

Curriculum Vitae

Personal Information

Name Shixia Liu Gender Female
Email shixia@tsinghua.edu.cn; liushixia@gmail.com

Education

1998.9-(2002.4) Ph.D in Department of Computer Science and Technology, Tsinghua University; Major: Computer Aided Design and Computer Graphics
1996.9-1998.7 MS in Department of Mathematics, Harbin Institute of Technology; Major: Computing Mathematics
Research interest: Computer Graphics
1992.9-1996.7 BS in Department of Mathematics, Harbin Institute of Technology; Major: Computing Mathematics

Working Experiences

2014.12 - now Tsinghua University Tenured Associate Professor
2010.6-2014.12 Microsoft Research Asia Lead Researcher
2002.4-2010.5 IBM China Research Lab Senior Researcher

Research Interests

Information Visualization and Visual Analytics
Explainable artificial intelligence, visual text analysis, text mining

Professional Activities

Associate Editor-in-Chief IEEE Transactions on Visualization and Computer Graphics (2019-now)
Steering committee IEEE VIS 2020-2023
Visualization in Data Science at IEEE VIS 2020~; VINCI 2012~2013; ChinaVis 2016~
General chair Visualization in Data Science at IEEE VIS 2019, 2018
Papers co-chair IEEE VAST (VIS) 2017, 2016; ChinaVis 2014
Associate editor IEEE Transactions on Visualization and Computer Graphics (2015-2018)
IEEE Transactions on Big Data (2018-now)
ACM Transactions on Intelligent Systems and Technology (2019-now)
Program co-chair PacificVis 2015; VINCI 2012;
Organizing Committee (Tutorials Chair): IEEE VIS 2015
Organizing Committee (Meetup Chair): IEEE VIS 2014
Poster Co-chair: PacificVis 2013
Workshop Co-chair: IEEE VisWeek 2012 Workshop on Interactive Visual Text Analytics
Editorial board Journal of Visualization, 2019~
Journal of Visual Language and Computing, 2017~
Information Visualization, 2015~
Guest editor ACM Transactions on Intelligent Systems and Technology: Special Issue on Intelligent Visual Interfaces for Text Analysis, 2012
Program committee CHI 2019, 2018; IEEE VIS (VAST) 2019, 2018, 2015, 2014; IEEE VIS (InfoVis) 2020, 2015, 2014; KDD 2015, 2014, 2013; PAKDD 2013; PacificVis 2013, 2012, 2011, 2010, 2009, 2008; ACM IUI 2011, 2009;

VISAPP 2012, 2011
VINCI 2011; ACM Multimedia 2009; SDM 2008

Invited Talks

PacificVis 2018, Keynote	Explainable Machine Learning
CAD&CG GDC 2018,	Interactive Machine Learning
VISSoft 2017, Keynote	Interactive Model Analysis: Explainable Machine Learning with Interactive Visualization
VADL 2017, Keynote	Explainable Machine Learning With Interactive Visualization
China CAD&CG 2017, Keynote	Visual Analytics for Explainable Deep Learning
China CAD&CG 2016, Keynote	Interactive Model Analysis: from Model Understanding to Analysis
PacificVis 2012, Tutorial	Interactive Visual Text Analytics and its Evaluation
VINCI 2011, Keynote	Interactive Visual Text Analytics for Decision Making

Projects

1. Siemens joint project. Research on visual analytics for industrial problem classes and explainable AI for end users. 2019.1-2019.12, PI.
2. Siemens joint project. Research on Visual Analytics and Machine Learning. 2018.1-12, PI.
3. Ali joint project. Explainable machine learning techniques for the PAI platform. 2018.1-12, PI.
4. National Key R&D Program of China, 2018YFB1004300. Research and Theory for Big Data Analysis. 2018.1-2020.12, core member.
5. National NSFC 61672308. Interactive Parameter Tuning in Machine Learning. 2017.1-2020.12, PI.
6. Siemens UR project. Research on Visual Analytics for Documents. 2017.1-12, PI.
7. Tencent UR project. The study of rumor propagation in Wechat. 2016.1-12, PI.
8. Microsoft Research UR project. How to Follow Your Heart in Text Streams. 2016.1-12, PI.
9. The National Key Technology R&D Program. Visual Text Analytics. 2015.1-12, PI

