Aditeya Pandey

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Summary

I am a Ph.D. candidate in Computer Science at Northeastern University. I build visualization tools to support analysis of complex and large datasets. 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** — Sep. 2016 – May 2022
Northeastern University — Boston, MA, United States

Bachelor of Technology and Engineering (B.Tech.) | **Computer Science** — Aug. 2009 – May 2013
KIIT University — Bhubaneswar, India

Work Experience

Ph.D. Candidate — Sep. 2016 – Present
Northeastern University — 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 — May 2020 – Aug. 2020
Harvard Medical School — 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 — May 2019 – Aug. 2019
Illumio Inc. — 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 — Dec. 2013 – May 2016
Innovation Labs, Tata Consultancy Services Inc. — Delhi, India

- **Advisors:** Dr. Gautam Shroff and Dr. Geetika Sharma
- Developed customer facing visual analytics tools. The tools supported essential data science tasks like visualizing results from rule-mining algorithms or visually explaining probabilistic graphical modes.

- **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 we 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 2020
Title: Towards a Knowledge-Based Recommendation System for Genomics Visualization

Doctoral Colloquium at IEEE Vis 2020
Doctoral thesis selected for mentoring by world renowned visualization experts.

Best Poster Award at VizSec 2019
Title: Segmentrix: A Network Visualization Tool to Develop and Monitor Micro-Segmentation Strategies

Best Poster Award at IEEE Vis 2018
Title: CerebroVis: Topology & Constraint-based Network Layout for Visualization of Cerebrovascular Arteries

PhD Network Northeastern University Travel Fund 2018 & 2019
Awarded $500 for conference travel.

IEEE VGTC VPG International Data-Visualization Contest 2016
Title: Bayesian Visual Analytics for Geo-Spatial Temporal Data

Khoury College of Computer Sciences, Northeastern University 2016 - present
Awarded complete funding for PhD coursework and research.

Teaching and Mentoring Experience

Head TA for DS 4200 - Information Presentation & Visualization Spring 2021
Responsible for teaching d3.js to a class of 60 students and managing two TAs. Northeastern University

TA for DS 4200 - Information Presentation & Visualization Spring 2020
Responsible for teaching d3.js and trees and networks to a class of 60 students. Northeastern University

Guest Lecture for CS 7280 - Information Presentation & Visualization Fall 2018
Tableau tutorial for graduate students. Northeastern University

Mentored Chaitya Shah, a M.S. in Data Science Student Summer 2018
Steered development of a tree visualization plugin for Glue. 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 2020
BELIV Workshop, IEEE Vis Salt Lake City (Virtual)

Panel Discussion: Vis Evaluation Moving into the Next Decade 2020
BELIV Workshop, IEEE Vis Salt Lake City (Virtual)

Workshop Talk: Augmenting Task Abstraction in Visualization Design with AI 2020
AI4HCI Workshop, ACM CHI (Virtual)

Invited Talk: CerebroVis 2019
Gehlenborg Lab, Harvard DBMI, Boston

Conference Talk: CerebroVis 2019
IEEE Vis, Vancouver

Invited Talk: Visual Data Fusion 2016
Jawaharlal Nehru University (JNU), India

Conference Talk: Interactive Visualization of Temporal Text Data 2015
International Symposium on Visual Information Communication and Interaction (VINCI), Tokyo

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)