

Nan Cao

I am a Ph.D student at the Visualization Lab of the [Hong Kong University of Science & Technology](#) and will graduate by July 2012. Before I join HKUST, I was a staff researcher of [IBM China Research Lab](#) (CRL) with 4 years' working experiences in research. Being a person with great passion in computer science, I wrote my first program when I was 13, took part in the [IBM Extreme Blue project](#) during July 2005 - Sep. 2005 (22 students in China were selected from more than 5000 candidates to join this project). I also won the [Microsoft's Global MVP Award](#) in Oct. 2005. I am interested in the research areas of Information Visualization (text, multidimensional, and graph visualization) and HCI.

1. Basic Information

Name	Nan Cao (曹楠)	
Cell Phone	13260065396	
E-Mails	cngroup@gmail.com / nancao@cse.ust.hk	
Address	TOWER A 310B, HKUST, Clear Water Bay, Kowloon, Hong Kong	
Education		
2010.1~ Now	Computer Science Department of Hong Kong University of Science & Technology	
2003.9~2006.4 (Master)	Computer Science Department of NWPU / Software engineering	
2001.9~2003.7 (Bachelor)	Automatic Control Department of NWPU / Network security	
1999.9~2001.7	Automatic Control Department of NWPU / Computer Control	
Experience		
2010.6 ~ 2010.12	IBM T.J. Watson Research Center, US.	Research intern at Healthcare transformation Team
2006.4 ~ 2009.12	IBM China Research Lab, PBC	Staff Researcher at CRL Visual Analytics Team
2005.9 ~ 2006.4	IBM China Research Lab	Research intern at CRL Visual Analytics Team
2005.7 ~ 2005.9	IBM China Research Lab	IBM Extreme Blue2005 Summer Student
2004.10 ~ 2005.7	NEC-AS	System developer at NEC-AS iStorage Replication (RPL) team.
2004.3 ~ 2004.10	Northwestern Polytechnical University Co-Think software company	Software developer at software developing department of Co-Think.
Other Skills		
Programming Languages	Java / C# / ActionScript / C++	

2. Selected Awards

1. **IBM Research Invention Achievement: The first, second, third and fourth Plateau Award** (four patent application awards from 2007 to 2009)
2. **IBM Climber Award** for high performance employee in Nov. 2007
3. A Contributor of one **IBM Research Accomplishment** in Nov. 2007
4. **IBM Bravo Global Recognition Award** in Apr. 2007
5. **IBM Research Invention Achievement: The First Patent Application Award** in Apr.2006
6. **Microsoft Global MVP Award** in Oct. 2005
7. **IBM Extreme Blue Award** in Sep. 2005
8. **Microsoft Excellent Achievement Award of "Imagine Cup"** software competition of China in Apr. 2005
9. **Sliver Cup (the second-class) and the New Star Award** of China's first **OpenSource Software Design Competition** in Jan. 2005
10. **The Best Thesis Award** of NWPU in 2003
11. **Microsoft Second-Class Award** of the "Imagine Cup" software competition in 2003
12. **Scholarship awards in NWPU from 1999 to 2006.**

3. Publications

Conference Papers

1. **Nan Cao**, David Gotz, Jimeng Sun, Huamin Qu. DICON : Interactive Visual Analysis of Multidimensional Clusters. IEEE Transactions on Visualization and Computer Graphics. **InfoVis2011**
2. **Nan Cao**, David Gotz, Jimeng Sun, Yu-Ru Lin, Huamin Qu. SolarMap: Multifaceted Visual Analytics for Topic Exploration. IEEE International Conference on Data Mining. **ICDM2011**
3. **Nan Cao**, Jimeng Sun, Yu-Ru Lin, David Gotz, Shixia Liu, Huamin Qu. FacetAtlas: Multi-facet Visualization for Rich Text Corpora. IEEE Transactions on Visualization and Computer Graphics. **InfoVis 2010**
4. **Nan Cao**, Shixia Liu, Hui Su. Peony : A Light Weighted Interactive InfoVis Toolkit, **HCHI 2006**
5. Wei Wei, **Nan Cao**, Jon Atle Gulla, and Huamin Qu. ImpactWheel : Visual Analysis of the Impact of Online News. IEEE/WIC/ACM International Conference on **Web Intelligence 2011**.
6. Jimeng Sun, **Nan Cao**, and David Gotz. DiseaseAtlas: Multi-facet Visual Analytics for Online Disease Articles. The 32nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society. **EMBC 2010**.
7. Ching-Yung Lin, **Nan Cao**, Shixia Liu, Spiros Papadimitriou, Jimeng Sun, Xifeng Yan: SmallBlue: Social Network Analysis for Expertise Search and Collective Intelligence. **ICDE 2009**
8. Lei Shi, **Nan Cao**, Shixia Liu, Weihong Qian, Li Tan, Guodong Wang, Jimeng Sun, and Ching-Yung Lin: HiMap: Adaptive visualization of large-scale online social networks. **PacificVis 2009**.