Selected Publications

Journal Papers

1. K Cao, M Liu, H Su, J Wu, J Zhu, **S Liu***. Analyzing the Noise Robustness of Deep Neural Networks. IEEE Transactions on Visualization and Computer Graphics (accepted).
2. C Chen, J Yuan, Y Lu, Y Liu, H Su, S Yuan, **S Liu***. OoDAnalyzer: Interactive Analysis of Out-of-Distribution Samples. IEEE Transactions on Visualization and Computer Graphics (accepted).
3. Q Wang, J Yuan, S Chen, H Su, H Qu, **S Liu***. Visual Genealogy of Deep Neural Networks. IEEE Transactions on Visualization and Computer Graphics (accepted).
4. J Yuan, C Chen, W Yang, J Xia, **S Liu***. A Survey of Visual Analytics Techniques for Machine Learning, Computational Visual Media. 2020 (accepted).
5. J Yuan, S Xiang, J Xia, L Yu, **S Liu***. Evaluation of Sampling Methods for Scatterplots, IEEE Transactions on Visualization and Computer Graphics, 2021.
6. Y Zhao, H Jiang, Q Chen, Y Qin, H Xie, Y Wu, **S Liu**, Z Zhou, J Xia, F Zhou. Preserving Minority Structures in Graph Sampling. IEEE Transactions on Visualization and Computer Graphics, 2021. (**Honorable Mention**).

7. Q Wang, Z Xu, Z Chen, Y Wang, **S Liu**, and H Qu. Visual Analysis of Discrimination in Machine Learning. *IEEE Transactions on Visualization and Computer Graphics*, 2021.
8. W Yang, Z Li, M Liu, Y Lu, K Cao, R Maciejewski, **S Liu**. Diagnosing Concept Drift with Visual Analytics, *IEEE VIS(VAST)*, 2020.
9. **S Liu**, X Wang, C Collins, W Dou, F Ouyang, M El-Assady, L Jiang, D. A. Keim. Bridging Text Visualization and Mining: A Task-Driven Survey. *IEEE Transactions on Visualization and Computer Graphics*, 25(7): 2482-2504, 2019.
10. **S Liu**, Chen, Y Lu, F Ouyang, B Wang. An Interactive Method to Improve Crowdsourced Annotations. *IEEE Transactions on Visualization and Computer Graphics*. 25(1):235-245, 2019.
11. Y Liang, X Wang, SH Zhang, SM Hu, **S Liu***. PhotoRecomposer: Interactive Photo Recomposition by Cropping. *IEEE Transactions on Visualization and Computer Graphics*. 24(10): 2728-2742, 2018. [IEEE TVCG spotlight article for Oct. 2018](#).
12. Y Wu, Z Chen, G Sun, X Xie, N Cao, **S Liu**, W Cui. StreamExplorer: A Multi-Stage System for Visually Exploring Events in Social Streams. *IEEE Transactions on Visualization and Computer Graphics*. 24(10): 2758-2772, 2018.
13. M Liu, J Shi, K Cao, J Zhu, **S Liu***. Analyzing the Training Processes of Deep Generative Networks. *IEEE Transactions on Visualization and Computer Graphics*, 24(1): 77 - 87, 2018. [ESI highly cited paper](#).
14. **S Liu**, J Xiao, J Liu, X Wang, J Wu, J Zhu. Visual Diagnosis of Tree Boosting Methods. *IEEE Transactions on Visualization and Computer Graphics*. 24(1): 163-173, 2018.
15. J. Choo, **S. Liu**. Visual Analytics for Explainable Deep Learning. *IEEE Computer Graphics and Applications*. 38 (4): 84-92, 2018. Featured in the Nov 2018 issue of *IEEE Computing Edge*.
16. M Liu; J Shi; Z Li; C Li; J Zhu; **S Liu***. Towards Better Analysis of Deep Convolutional Neural Networks. *IEEE Transactions on Visualization and Computer Graphics*. 23(1): 91-100, 2017. [ESI hot paper, highly cited paper](#).
17. **S Liu**, J Yin, X Wang, W Cui, K Cao, J Pei. Online Visual Analytics of Text Streams. *IEEE Transactions on Visualization and Computer Graphics*. 22(11): 2451 – 2466, 2016.
18. X Wang, **S Liu***, J Liu, J Chen, J Zhu, B Guo. TopicPanorama: A Full Picture of Relevant Topics. *IEEE Transactions on Visualization and Computer* 22(12): 2508 – 2521, 2016. [IEEE TVCG spotlight article for Dec. 2016](#).
19. M Liu, **S Liu***, X Zhu, Q Liao, F Wei, S Pan. An Uncertainty-Aware Approach for Exploratory Microblog Retrieval. *IEEE Transactions on Visualization and Computer Graphics*. 22(1): 250-259, 2016.
20. L Dong, F Wei, K Xu, **S Liu**, M Zhou. Adaptive Multi-Compositionality for Recursive Neural Network Models. *IEEE/ACM Transactions on Audio, Speech and Language Processing*. 24(3): 422-431, 2016
21. W. Dou, **S. Liu**. Topic- and Time-Oriented Visual Text Analysis. *IEEE Computer Graphics and Applications*. 36(4): 8-13, 2016.
22. **S. Liu**, Y. Chen, H. Wei, J. Yang, K. Zhou, S. Drucker. Exploring Topical Lead-Lag across Corpora. *IEEE Transactions on Knowledge and Data Engineering* 27(1): 115 - 129 , 2015
23. **S. Liu**, X. Wang, Y. Song, B. Guo. Evolutionary Bayesian Rose Trees. *IEEE Transactions on Knowledge and Data Engineering*. 27(6):1533-1546, 2015.
24. Y. Song, **S. Liu**, X. Liu, H. Wang. Automatic Taxonomy Construction from Keywords via Scalable Bayesian Rose Trees. *IEEE Transactions on Knowledge and Data Engineering*, *IEEE Transactions on Knowledge and Data Engineering*. 27(7): 1861-1874, 2015.

