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VISUAL VISITOR ANALYTICS

(Deep) machine learning and computer vision research blog monthly average pageviews around *8500+*; total pageviews *378,496* from Mar 24, 2017 to December 24, 2020.

ACADEMIC APPOINTMENTS

Assistant Professor of Geographic Information Science **January 2020 – present**
Department of Geography and Environmental Studies
The University of New Mexico

Assistant Professor *(Secondary Appointment)* **April 2020 – present**
Department of Computer Science
The University of New Mexico

Postdoctoral Research Associate November 2018 – December 2019
Information Sciences Group (CCS-3)
Los Alamos National Laboratory (LANL)

Postdoctoral Researcher September 2016 – August 2018
GeoVISTA Center, Department of Geography and Institute for CyberScience
The Pennsylvania State University

Visiting Scholar June 2017 – July 2017
CISL (Computational Information Systems Laboratory), Mesa Lab
NCAR (National Center for Atmospheric Research)

Postdoctoral Research Assistant September 2015 – August 2016
School of Computing and Information Science, The University of Maine

RESEARCH INTERESTS

- Geographic Information Science (GIScience), Geospatial Big Data, Geovisualization, Geospatial Artificial Intelligence (GeoAI)
- Deep Learning, Machine Learning, Computer Vision, Image Analysis, Visual Analytics
- Natural Hazards, Indoor Navigation, Indoor Mapping, Scene Understanding

EDUCATION

Ph.D., Spatial Information Science and Engineering **2010 – 2015**
University of Maine Orono, USA
Ph.D. Advisors: Dr. Michael Worboys and Dr. Kate Beard
Dissertation Title: *Theories and models of indoor space*

M.Sc., Cartography and Geographic Information Systems (GIS) **2006 – 2009**
Fujian Normal University Fuzhou, China
M.Sc. Advisors: Dr. Guangfa Lin and Dr. Youfei Chen
Thesis Title: *Auto-match between text and map based on Chinese word segmentation: A case study of land use policy text*

B.Sc., Geographic Information Systems (GIS) **2002 – 2006**
Yunnan Normal University Kunming, China
Thesis Title: *Design and development of transport information system based on MapObjects: A case of Kunming City*

PUBLICATIONS

Academic Profiles

Google Scholar | **ResearchGate** | **ORCID**

Refereed Papers

Published (*Total: **21;** h-index: **9;** First-author: **10**; Corresponding author: **11**, where * indicates the corresponding author**;** underlined indicates advisees**)***

1. **Yang, L***., MacEachren, A. M., and Mitra, P. Geographical feature classification from text using (active) convolutional neural networks. In *Proceedings of the IEEE International Conference on Machine Learning and Applications (ICMLA)*. Virtual, December 2020.

2. **Yang, L***., Gong, M., and Asari, V K. Diagram Image Retrieval and Analysis: Challenges and Opportunities. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops*. Virtual, June 2020. **(has 1 citation as of 2020/12/24, Google Scholar)**

3. Manish Bhattarai*., Oyen, D., Castorena J., **Yang, L**. and Wohlberg, B. Diagram Image Retrieval using Sketch-Based Deep Learning and Transfer Learning. In *Proceedings of the*

IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops. Virtual, June 2020.

4. Potts, C., **Yang, L***., Oyen, D., and Wohlberg, B. A topological graph-based representation for denoising low quality binary images. In *the IEEE International Conference on Computer Vision (ICCV) 2019 Workshop on Scene Graph Representation and Learning*. Seoul, South Korea, October 2019. **(has 1 citation as of 2020/12/24, Google Scholar)**

5. **Yang, L***., Oyen, D., and Wohlberg, B. Image classification using topological features automatically extracted from graph representation of images. *Proceedings of the 15th International Workshop on Mining and Learning with Graphs (MLG)*. Anchorage, Alaska, August 2019. **(has 4 citations as of 2020/12/24, Google Scholar)**