9. Shixia Liu, **Nan Cao**, Hao Lv. Interactive Visual Analysis of the NSF Funding Information. **IEEE PacificVis 2008**.
10. David Gotz, Jimeng Sun, **Nan Cao**. Multi-Faceted Visual Analytics for Healthcare Applications. To appear in the IEEE IBM journal on Research and Development.
11. Yu-Ru Lin, Jimeng Sun, **Nan Cao** and Shixia Liu. ContextTour: Contextual Contour Visual Analysis on Dynamic Multi-Relational Clustering. To appear in Proceedings of 2010 SIAM International Conference on Data Mining (**SDM 2010**)
12. David Gotz, Jimeng Sun, **Nan Cao**, and Shahram Ebadollahi. "DICON: Visual Cluster Analysis in Support of Clinical Decision Intelligence". **AMIA 2011**.
13. Jimeng Sun, Spiros Papadimitriou, Ching-Yung Lin, **Nan Cao**, Shixia Liu, Weihong Qian. Content-based Social Network Exploration Through Multi-way Visual Analysis. **SDM 2009**

Posters & Workshop Papers

1. **Nan Cao**, Yu-Ru Lin, David Gotz, Jimeng Sun, Huamin Qu. ChronAtlas: A Visualization for Dynamic Topic Exploration. **IEEE InfoVis 2011**
2. **Nan Cao**, Yu-Ru Lin, David Gotz, Jimeng Sun, Huamin Qu. Mapping Relational Patterns over Time for Rich Context Media. International Symposium on Visual Information Communication, Poster in **VNCI 2011**.
3. **Nan Cao**, Shixia Liu, Li Tan, Michelle X Zhou, "Context-Preserving Dynamic Graph Visualization", **IEEE InfoVis 2008**
4. **Nan Cao**, Shixia Liu, and Tianshu Wang. Peony: An integrated InfoVis design and development platform. **IEEE PacificVis 2008**
5. Shixia Liu, **Nan Cao**, Paul Moody, Tianshu wang. Trammel Map: Providing a Clear View of the Enterprise Social Network. **IEEE Infovis 2007**
6. Shixia Liu, **Nan Cao**, Hao Lv, Hui Su. The Visual Funding Navigator: Analysis of the NSF Funding Information. **ACM CIKM 2006**.
7. David Gotz, Zhen Wen, Jie Lu, Peter Kissa, **Nan Cao**, Wei Hong Qian, Shi Xia Liu, Michelle X. Zhou. HARVEST: An Intelligent Visual Analytic Tool for the Masses. Proceedings of the First International Workshop on Intelligent Visual Interfaces for Text Analysis. **IUI 2010**
8. David Gotz, Zhen Wen, Jie Lu, Peter Kissa, Michelle X. Zhou, **Nan Cao**, Wei Hong Qian, Shi Xia Liu. HARVEST: Situational Visualization and Analysis for the Masses. **IEEE InfoVis 2008**

Selected Patents (filed by IBM)

1. **Nan Cao**, David Gotz, Jimeng Sun. YOR920110279US1 Visual Analysis of Multidimensional Clusters.
2. **Nan Cao**, Jimeng Sun, David Gotz. YOR920110137US1 Multifaceted Visualization of Topic Exploration.
3. **Nan Cao**, Jimeng Sun, David Gotz. YOR920100438US1 Method and system for visualizing multi-facet information.
4. **Nan Cao**, Jimeng Sun, Weihong Qian, Shixia Liu. 200910211313.0 A method of visually analyzing social communities based on their content.
5. **Nan Cao**, Li, Tan, Shixia Liu, Michelle X Zhou. 200910136964.8 An adaptive stabilized layout method for disconnected dynamic networks.
6. **Nan Cao**, Li, Tan, Shixia Liu, Michelle X Zhou. 200910136970.3 The method of animation planning for the multi-stage transition in a dynamic graph series.
7. **Nan Cao**, Li, Tan, Shixia Liu, Michelle X Zhou. 200810149341.X The method of animated

transition between dynamic graph series.