25. **S. Liu**, Y. Chen, H. Wei, J. Yang, K. Zhou, S. Drucker. Exploring Topical Lead-Lag across Corpora. *IEEE Transactions on Knowledge and Data Engineering* 27(1):115-129, 2015.
26. W. Cui, **S. Liu**, Z. Wu, H. Wei. How Hierarchical Topics Evolve in Text Streams. *IEEE Transactions on Visualization and Computer Graphics (IEEE InfoVis'14)*. 20(12): 2281-2290.
27. Y. Wu, **S. Liu**, K. Yan, M. Liu. OpinionFlow: Visual Analysis of Opinion Diffusion on Social Media. *IEEE Transactions on Visualization and Computer Graphics (IEEE VAST'14)*, 20 (12): 1763-1772.
28. G. Sun, Y. Wu, **S. Liu**, T. Peng, J. Zhu, R. Liang. EvoRiver: Visual Analysis of Topic Competition on Social Media. *IEEE Transactions on Visualization and Computer Graphics (IEEE VAST'14)*. 20 (12): 1753-1762.
29. C. Shi, Y. Wu, **S. Liu**, H. Zhou, H. Qu. LoyalTracker: Visualizing Loyalty Dynamics in Search Engines. *IEEE Transactions on Visualization and Computer Graphics (IEEE VAST'14)*. 20 (12): 1733-1742 (**Honorable Mention**).
30. **S. Liu**, W. Cui, Y. Wu, M. Liu. A Survey on Information Visualization: Recent Advances and Challenges. *The Visual Computer* (2014): 1-21.
31. **S. Liu**, Y. Wu, E. Wei, M. Liu, Y. Liu. StoryFlow: Tracking the Evolution of Stories. *IEEE Transactions on Visualization and Computer Graphics (IEEE InfoVis'13)* 19(12):2436-45, 2013.
32. Y. Song, S. Pan, **S. Liu**, F. Wei, M. X. Zhou, W. Qian. Constrained Text Clustering with Supervised and Unsupervised Constraints. *IEEE Transactions on Knowledge and Data Engineering*. 25(6): 1227-1239, 2013.
33. Y. Wu, X. Liu, **S. Liu**, K. Ma. ViSizer: A Visualization Resizing Framework. *IEEE Transactions on Visualization and Computer Graphics*. 19(2): 278-290, 2013.
34. P. Xu, Y. Wu, E. Wei, T.Q. Peng, **S. Liu**, J. J. H. Zhu, H. Qu. Visual Analysis of Topic Competition on Social Media. *IEEE Transactions on Visualization and Computer Graphics*. 19(12): 2012-2021, 2013 (*IEEE VAST'13*).
35. J. Yang, Y. Liu, X. Zhang, X. Yuan, Y. Zhao, S. Barlowe, **S. Liu**. PIWI: Visually Exploring Graphs Based on Their Community Structure. *IEEE Transactions on Visualization and Computer Graphics*. 19(6): 1034-1047, 2013.
36. G. Sun, Y. Wu, R. Liang, **S. Liu**. A Survey of Visual Analytics Techniques and Applications: State-of-the-Art Research and Future Challenges. *JCST*, 28(5): 852-867, 2013.
37. C. Shi, W. Cui, **S. Liu**, P. Xu, W. Chen, H. Qu. RankExplorer: Visualization of Ranking Changes in Large Time Series Data. *IEEE Transactions on Visualization and Computer Graphics (IEEE InfoVis'12)*. 18(12): 2669-2678, 2012.
38. N. Cao, Y. Lin, X. Sun, D. Lazer, **S. Liu**, H. Qu. Whisper: Tracing the Spatiotemporal Process of Information Diffusion in Real Time. *IEEE Transactions on Visualization and Computer Graphics*. 18(12): 2649-2658, 2012 (*IEEE InfoVis'12*).
39. **S. Liu**, M. X. Zhou, S. Pan, Y. Song, W. Qian, W. Cai, X. Lian. TIARA: Interactive, Topic-Based Visual Text Summarization and Analysis. *ACM Transactions on Intelligent Systems and Technology* 3(2): 25, 2012 (**Impact factor: 9.39**).
40. J. Alsakran, Y. Chen, D. Luo, Y. Zhao, J. Yang, W. Dou, **S. Liu**. Real-Time Visualization of Streaming Text with a Force-Based Dynamic System. *IEEE Computer Graphics and Applications* 32(1): 34-45, 2012.
41. L. Tan, Y. Song, **S. Liu**, L. Xie. ImageHive: Interactive Content-Aware Image Summarization. *IEEE Computer Graphics and Applications* 32(1): 46-55, 2012.
42. W. Cui, **S. Liu**, L. Tan, C. Shi, Y. Song, Z. Gao, H. Qu, X. Tong. TextFlow: Towards Better Understanding of Evolving Topics in Text. *IEEE Transactions on Visualization and Computer Graphics*. 17(12): 2412-2421, 2011 (*IEEE InfoVis'11*).
43. Y. Wu, T. Provan, F. Wei, **S. Liu**, Kwan-Liu Ma. Semantic-Preserving Word Clouds by Seam Carving. *Computer Graphics Forum* 30(3): 741-750 (2011) (*EuroVis 2011*).