6. **Yang, L***., Oyen, D., and Wohlberg, B. A Novel Algorithm for Skeleton Extraction From Images Using Topological Graph Analysis. In *the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2019 Workshop on Deep Learning for Geometric Shape Understanding*. Long Beach, California, June 2019. **(has 7 citations as of 2020/12/24, Google Scholar)**

7. **Yang, L***. and Cervone, G. Analysis of remote sensing imagery for disaster assessment using deep learning: a case study of flooding event. *Soft Computing*, 23(24), 13393-13408, 2019. **(has 13 citations and 685 downloads on the journal website as of 2020/12/24, Google Scholar)**

8. Yang, N.*, MacEachren, A. M., and **Yang, L.** TIN-based tag map layout. *The Cartographic Journal*, 56(2), 101-116, 2019. **(has 1 citation as of 2020/12/24, Google Scholar)**

9. **Yang, L**.*, MacEachren, A. M., Mitra, P., and Onorati, T. Visually-enabled active deep learning for (geo) text and image classification: a review. *ISPRS International Journal of Geo-Information*, 7(2), 65, 2018. (**has 5139 views, 4316 downloads, and 28 citations as of 2020/12/24, Google Scholar.** It is ranked as the top **6 most viewed paper** among the papers published within 3 years on the journal website.)

10. Pan, Y., Zhang, X.*, Cervone, G., and **Yang, L.** Detection of Asphalt Pavement Potholes and Cracks Based on the Unmanned Aerial Vehicle Multispectral Imagery. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, (99): 1-12, 2018. **(has 31 citations as of 2020/12/24, Google Scholar)**

11. MacEachren, A. M.*, Caneba, R., Chen, H., Cole, H., Domanico, E., Triozzi, N., Xu, F., and **Yang, L.** Is This Statement About A Place? Comparing two perspectives (Short Paper). In *LIPIcs-Leibniz International Proceedings in Informatics* (Vol. 114). Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, 2018.

12. Simpson, M.*, Wallgrün, J. O., Klippel, A., **Yang, L.**, Garner, G., Keller, K., Oprean, D., and Bansal, S. "Immersive analytics for multi-objective dynamic integrated climate-economy (DICE) models." *In Proceedings of the 2016 ACM companion on interactive surfaces and spaces*, 99-105. ACM, 2016. **(has 12 citations as of 2020/12/24, Google Scholar)**

13. **Yang, L.*** and Worboys, M. Generation of navigation graphs for indoor space. *International Journal of Geographical Information Science*, 29(10): 1737-1756, 2015. **(has 81 citations as of 2020/12/24, Google Scholar)**

14. **Yang, L.*** and Worboys, M. A navigation ontology for outdoor-indoor space. *Third ACM SIGSPATIAL International Workshop on Indoor Spatial Awareness (ISA 2011)*, November, Chicago, IL. 2011. **(has 70 citations as of 2020/12/24, Google Scholar)**

15. Ma, J., Lin, G.*, Chen, J. and **Yang, L.** An improved topographic wetness index considering topographic position. *Geoinformatics*, *18th International Conference*. IEEE, 2010. **(has 17 citations as of 2020/12/24, Google Scholar)**

16. Lin, L., Lin, G.*, Yan, X., **Yang, L.,** Yang, Z. and Chen, A. Surface modeling of human population on subdistrict scale using SPOT5 image and census data: A case study of Xiamen, PR China. *Geoinformatics*, *18th International Conference*. IEEE, 2010.

17. **Yang, L.*,** Lin, G., Chen, A., Chen, Y., and Wen, X. A spatio-temporal data model for administrative division place names: A case study of Xiamen. *Proceedings of the 6th International Symposium on Digital Earth (ISDE6): Digital Earth in Action*, Organized by International Society for Digital Earth (ISDE) and Chinese Academy of Sciences(CAS), Beijing, P. R. China, September 9-12, 2009. **(has 1 citation as of 2020/12/24, Google Scholar)**

18. **Yang, L.*,** Lin, G. and Chen, Y. Color processing methods of different seasonal SPOT5 images before mosaic. *Remote Sensing Technology and Application*, 24(2): 140-145, 2009. (in Chinese) **(has 3 citations as of 2020/12/24, Google Scholar)**

