

Aditeya Pandey



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SUMMARY

I am a Ph.D. candidate in Computer Science at Northeastern University. I develop visualization tools to assist data scientists in performing critical decision-making tasks. My research has contributed to novel visualization tools in the domain of medical diagnosis and cybersecurity. I also develop visualization recommendation systems to augment the capability of practitioners to choose appropriate visualization techniques.

EDUCATION

Doctor of Philosophy (Ph.D.) | Computer Science

Northeastern University

Sep. 2016 – May 2022
Boston, MA, United States

Bachelor of Technology and Engineering (B.Tech.) | Computer Science

KIIT University

Aug. 2009 – May 2013
Bhubaneswar, India

WORK EXPERIENCE

Ph.D. Candidate

Northeastern University

Sep. 2016 – Present
Boston, MA, US

- **Thesis Title:** *The Role of Data and Tasks in Visualization Design and Recommendation Systems*
- **Thesis Advisor:** Dr. Michelle A. Borkin
- **Task Survey For Tree Visualizations:** Curated a dataset of 200+ analytical tasks from a survey of over 1000+ tree visualization research articles. Developed a website for researchers and practitioners to explore the curated dataset of tree visualization tasks. [Code](#) | [Video](#) | [Paper](#)
- **CerebroVis:** Developed a novel network visualization layout to facilitate the identification of cerebrovascular abnormalities in the human brain. [Code](#) | [Video](#) | [Paper](#)
- **Picture Penguin:** Developed a novel mobile application to explore and find personal photos visually. [Code](#) | [Video](#)
- **Timeline Shape Evaluation:** Conducted a crowd-sourced study on Amazon's Mechanical Turk to measure the effectiveness of different timeline shapes. [Paper](#)

Visiting PhD Student

Harvard Medical School

May 2020 – Aug. 2020
Boston, MA, US

- **Advisor:** Dr. Nils Gehlenborg
- **GenoREC:** Developed a system to recommend genomics visualizations to genomics analysts. The system allows analysts to specify their data and task description and uses a knowledge-based recommendation engine to generate an appropriate visualization technique. [Code](#) | [Video](#)

Data Visualization Engineer Intern

Illumio Inc.

May 2019 – Aug. 2019
Sunnyvale, CA, US

- **Manager:** Mr. Brian Staats
- **Segmentrix:** Developed a visualization system using React framework which allowed security analysts to write proactive network security policies. Rendered visualization with Canvas to handle the scale of the data. [Video](#) | [Paper](#)

Research Engineer

Innovation Labs, Tata Consultancy Services Inc.

Dec. 2013 – May 2016
Delhi, India

- **Advisors:** Dr. Gautam Shroff and Dr. Geetika Sharma
- Developed customer facing visual analytics tools. The tools support essential data science tasks like visualizing results from rule-mining algorithms or visually explaining probabilistic graphical models, which gave customers valuable business insights.
- **Visual Data Fusion:** Developed a novel platform for the analysis of heterogeneous data sources. The platform supports probabilistic joins for combining uncertain datasets and perform joint analysis. Within the platform integrated a novel interactive visualization to evaluate results from Probabilistic Graphical Models. [Video](#) | [Paper](#)

- **Multi Sensor Visual Analytics:** Developed a system that supports visual pattern search to discover similar patterns in engine sensor data. [Video](#) | [Paper](#)
- **VARC:** Developed a visualization tool to interactively visualize the summary of association rules and their exceptions generated from rule-mining algorithms. [Paper](#)

PUBLICATIONS

Journal Papers (peer-reviewed)