44. Y. Wu, F. Wei, **S. Liu**, N. Au, W. Cui, H. Zhou, and H. Qu. OpinionSeer: Interactive Visualization of Hotel Customer Feedback. *IEEE Transactions on Visualization and Computer Graphics*. 16(6): 1109-1118, 2010 (IEEE InfoVis'10).
45. N. Cao, J. Sun, Y. Lin, D. Gotz, **S. Liu**, H. Qu. FacetAtlas: Multifacet Visualization for Rich Text Corpora. *IEEE Transactions on Visualization and Computer Graphics (InfoVis'10)*. 16(6): 1172-1181, 2010.
46. F. Wei, W. Li, **S. Liu**. iRANK: A rank-learn-combine framework for unsupervised ensemble ranking. *Journal of the American Society for Information Science and Technology*. 61(6): 1232-1243 (2010).
47. W. Cui, Y. Wu, **S. Liu**, F. Wei, M. Zhou, H. Qu. Context-Preserving, Dynamic Word Cloud Visualization. *IEEE Computer Graphics & Applications*, 30(6): 42 – 53, 2010.
48. L. Zhang, T. Li, **S. Liu**, Y. Pan. An Integrated System for Building Enterprise Taxonomies. *Information Retrieval*, 10(4-5): 365-391, 2007.
49. **S. Liu**, S. Hu, Y. Chen, J. Sun. Reconstruction of Curved Solids from Engineering Drawings. *Computer-aided design*, 33(14): 1059-1072, 2001.
50. **S. Liu**, S. Hu, J. Sun. Two Accelerated Techniques for 3D Reconstruction. *Journal of Computer Science and Technology*, 2000.