19. You, L., Lin, G.*, Yang, C., Lin, Q. and **Yang, L.** The effects of spatial scales on landscape indices – a case study of the landuse pattern of Xiamen island. *Geo-Information Science*, 10(1): 74-79, 2008. (in Chinese) **(has 14 citations as of 2020/12/24, Google Scholar)**

20. Jiao, Y.* and **Yang, L.** Multi-scale research on the fractal beauty of Hani terrace based on remote sensing and geographic information system. *Journal of Mountain Science*, 26(3): 339-346, 2008. (in Chinese) **(has 3 citations as of 2020/12/24, Google Scholar)**

21. Jiao, Y.* and **Yang, L.** The fractal characteristics of Hani terrace in Ailao mountain. Acta *Ecologica Sinica*, 27(11): 4583-4589, 2007. (in Chinese) **(has 5 citations as of 2020/12/24, Google Scholar)**

Posters, Short Papers, and Talks (not Included Above)

1. **Yang, L.**, Cervone, G., MacEachren, A. M., Mitra, P., and Baka J. Visually-enabled Image and Text Analysis Using Machine Learning and Deep Learning. Poster presentation at the *Penn State ICS Symposium 2018: Harnessing the Power of Data.* Penn State University, University Park, PA. March 2018.

2. **Yang, L.** A unified OI-space navigation model supporting seamless navigation between and within built indoor and outdoor spaces. Doctoral colloquium talk at the *Conference on Spatial Information Theory (COSIT 2013)*, September, Scarborough, UK. 2013.

3. **Yang, L.** A navigation ontology for outdoor-indoor space. Poster presentation at the *UMaine Graduate Expo*, April 2012, University of Maine.

4. **Yang, L.** and Worboys, M. Similarities and differences between outdoor and indoor space from the perspective of navigation. Poster presentation at the *Conference on Spatial Information Theory (COSIT 2011)*, September, Belfast, ME. 2011. **(cited by 17 as of 2020/01/11, Google Scholar)**

5. **Yang, L.** A unified informatic framework supporting seamless navigation within built indoor and outdoor spaces. Doctoral colloquium talk at the *Conference on Spatial Information Theory (COSIT 2011)*, September, Belfast, ME. 2011.

INVITED TALKS

1. "Advancing Patent Image Data Analysis Using Topological Graph-Based Representations and Methods" (pre-recorded talk video can be found at HERE), *AI & Patent Data Workshop*, organized by Center for AI and Patent Analysis, Carnegie Mellon University, December 2020.

2. "Advancing Machine Learning and Machine Vision Using Topological Graph-Based Representations, Methods, and Algorithms", Computer Science Colloquium Series, Department of Computer Science, The University of New Mexico, Albuquerque, NM, March 2020.

3. "Advancing Machine Learning and Machine Vision Using Topological Graph-Based Representations, Methods, and Algorithms", Group seminar talk, Information Sciences Group (CCS-3), Los Alamos National Laboratory (LANL), Los Alamos, NM, November 2019.

4. "Advancing Machine Learning and Machine Vision Using Topological Graph-Based Representations, Methods, and Algorithms", the New Mexico Big Data and Analytics Summit Conference, Albuquerque, NM, October 2019.

5. "Enhancing GIScience and Remote Sensing Using GeoAI and Geovisualization", Department of Geography and Environmental Studies, The University of New Mexico, Albuquerque, NM, February 2019.

6. "Enhancing GIScience and Remote Sensing Using GeoAI", Research Computing Center & Mansueto Institute for Urban Innovation, The University of Chicago, Chicago, IL, July 2018.

7. "Introduction to Deep Learning with TensorFlow" (with hands-on tutorial: using TensorFlow for image classification on NCAR HPC cluster), *NCAR SEA Class and Hands-on Workshop: Spark and TensorFlow*, NCAR (National Center for Atmospheric Research), Boulder, CO. June 2017.

