CiteSpace

Detecting and Tracking Trends and Transformative Changes

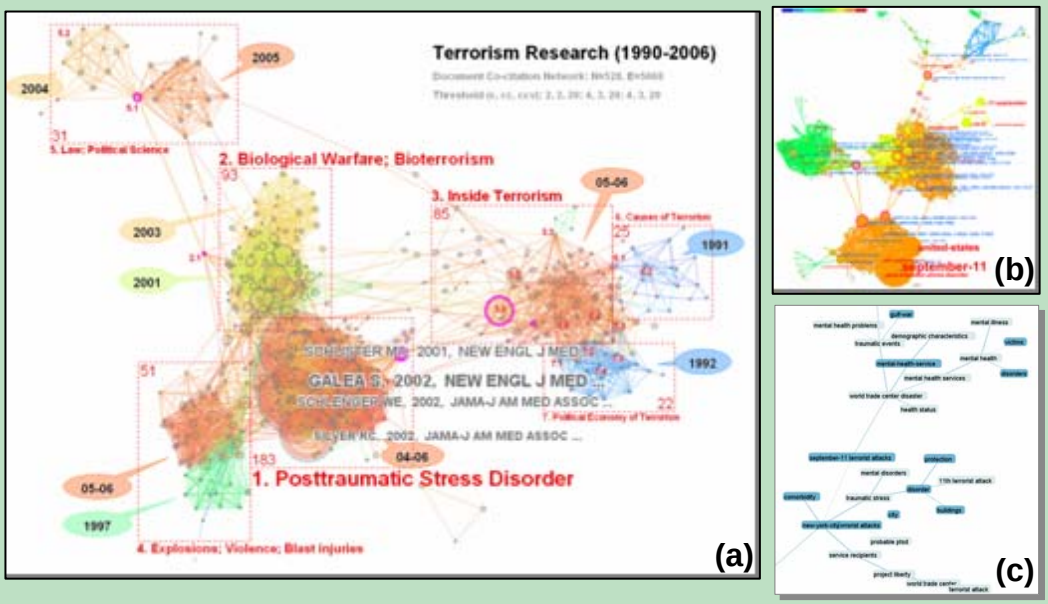
Benefit: *CiteSpace allows for the tracking of large-scale aggregated patterns and pinpointing critical paths of transformative changes in knowledge networks.*

CiteSpace is designed to facilitate the visual analysis of trends, patterns, and critical changes in a volatile information environment. Drexel University originally developed CiteSpace as an integrated and widely accessible tool for visualizing and analyzing macroscopic structures reflected through scientific literature, notably citation and co-citation patterns. It is implemented and disseminated as a freely available Java application.

CiteSpace's simple and intuitive design model can be compared to a virtual camera that takes snapshots of a body of scientific literature and distills the intellectual landscape of a knowledge domain into a big picture. Ultimately, CiteSpace will provide a clear picture of invisible colleges and will clearly delineate the growth and evolution of a discipline, a paradigm shift, conflicting opinions, scientific discoveries and technological innovations.

The core functionality of CiteSpace is the analysis and visualization of dynamic networks. CiteSpace provides an extensible framework for analyzing and synthesizing a time series of complex networks. Through the introduction of concepts such as pivotal points, identified algorithmically based on patterns of connectivity in an evolving network, CiteSpace helps in understanding transformative changes in networks. CiteSpace also adapts the notion of burst detection in finding hot spots.

CiteSpace is continuously expanding the scope of its functionality, especially for visual analytics. It has been used to analyze social networks, structural and temporal patterns in scientific citation networks, conflicting opinions in book reviews, and knowledge diffusion over geographic maps. CiteSpace incorporates strong natural language processing capabilities to process unstructured text, and strong theoretical foundations for novelty detection and discovery.



A big picture of terrorism research: *(a) a 2006 follow-up, (b) the original in 2003, (c) a detail-in-context network*

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Early Development — Lab Prototype — Commercial Product

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