Conference Papers

51. S Xiang, X Ye, J Xia, J Wu, Y Chen, **S Liu**. Interactive Correction of Mislabeled Training Data. *IEEE VIS(VAST)*. 2019.
52. M Liu, **S Liu***, H Su, K Cao, J Zhu. Analyzing the Noise Robustness of Deep Neural Networks. *IEEE VIS(VAST)*. 2018.
53. J Chen, J Zhu, J Lu, **S Liu**. Scalable training of hierarchical topic models. *Proceedings of the VLDB Endowment*. 11(7):826-39, 2018
54. M Liu, L Jiang, J Liu, X Wang, J Zhu, S Liu. Improving Learning-from-Crowds through Expert Validation. *IJCAI* 2017.
55. X Wang, **S Liu***, Y Chen, TQ Peng, J Su, J Yang, B Guo. How Ideas Flow across Multiple Social Groups *IEEE VIS*, 2016.
56. Y Zhong, **S Liu***, X Wang, J Xiao, Y Song. Tracking Idea Flows between Social Groups, *AAAI* 2016.
57. A Bhadury, J Chen, J Zhu, **S Liu**. Scaling up Dynamic Topic Models. *WWW* 2016.
58. Y Hu, T Polk, J Yang, Y Zhao, **S Liu**. Spot-Tracking Lens: A Zoomable User Interface for Animated Bubble Charts. *PacificVis* 2016.
59. Y Meng, H Zhang, M Liu, **S Liu**. Clutter-Aware Label Layout. *PacificVis*, 207-214, 2015
60. **S. Liu**, X. Wang, J. Chen, J. Zhu, B. Guo. TopicPanorama: a Full Picture of Relevant Topics. *IEEE VIS (VAST) 2014*: 183-192.
61. W. Cui, X. Wang, **S. Liu**, N. H. Riche, T. M. Madhyastha, K. Ma, B. Guo. Let It Flow: a Static Method for Exploring Dynamic Graphs. *PacificVis* 2014.
62. X. Wang, **S. Liu**, Y. Song, B. Guo. Mining evolutionary multi-branch trees from text streams. *KDD*: 722-730, 2013 (Research Track).
63. Suin. Kim, J. Zhang, Z. Chen, A. H. Oh, **S. Liu**. A Hierarchical Aspect-Sentiment Model for Online Reviews. *AAAI* 2013.
64. F. Wu, Y. Song, **S. Liu**, Y. Huang, Z. Liu. Lead-lag analysis via sparse co-projection in correlated text streams. *CIKM* 2013: 2069-2078, 2013.
65. S. Pan, M. X. Zhou, Y. Song, W. Qian, F. Wang, **S. Liu**. Optimizing temporal topic segmentation for intelligent text visualization. *IUI* 2013: 339-350.
66. X. Liu, Y. Song, **S. Liu**, H. Wang. Automatic taxonomy construction from keywords. *KDD* 2012: 1433-1441, 2012 (Research Track).