8. "What is Deep Learning", *the Geospatial Data Science Workshop (GDS 2017)* at Penn State University, University Park, PA. February 2017.

RESEARCH GRANTS

Externally Funded Grants

June 2017	**Liping Yang (PI),** Guido Cervone (CoPI), NCAR/CISL Summer Research Grant, Experiments with TensorFlow and Apache Spark on Cheyenne and Yellowstone supercomputers for image classification and segmentation.
May 2017	**Liping Yang (PI)**, Guido Cervone (CoPI), Alan M. MacEachren (CoPI), NVIDIA GPU Grant Proposal, NVIDIA awarded one Titan X Pascal GPU card to support research for big geospatial data challenges using machine leaning and deep learning.
2016 – 2018	Guido Cervone (PI), **Liping Yang** (**Postdoc**), ONR, Research Grant, Proposal number: N00014-16-1-2543, Fusing social media and aerial radiological measurements of study CBRNE emergencies.
2015 – 2016	Kate Beard (PI), **Liping Yang (Postdoctoral Research Assistant)**, NSF, Research Grant, Proposal number: CDI-1028895, Perception of indoor scene layouts by machines and visually impaired users.
2010 – 2014	Michael Worboys (PI), Nicholas Giudice (CoPI), **Liping Yang (Graduate Research Assistant)**, NSF, Research Grant, Proposal number: IIS-0916219, Information integration and human interaction for indoor and outdoor spaces.

Internally Funded Grants

2020 – 2022	Diane Oyen (PI), **Liping Yang (CoPI),** Brendt Wohlberg, DOE LANL Laboratory Directed Research & Development (LDRD), Exploratory Research (ER), Research Grant, Proposal number: 20200041ER, Topological relation-based image analysis using graphs, $927,000. **(*Before leaving her position at LANL for her tenure track faculty position at UNM, Liping was the CoPI of this grant*. Liping Yang was the major and significant contributor of the funded proposal.)**
2017 – 2018	Alan M. MacEachren (PI), Jennifer Baka (CoPI), Prasenjit Mitra (CoPI), **Liping Yang (Postdoc)**, Internal (Penn State) Institute for CyberScience Seed Grant, Comment analytics: Leveraging big unstructured data to understand spatial and temporal variations in public response to government policy.

TEACHING

Courses Taught *(Instructor)* at the University of New Mexico

GEOG 525	*Advanced GIScience Seminar* (Fall 2020)
GEOG 380L	*Basic Statistics for Geographers* (Fall 2020)
GEOG 485L/585L	*Internet Mapping* (Spring 2020)

Courses Taught *(Co-Instructor)* at Penn State University

GEOG 461W *Dynamic Cartographic Representation* (Fall 2017)

Courses Taught *(Guest Instructor)* at Penn State University

GEOG 597 *Big Data & Place* (Spring 2018)

Invited lecture: *Tweet analysis about places using machine learning with Python (brief machine learning theory and hands-on tutorials)*

MENTORING

Graduate Committees (University of New Mexico, *Department of Geography and Environmental Studies)*

First advisor of ongoing doctoral degrees

- Sarigai Sarigai

First advisor of ongoing master degrees

- Roald Kern

External committee member of ongoing doctoral degrees

- Ming Gong (University of Dayton, *Department of Electrical and Computer Engineering*)

Information Sciences Group, LANL

Summer 2019 Advised three summer intern graduate students for the Applied Machine Learning summer school

- Catherine Potts (3rd year Ph.D. student, Department of Mathematical Sciences, Montana State University)
- Ming Gong (2nd year Ph.D. student of Electrical Engineering, University of Dayton)
- Manish Bhattarai (3rd year Ph.D. student, Department of Electrical and Computer Engineering, University of New Mexico)

HONORS AND AWARDS

2014 – 2015	Michael J. Eckardt Dissertation Fellowship in MEIF (Maine Economic Improvement Fund) Areas, University of Maine, USA
2010 – 2014	Graduate Research Assistantship, University of Maine, USA
2011	ACM SIGSPATIAL GIS 2011 NSF Student Travel Grants, USA
2010	ACM SIGSPATIAL GIS 2010 NSF Student Travel Grants, USA
2005	Yunnan Province Government Scholarship (Top level), China
2004	National Scholarship (Top level), China