- A. Pandey**, S. Lyi, Q. Wang, M. Borkin and N. Gehlenborg. GenoREC: A Recommendation System for Interactive Genomics Data Visualization. Under Review at IEEE Vis 2021. 2021*
- A. Pandey**, U. H. Syeda, C. Shah, J. A. Guerra-Gomez, M. Borkin. A State-of-the-Art Survey of Tasks for Tree Design and Evaluation with a Curated Task Dataset. In IEEE Transactions on Visualization and Computer Graphics. 2021
- A. Pandey**, H. Shukla, G.S. Young, L. Qin, A.A. Zamani, L. Hsu, R. Huang, C. Dunne, M. Borkin. CerebroVis: Designing an Abstract yet Spatially Contextualized Cerebral Artery Network Visualization. In IEEE Transactions on Visualization and Computer Graphics. 2019

Conference Papers (peer-reviewed)

- M. Schwab, **A. Pandey**, M. A. Borkin. Evaluation of 1D Selection Techniques for Mobile Visualizations. In Proceedings of the Late-Breaking Work of the CHI Conference on Human Factors in Computing Systems. 2021
- S. Bartolomeo, **A. Pandey**, A. Leventidis, D. Saffo, U. H. Syeda, E. Carstensdottir, M. S. El-Nasr, M. A. Borkin, C. Dunne. Evaluating the Effect of Timeline Shape on Visualization Task Performance. In Proceedings of the CHI Conference on Human Factors in Computing Systems. 2020
- K. Singh, K. Paneri, **A. Pandey**, G. Gupta, G. Sharma, P. Agarwal, G. Shroff. Visual Bayesian fusion to navigate a data lake. In Proceedings of 19th International Conference on Information Fusion (FUSION). 2016
- A. Pandey**, K. Ranjan, G. Sharma, L. Dey. Interactive Visual Analysis of Temporal Text Data. In Proceedings of the 8th International Symposium on Visual Information Communication and Interaction. 2015
- S. Saikia, G. Shroff, P. Agarwal, A. Srinivasan, **A. Pandey**, G. Anand. Exploratory data analysis using alternating covers of rules and exceptions. In Proceedings of the 20th International Conference on Management of Data. 2014

Workshop Papers (peer-reviewed)

- A. Pandey**, U. H. Syeda, M. A. Borkin. Towards Identification and Mitigation of Task-Based Challenges in Comparative Visualization Studies. IEEE Workshop on Evaluation and Beyond - Methodological Approaches to Visualization (BELIV). 2020
- A. Pandey**, Y. Zhang, J. A. Guerra-Gomez, A. G. Parker, M. Borkin. Digital Collaborator: Augmenting Task Abstraction in Visualization Design with Artificial Intelligence. CHI Workshop on Artificial Intelligence for HCI. 2020
- G. Sharma, G. Shroff, **A. Pandey**, B. Singh, G. Sehgal, K. Paneri, P. Agarwal. Multi-sensor Visual Analytics Supported by Machine-Learning Models. 2015 IEEE International Conference on Data Mining Workshop (ICDMW). 2015
- G. Sharma, G. Shroff, **A. Pandey**, P. Agarwal, A. Srinivasan. Interactively Visualizing Summaries of Rules and Exceptions. In Proceedings of EuroVA Workshop at EuroVis. 2014

Posters (peer-reviewed)

- A. Pandey**, S. Lyi, N. Gehlenborg. Interactively Visualizing Summaries of Rules and Exceptions. IEEE Vis. 2020
- A. Pandey**, P. Bex, M. A. Borkin. Effect of Glyph Design on Probabilistic Categorization Accuracy. IEEE Vis. 2019
- A. Pandey**, L. Chan, R. Gao, J. Scott, B. Staats. Segmentrix: A Network Visualization Tool to Develop and Monitor Micro-Segmentation Strategies. Vizsec at IEEE Vis. 2019
- A. Pandey**, H. Shukla, G.S. Young, L. Qin, C. Dunne, M.A. Borkin. CerebroVis: Topology and Constraint-based Network Layout for the Visualization of Cerebrovascular Arteries. IEEE Vis. 2018