67. M. Hu, **S. Liu**, F. Wei, Y. Wu, J. T. Stasko, K. Ma. Breaking news on twitter. CHI 2012: 2751-2754.
Media report: [Washington Times](#); [ReadWriteWeb](#); [LA Times](#); [Poynter](#); [GT news](#)
68. Z. Gao, Y. Song, **S. Liu**, H. Wang, H. Wei, Y. Chen, W. Cui. Tracking and Connecting Topics via Incremental Hierarchical Dirichlet Processes. ICDM 2011: 1056-1061.
69. L. Shi, N. Cao, **S. Liu**, W. Qian, L. Tan, G. Wang, J. Sun, C. Lin. HiMap: Adaptive visualization of large-scale online social networks. IEEE PacificVis, 41-48, 2011.
70. J. Zhang, Y. Song, C. Zhang, **S. Liu**. Evolutionary hierarchical dirichlet processes for multiple correlated time-varying corpora. KDD 2010: 1079-1088 (Research Track).
71. F. Wei, **S. Liu**, Y. Song, S. Pan, M. X. Zhou, W. Qian, L. Shi, L. Tan, Q. Zhang. TIARA: a visual exploratory text analytic system. KDD 2010: 153-162.
72. Y. Song, S. Pan, **S. Liu**, F. Wei, M. X. Zhou, W. Qian. Constrained Co-clustering for Textual Documents. AAAI, 2010.
73. L. Shi, F. Wei, **S. Liu**, L. Tan, X. Lian, M. X. Zhou. Understanding text corpora with multiple facets. IEEE VAST 2010: 99-106.
74. Y. Lin, J. Sun, N. Cao, **S. Liu**. ContexTour: Contextual Contour Visual Analysis on Dynamic multi-Relational Clustering. SDM 2010: 418-429.
75. W. Cui, Y. Wu, S. Liu, F. Wei, M. X. Zhou, H. Qu. Context preserving dynamic word cloud visualization. PacificVis 2010: 121-128.
76. J. Sun, S. Papadimitriou, C.Y. Lin, N. Cao, **S. Liu**, W. Qian. MultiVis: Content-Based Social Network Exploration through Multi-way Visual Analysis. SDM, 1063-1074, 2009.
77. **S. Liu**, M. X. Zhou, S. Pan, W. Qian, W. Cai, X. Lian. Interactive, Topic-based Visual Text Summarization and Analysis. CIKM, 543-552, 2009. (**Candidate of the best paper award**)
78. X. Lou, **S. Liu**, T. Wang. FanLens: A Visual Toolkit for Dynamically Exploring the Distribution of Hierarchical Attributes. *IEEE PacificVis 2008*, 51-158.
79. Y. Wang, **S. Liu**, J. Feng, and L. Zhou. Mining Naturally Smooth Evolution of Clusters from Dynamic Data. *SDM 2007*, 125-134, 2007.
80. **S. Liu**, Y. Pan, L. Yang, W. Liu. An LOD Model for Graph Visualization and its Application in Web Navigation. *APWEB05*, 441-452, 2005.
81. **S. Liu**, S. Hu, C. Tai, J. Sun. A Matrix-Based Approach to Reconstruction of 3D Objects from Three Orthographic Views. PG 2000: 254~261.

Selected Inventions

53 granted patents, including 26 US patents and 27 Chinese and international patents.

- ◆ US patent 9,501,569, Automatic Taxonomy Construction From Keywords. Granted on Nov 22, 2016
- ◆ US patent 8788494, Method, device and system for processing, browsing and searching an electronic documents, granted Jul. 22, 2014.
- ◆ US patent 8650483. Method and apparatus for improving the readability of an automatically machine-generated summary, granted Feb. 11, 2014.
- ◆ US patent 8621359, Method and apparatus for generating 3D carousel tree data visualization and related device, granted Dec. 31, 2013.
- ◆ US patent 8554720, Processing, browsing and extracting information from an electronic document, granted Oct. 8, 2013.
- ◆ US patent 8244734. Apparatus and method for transmitting file and apparatus and method for receiving file, granted Aug. 14, 2012.
- ◆ US patent 8245135. Producing a visual summarization of text documents, granted Aug. 14, 2012.
- ◆ US patent 7865530. Constructing and maintaining a personalized category tree, displaying documents by category and personalized categorization system, granted Jan. 4, 2011.