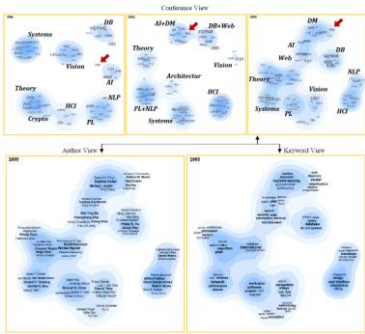
8. **Nan Cao**, Shixia Liu, Tianshu Wang. 200810096094.1 The method for providing a clear moving track in the animated transition between related data graphics.
9. **Nan Cao**, ShengYi Wang, Shixia Liu. 200810108432.9A method of visualizing huge amount of information on a sphere.
10. **Nan Cao**, Xinghua Lou, Tianshu Wang, Weijia Cai. 200810109803.5 An interactive method to generate personal and maintain personal bookmarks. Shixia Liu.
11. **Nan Cao**, Shixia Liu, Tianshu Wang. 200710160532.1 Sunburst Graph: A new method for visualizing and exploring large hierarchy graph.
12. **Nan Cao**, Shixia Liu, Hui Su. 200710107720.8 A method of generating 3D Carousel tree view.
13. Weixiong Shang, Wei Li, Yixin Zhao and **Nan Cao**. 200910005432.0 Method and System of Extended Shortcut Key Mechanism to support fast mobile browsing.
14. Weihong Qian, Shixia Liu, **Nan Cao**. 200810212645.6 A method of automatically identifying similar sub-graph candidates in huge networks.

4. Referees:

1. Dr. Prof. Huamin Qu (huamin@cse.ust.hk). Associate professor of computer science and engineering department at the Hong Kong University of Science & Technology.
2. Dr. David Gotz, Dr. Jimeng Sun ([dgotz](mailto:dgotz@us.ibm.com), jimeng@us.ibm.com). Research staff member at IBM T.J. watson research center.
3. Dr. Shixia Liu (shixia@gmail.com). Research Staff Member, manager at IBM China Research Lab since 2003 - 2010. Leading researcher at Microsoft Research Asia since 2010 – now.

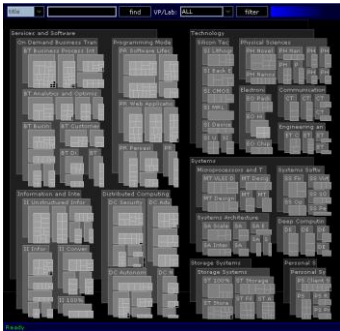
5. Academic Activities

1. Reviewer of IEEE InfoVis.
2. Reviewer of IEEE Asia/PacificaVis.
3. Reviewer of TVCG



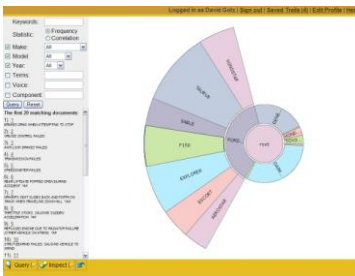
Rich context topic evolution

How can we extract sustained topics in dynamic social medias and analyze the evolution of these topics and communicates? We introduce ContextTour, a probabilistic generative model to analyze communities and their evolutions in a unified process.



Visual analysis on document database

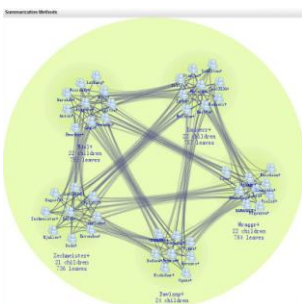
Document database, such as NSF, usually organized with hierarchies. In this research we designed a new 2.5D Treemap visualization with rich interaction that visualizes the underlying documents in an intuitive way.