AWARDS AND FUNDING

Best Poster Award at IEEE Vis Title: Towards a Knowledge-Based Recommendation System for Genomics Visualization	2020
Doctoral Colloquium at IEEE Vis Doctoral thesis selected for mentoring by world renowned visualization experts.	2020
Best Poster Award at VizSec Title: Segmentrix: A Network Visualization Tool to Develop and Monitor Micro-Segmentation Strategies	2019
Best Poster Award at IEEE Vis Title: CerebroVis: Topology & Constraint-based Network Layout for Visualization of Cerebrovascular Arteries	2018
PhD Network Northeastern University Travel Fund Awarded \$500 for conference travel.	2018 & 2019
IEEE VGTC VPG International Data-Visualization Contest Title: Bayesian Visual Analytics for Geo-Spatial Temporal Data	2016
Khoury College of Computer Sciences, Northeastern University Awarded complete funding for PhD coursework and research.	2016 - present

TEACHING AND MENTORING EXPERIENCE

Head TA for DS 4200 - Information Presentation & Visualization Responsible for teaching d3.js to a class of 60 students and managing two TAs.	Spring 2021 Northeastern University
TA for DS 4200 - Information Presentation & Visualization Responsible for teaching d3.js and trees and networks to a class of 60 students.	Spring 2020 Northeastern University
Guest Lecture for CS 7280 - Information Presentation & Visualization Tableau tutorial for graduate students.	Fall 2018 Northeastern University
Mentored Chaitya Shah, a M.S. in Data Science Student Steered development of a tree visualization plugin for <u>Glue</u> .	Summer 2018 Northeastern University

SERVICE AND VOLUNTEERING

Served on International Program Committee for EuroVis 2021, ACHI 2021 Responsible for promoting conference participation and reviewing research articles.
Peer Reviewer for IEEE Vis, ACM CHI, EuroVis Reviewed articles for top visualization and human-computer interaction conferences and journals.
Prayas Foundation, India Taught english and math to underprivileged kids in India.
National Cadet Corps, India Assisted disaster management squads in serving people during humanitarian crisis like floods and droughts.

TALKS

Conference Talk: Task-based Challenges in Comparative Visualization Studies BELIV Workshop, IEEE Vis Salt Lake City (Virtual)	2020
Panel Discussion: Vis Evaluation Moving into the Next Decade BELIV Workshop, IEEE Vis Salt Lake City (Virtual)	2020
Workshop Talk: Augmenting Task Abstraction in Visualization Design with AI AI4HCI Workshop, ACM CHI (Virtual)	2020
Invited Talk: CerebroVis Gehlenborg Lab, Harvard DBMI, Boston	2019
Conference Talk: CerebroVis IEEE Vis, Vancouver	2019
Invited Talk: Visual Data Fusion Jawaharlal Nehru University (JNU), India	2016
Conference Talk: Interactive Visualization of Temporal Text Data International Symposium on Visual Information Communication and Interaction (VINCI), Tokyo	2015

SKILLS

Research Skills: User studies (design experiments (structured and semi-structured study design), conduct in-person and remote evaluations(Amazon Mechanical Turk)), quantitative, qualitative and mixed-method data analysis, systematic literature review and survey

Visualization Skills: d3.js, Tableau, Vega, Vega-Lite, Matplotlib, Observablehq

Front-end Web Dev Skills: JavaScript, TypeScript, React, Angular, HTML5, CSS3, and jQuery

Back-end Web Dev Skills: Node.js, Java

Databases: SQL Based (MySQL), NoSQL (Firebase Database, MongoDB)

Data Science & Applied M.L.: Python (NumPy, Pandas, scikit-learn), JavaScript (TensorFlow.js)

Document Creation: Microsoft and Google Office Suites, LaTeX, Markdown

Graphics and Video Editing: Adobe Illustrator, Inkscape, Filmora Wondershare, Apple iMovie

Languages: English (Native), Hindi (Native)