- ♦ US patent 7899017. Switching between two communication modes in a WLAN, granted Mar. 1, 2011.
- ♦ US patent 7895195. Method and apparatus for constructing a link structure between documents, granted Feb. 22, 2011.
- ♦ US patent 7870509. Method and apparatus for improving the visibility of a treemap, granted Jan. 11, 2011.
- ♦ US patent 7831910. Computer aided authoring, electronic document browsing, retrieving, and subscribing and publishing, granted Nov. 9, 2010.
- ♦ US patent 7685088. System and method for generating new concepts based on existing ontologies, granted Mar. 23, 2010.
- ♦ US patent 7519528. Building concept knowledge from machine-readable dictionary, granted Apr. 14, 2009.
- ♦ US patent 7502786. Visual method and apparatus for enhancing search result navigation, granted Mar. 10, 2009.
- ♦ US patent 7499934. Method for linking documents, granted Mar. 3, 2009.
- ♦ US patent 7376634. Method and apparatus for implementing Q&A function and computer-aided authoring, granted May 20, 2008.
- ♦ US patent 7366715. Processing, browsing and extracting information from an electronic document, granted Apr. 29, 2008.
- ♦ US patent 7305406. Computer aided authoring, electronic document browsing, retrieving, and subscribing and publishing, granted Dec. 4, 2007.
- ♦ ZL200810149341.X, Method and device for transforming between dynamic diagram sequences shown by cartoons, N. Cao, S. Liu, W. Cai, L. Tan. Granted May 8, 2013.
- ♦ 5063418. Method, interaction method and apparatus for visualizing hierarchy data with angular chart. X. Lou, **S. Liu**, H. Su, H. Young, granted Aug. 17, 2012.
- ♦ ZL200810109803.5. An interactive method to generate personal and maintain personal bookmarks. **S. Liu**, N. Cao, X. Lou, T. Wang, W. Cai, granted May 30, 2012.
- ♦ 1104039. A tag-path based method for automatically managing file exchange in computer networks. M. Qiu, **S. Liu**, H. Ding, J. Dong, granted Jan. 2, 2012.
- ♦ ZL200810108432.9. A method of visualizing huge amount of information on a sphere. N. Cao, **S. Liu**, granted Nov. 9, 2011.
- ♦ ZL200710107720.8. Method for generating 3d carousel tree data visualization and related device. N. Cao, **S. Liu**, Hui SU, granted May 4, 2011.
- ♦ ZL200710160532.1. Method and apparatus for visualizing hierarchical data. N., **S. Liu**, T. Wang, granted Apr. 20, 2011.
- ♦ 1013052. An approach to tree visualization with nodes cascading. H. Lv, **S. Liu**, M. Wattenberg, X. Ma, N. Cao, granted Jan. 28, 2011.
- ♦ ZL200610115195.X. Method and computer system for displaying a weighted tree based on hyperbolic geometry. **S. Liu**, T. Li, granted Jul. 7, 2010.
- ♦ ZL200410004288.6. Method of constructing progressive model for visualizing semantic network. **S. Liu**, Z., Y. Pan, L. Zhang, Granted May 26, 2010.
- ♦ ZL200610079019.5. An approach to tree visualization with nodes cascading. H. Lv, **S. Liu**, M. Wattenberg, X. Ma, N. Cao, granted May 12, 2010.
- ♦ ZL200610076095.0. Method and system for constructing a labeled treemap with balanced layout. H. Lv, **S. Liu**, M. Wattenberg, X. Ma, granted Jan. 13, 2010.
- ♦ ZL200510088825.4. An iterative method of construction a web-like link structure for the enterprise search. **S. Liu**, L. Yang, granted Apr. 29, 2009.
- ♦ ZL200610001267.8. A visual method and system for enhancing search result navigation. **Sh. Liu**, Z. Su, granted Apr. 22, 2009.

- ♦ ZL200410054631.8. A method for constructing and maintaining a personalized category tree. **S. Liu**, L. Yang, granted Sep. 9, 2009.
- ♦ ZL200310123108.1. Authoring for search engines. **S. Liu**, L. Yang, granted Nov. 26, 2008.
- ♦ ZL02160013.9. A computer-aided method for building concept knowledge from machine readable dictionaries. **S. Liu**, L. Yang, granted Dec. 13, 2006.

Awards

2019	Excellent class teacher of Tsinghua university
2016	China CAD/CG 2016 best student award.
2014	IEEE VAST 2014 Honorable Mention
2012	Microsoft Ship-It award
2011	Microsoft Ship-It award
2010	Microsoft star award
2010	IBM Research accomplishment
2009	CIKM 2006 Honorable Mention
2009	Retention award
2008	Retention award
2007	IBM Research accomplishment
2007	GTO special contribution award
2006	IBM master inventor
2005	Retention award
2002-now	30+ patent awards

Technology Transfer

2018	Integrate CNNVis and BOOSTVis with Alibaba's cloud
2017	Integrate BOOSTVis with Microsoft LightGBM
2012	BingFLIP: Bing
2012	FastRank Debugging Tool: Bing
2012	Graph visualization: Microsoft Academic Search
2011	Visual interleaving analysis toolkit: Bing
2010	TIARA (Visual Analytics): IBM Cognos Including content analytics, eDiscovery analyzer, Cognos consumer insight http://researcher.watson.ibm.com/researcher/view_pic.php?id=143 http://www.performance-ideas.com/2011/10/13/cognos-consumer-insight/
2008	Corporate Brand and Reputation Analysis (COBRA): IBM global service