PROFESSIONAL SERVICE & ASSOCIATIONS

National Science Foundation (NSF) proposal review

- GSS program (2018 – present)
- MMS program (2020 – present)

Journals reviewed:

- *International Journal of Geographical Information Science* (IJGIS) [2016 – present] ***(#1 journal in GIScience)***
- *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)* [2020 – present] ***(#1 journal in Computer Vision, Machine Learning and Deep Learning)***
- *Remote Sensing* [2018 – present] **(One of the premier journals in Remote Sensing)**
- *ISPRS International Journal of Geo-Information* (ISPRS IJGI) [2018 – present]
- Other journals [2018 – present]:
    - *Sensors;*
    - *Machine Learning and Knowledge;*
    - *Entropy;*
    - *Information;*
    - *Sustainability;*
    - *Journal of Hydrology: Regional Studies*

Conference organized:

- ***Primary organizer*** *-- IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2020 Workshop: Diagram Image Retrieval and Analysis (DIRA): Representation, Learning, and Similarity Metrics*
- *Co-organizer -- IEEE International Conference on Machine Learning and Applications (IEEE ICMLA) 2020 Special Session: "AI with Geographic Information Systems for Social Good"*

Conference program committee:

- *International Conference on Computer Vision (ICCV) 2019 Workshop: Scene Graph Representation and Learning*

Internal Service

Reviewer, Penn State Institute for CyberScience Seed Grant Proposal, Spring 2017

Judge, EMS graduate poster competition, Spring 2017, Penn State University

Membership of Professional Societies

2016 – 2017	Member of International Association of Chinese Professionals in Geographical Information Sciences (CPGIS)
2016 – 2017	Education Committee Member of CPGIS
2016 – 2017	Member of Association of American Geographers (AAG)

COMPUTER SKILLS

- **GIS:** ArcGIS, ArcObjects, ArcGIS Engine, QGIS, ERDAS Imagine, PCI, IDRISI.
- **Programming languages:** C/C++, Java, Python, JavaScript, Shell Scripting, C#, Visual Basic.NET, Octave, Prolog, NetLogo.
- **Database:** MySQL, MongoDB, SQLite, PostgreSQL, PostGIS, ESRI Geodatabase, Microsoft SQL Server.
- **Document and web markup languages:** LaTeX, XML, HTML.
- **3D modeling:** Unity3D, Blender.
- **Statistics:** Python**,** R, SPSS, S-PLUS.
- **Image processing:** OpenCV, Scikit-image, NetworkX, Processing, Point Cloud Library, OpenNI, Kinect.
- **Machine learning and deep learning:** PyTorch**,** TensorFlow, Scikit-Learn, Keras, NumPy, Pandas, Matplotlib, Seaborn, Xarray, IPython, Jupyter Notebook, Google Colaboratory, Gensim, NLTK, Conda, Virtualenv, Amazon Mechanical Turk (MTurk) crowdsourcing data Requester.
- **High performance computing:** Apache Spark, OpenMP, MPI, Microsoft Azure cloud computing, Apache Hadoop.
- **Geoparsing:** GeoTxt, GeoPy, GeoNames, Google Cloud Natural Language API.
- **Web development:** Django, Node.js, CSS, JavaScript, jQuery, AJAX, Bootstrap, D3.js, DC.js, Crossfilter.js, Leaflet.js, Turf.js, Highcharts.js, JSON, GeoJSON, TopoJSON, Mapbox, OpenStreetMap.
- **Version control tools:** Git, GitHub, GitLab, Bitbucket.
- **Platforms:** Linux (Ubuntu, CentOS, Red Hat), Windows, Mac OS X.
- **General:** Microsoft Office Suite, Apache OpenOffice, LibreOffice.
- **Others:** Protégé, Adobe Photoshop, tmux.