directed model and makes the layout of academic network with a million papers possible;
 - A network presentation approach based on hierarchical slice loading that greatly improves the speed of scaling of super-large-scale academic networks while ensuring the visual quality at both the micro and macro levels.



The process of gradual zooming in the Nature citation relationship network. The network is laid out and rendered by our method VSAN.