

EDUCATION

- University of Washington, Seattle** WA, USA
Ph.D. in Computer Science, Advised by Dr. Leilani Battle Sept 2021 - Present
– **Research Interests:** Information Visualization, Computer Graphics, Interactive Data Analytics
- University of Maryland, College Park** MD, USA
Ph.D. in Computer Science, Advised by Dr. Leilani Battle, GPA: 4.00/4.00 Jan 2021 - May 2021
– **Research Interests:** Information Visualization, Computer Graphics, Interactive Data Analytics
– **Relevant coursework:** Game Design
- University of Maryland, College Park** MD, USA
M.S. in Computer Science, GPA: 3.84/4.00 Aug 2018 - Dec 2020
– **Relevant coursework:** Machine Learning, Geometric Computer Vision, Advanced Computer Graphics, Physically Based Modelling, Simulation & Animation, Interactive Data Analytics, Computational Geometry, Interactive Technologies in HCI, Database System Architecture and Implementation
- Birla Institute of Technology and Science - Pilani** Goa, India
B.E. (Honors) in Computer Science, GPA: 8.24/10.00 Aug 2012 - May 2016
– **Electives:** Data Mining, Data Storage Technologies and Networks, Creative Multimedia

ONGOING RESEARCH

- **Exploratory Visual Analysis Systems for Large Scale Graph Data** UMD-MIT-Tufts-Recorded Futures
Graph analytics face two major challenges - using the right kind of visualization and scaling to bigger datasets. Interactive graph visualization systems need to address both these issues. To this end, I am developing a declarative specification language for quick authoring of interactive multi-variate graph visualizations, by choosing from a wide range of templates for layout and visual graph summarization techniques. Further, I am also investigating spatial indexing, graph data structures and dedicated graph databases like Neo4j to improve the scalability of interactive graph visualizations. This includes making the visualization computation, data storage and data retrieval, more efficient.
- **Data Pre-fetching for Interactive Multi-User Environments** UMD-Tulane University
Interactive data visualization and analysis tools generally use a DB server which is queried using a client machine. However, DBMS are not usually designed for responding to queries at interactive speeds, which can result in a latency in the data exploration experience. Concurrent multi-user visual data exploration presents avenues for improving interactive speeds by using cache sharing strategies. I am studying this concurrent multi-user data analysis use case, with respect to cache sharing strategies and data pre-fetching. The aim is to provide guidelines on configuring pan-zoom based visual data exploration systems with pre-fetching, for better performance in a multi-user context. To pre-fetch data, I am predicting the next interaction of the user. I am using LSTM to formulate the problem of next interaction prediction.
- **Improving Early Decision Making with Progressive Bar Charts** AVIZ, Inria
Progressive visualization systems divide different stages of the visualization pipeline — data fetching, processing, and visualization, into iterative steps to maintain interactivity at scale. This enables users to make early decisions based on visualizations of intermediate results. However, depending on how data is processed in each iteration, early intermediate results may not represent the truth, thus misleading the users. To investigate this, we conduct a user study to understand if users make mistakes when using progressive bar charts with confidence intervals, and propose

new visualization designs to help improve early decision-making. We comparatively evaluate four progressive bar chart visualization designs on three realistic data distributions, based on accuracy and response time when making early decisions on simple comparison tasks. Our results show that users tend to make errors even with confidence intervals in progressive bar charts. Further, we observe improvements in early decision-making with our proposed visualization designs.

PUBLICATIONS

1. A. Aguinaldo, P.-Y. Chiang, A. Gain, **A. Patil**, K. Pearson and S. Feizi, “Compressing GANs using Knowledge Distillation”, *CoRR*, vol. *abs/1902.00159*, 2019. [arXiv:1902.00159](#)

TEACHING

- **Head Teaching Assistant** at University of Maryland, College Park Fall 2018, Fall 2019, Fall 2020
Computer Systems Architecture (CMSC411)
- **Teaching Assistant** at University of Maryland, College Park Spring 2019, Spring 2020
Introduction to Data Visualization (CMSC498O)
- **Teaching Assistant** at University of Maryland, College Park Spring 2021
Advanced Data Structures (CMSC420)

EXPERIENCE

AVIZ, Inria Saclay, France
Research Intern Summer 2021

- Worked on understanding the efficacy of confidence intervals for decision making using progressive bar charts
- Proposed and studied the efficacy of two new visualization designs for progressive bar charts

Fraunhofer CESE MD, USA
Research Assistant Intern Summer 2019

- Worked as Java developer on the [PocketSecurity](#) project which collects data to perform user behaviour analysis
- Identified and implemented critical data probes to be collected for better analysis and improved existing probes

NVIDIA Pune, India
System Software Engineer - C/C++ July 2016 - July 2018

- Developer for Shadowplay - a gameplay sharing app with features like record, screenshot, broadcast and coplay
- Worked on multi-threaded and multi-processes features, GPU driver code and render pipeline
- Enhanced and monitored the automated software testing suite and guided an intern for the same

NVIDIA Pune, India
Intern July 2015 - Dec 2015

- Device Filter Drivers - C/C++: Implemented end-to-end user input redirection from input devices to a specific application using filter drivers and device notifications
- Z-buffer - Python: Implemented aesthetic visual effects such as zoom burst using the depth data of images

PROJECTS

- **Physically Based Clustering Visualization** Oct 2019 - Dec 2019
Implemented a data analysis/visualization tool with interactions modelled on real-life physical forces using the D3-Force API. The specific use case targeted was evaluating word embeddings created by different methods, where words closer in the vector space belonged to the same cluster.
- **Adding shadows to a scene using CNN** April 2019 - May 2019
Trained a network to generate shadows in a scene, given the scene without shadows, the depth map and the light source position map. Used the [pix2pix](#) model for the task.
- **GoRoutines vs OpenMP** Oct 2018 - Dec 2018
Comparatively evaluated the parallelization constructs of Go language and OpenMP using various task distribution schemes among threads. 2D image convolution operation was used for the study.
- **Data Sonification** Jan 2016 - Apr 2016
Investigated and implemented possible correlations between digital images and digital sounds for image encoding. Characterized aural encoding channels similar to visual encoding channels.
- **LEAP Motion App Development** Mar 2015 - Apr 2015
Programmed the LEAP Motion sensor to create a hand gesture based virtual music instrument dashboard. Used JAVA Swing for the UI and MIDI files for the audio.

SKILLS

- **Programming Languages:** C, C++, Java, Python
- **Libraries/Frameworks:** Pytorch, OpenCV, MPI, OpenMP
- **Miscellaneous:** DSLR Photography, Adobe Lightroom

LANGUAGES

- **Marathi:** Native
- **Hindi:** Fluent
- **English:** Fluent

EXTRACURRICULAR ACTIVITIES

- **Volunteer at Ekta Nagar Residents Welfare Association** 2017 - 2018
Aided in the organisation of community activities and administrative affairs of my residential society
- **Organising Committee Member at Quark (BITS - Pilani Goa Technical Festival)** 2015
Directed the photo and video coverage of the technical festival spanned over 3 days
- **Member at The Department of Photography, BITS-Pilani Goa** 2012 - 2015
Performed photo and video coverage of campus events over 3 years and mentored new inductees