

# Aditeya Pandey

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## SUMMARY

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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

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**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

## SKILLS

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

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

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

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

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

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

**Research:** 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

## WORK EXPERIENCE

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**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 supported essential data science tasks such as visualizing results from rule-mining algorithms and visually explaining probabilistic graphical models.
- **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

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### 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, <b>A. Pandey</b> , 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, <b>A. Pandey</b> , P. Agarwal, A. Srinivasan. Interactively Visualizing Summaries of Rules and Exceptions. In Proceedings of EuroVA Workshop at EuroVis.	2014
<b>Posters (peer-reviewed)</b>	
<b>A. Pandey</b> , S. Lyi, N. Gehlenborg. Interactively Visualizing Summaries of Rules and Exceptions. IEEE Vis.	2020
<b>A. Pandey</b> , P. Bex, M. A. Borkin. Effect of Glyph Design on Probabilistic Categorization Accuracy. IEEE Vis.	2019
<b>A. Pandey</b> , 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
<b>A. Pandey</b> , 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

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

## TEACHING AND MENTORING EXPERIENCE

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

## SERVICE AND VOLUNTEERING

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

## TALKS

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