Harvest

Our research focus in this area is on innovating technologies which enable casual business users to quickly and intuitively derive value from semi-structured enterprise information in the context of their daily tasks. We are creating tools to support an intelligent information workspace through which every business user can quickly search, analyze, and visualize the information they need.

3. Social Medias Visualizations



Visualization on huge online social networks

Visualizing large-scale online social network is a challenging yet essential task. This paper presents HiMap, a system that visualizes it by clustered graph via hierarchical grouping and summarization. HiMap employs a novel adaptive data loading, the optimized layout algorithm and the two kinds of edge bundling methods, to effectively avoid the visual clutter commonly found in previous social network visualization tools.

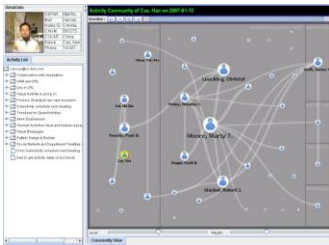
Social network visualization for enterprise search and collaboration



SmallBlue is a social networking application that unlocks the valuable business intelligence of 'who knows what?', 'who knows whom?' and 'who knows what about whom' within an organization, without requiring explicit involvement of individuals. The aim of SmallBlue is to locate knowledgeable colleagues, communities, and knowledge networks in companies.

Website: <http://smallblue.research.ibm.com/>

Enterprise social network visual analysis



Enterprise social network usually seamlessly aligned with a underlying organization hierarchy. In order to visualize the multi-dimensional data in an intuitive way, we proposed trammel map to display the organization and network structure embedded in the enterprise social network. The basic idea of this design is to display the organization structure as a Treemap and graph links as curved links overlaid on the Treemap. Nodes from different organization units are put into separated squares.

4. Information Visualization Architectures

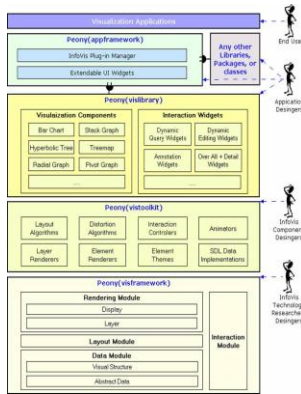
DaVinci



DaVinci is an open source project which targets on designing a light weighted information visualization framework for visualization component and application developments. When compared with some other projects such as [Prefuse](#), [Peony](#) and [The InfoVis Toolkit](#), this project focused on providing the simplest interfaces and architectures that facilitate efficient agile development.

Website: <http://www.cse.ust.hk/~nancao/architecture.html>

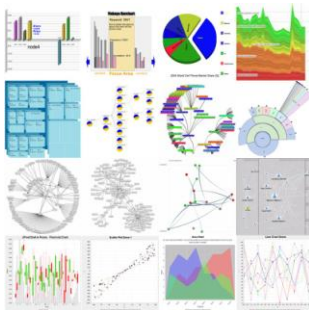
Peony InfoVis framework



The major goal of Peony is to design and develop an integrated Information Visualization (InfoVis) development platform which can handle both structured and unstructured data and plug in various kinds of analysis methods from different domains. By now, Peony contains a lot of reusable visualization components, style widgets, and interaction widgets and is adopted by over 50 projects inside and outside Research. I am the chief architect and designer of Peony.

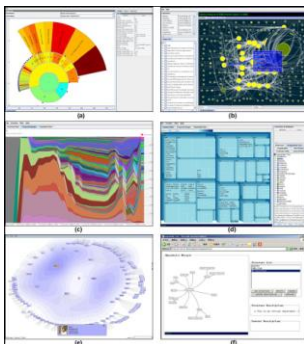
Website:

http://domino.research.ibm.com/comm/research_teams.nsf/pages/iva.peony.html



Visualization components design based on peony

This library is designed based on the Peony framework. It contains a set of visualization component such as FanLens, TrammelMap, Hyperbolic Graph, Voyager, etc.



Applications of peony inside IBM

Widely used in IBM China Research Lab and IBM T. J. Watson Research Center. More than 50 projects are using these libraries and components.