Omkar Chekuri

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Visualization and Visual Analytics Researcher
Machine Learning, Data Science, Software Engineering

Summary

- PhD candidate specializing in information visualization software architectures with over **5 years** of experience.
- Strong foundation in data science, AI, and machine learning, with a focus on solving real-world challenges.
- Skilled in evaluating user interfaces and conducting user studies to enhance data-driven decision-making.
- Experienced in publishing research, developing innovative visualization solutions, and software development.
- Over **10 years** of experience in data collection, analysis, and reporting across the Construction, Oil & Gas, and IT sectors.
- Experienced in project management, team management, client communication, and stakeholder management.
- Interested in leveraging Visual Analytics Solutions for emerging technologies such as Digital Twins and Virtual Reality.

Education

2018 – Dec-2024 (Expected) **PhD in Computer Science**, *University of Oklahoma*, Norman, OK, USA, *GPA: 3.50/4.0.*
Minor Field: Information Visualization and Visual Analytics
Advisor: Dr. Chris Weaver
Dissertation Title: *Designing a Software Architecture and Data Pipeline for the Visualization and Interaction with Hierarchical Topologies to Support Analytical Operations on Hierarchical Visualizations*

2016 – 2018 **M.S. in Data Science and Analytics**, *University of Oklahoma*, Norman, OK, USA, *GPA: 3.48/4.0.*

2008 – 2012 **Bachelor of Technology in Mechanical Engineering**, *JNTU*, Kakinada, India, *GPA: 3.35/4.0.*

Skills & Certifications

Certifications	Tableau Designer(2020), Tableau Developer(2020), Advanced Google Analytics(2020)
Programming	JavaScript, Python, Java, R, SQL, C#, GraphQL, Neo4j, C, CUDA
Libraries & Tools	Tableau, PowerBI, D3.js, Web-GL, Streamlit, Vizard (VR), Excel, Improvise, LWJGL, MNE-Python, PyCUDA, AdobeXD, AutoCAD, TensorFlow, Scikit-Learn, NLTK, React, Docker, Google Cloud, PowerApps, Hadoop, Linux
Technical Skills	Visualization, Visual Analytics, UI/UX Design, Prototyping, User Evaluation, Genetic Algorithms, Virtual Reality, Computer Graphics, Machine Learning, NLP, Generative AI, Database Management, EEG Data Analysis, FullStack Development, Distributed Systems, High Performance Computing, Big Data Analytics
Other	Proficient in interpreting and modifying P& ID, Electrical, HVAC, Telecom, Fire & Safety and Civil Drawings
Languages	English(Fluent), Telugu(Native), Hindi(Limited Working Proficiency)

Professional Affiliations

Association for Computing Machinery (ACM) *(2023 - Present)*

Human Factors & Ergonomics Society (HFES OU) *(2017 - 2018)*

Experience

08/2018 – 12/2022 **Graduate Research Assistant(Various)**, *University of Oklahoma*, Norman, OK.
- Developed a high-performance abstraction and **coordination library** for D3.js in TypeScript, enabling seamless interaction across up to 30 synchronized visualizations with 10000 total data points without performance degradation.
- Developed a **representative suitability model** to assesss the capability of various hierarchical visualizations in their ability to represent various kinds of information.
- Developed a Tree Visualization system, **software architecture** and a **data pipeline**, designed eight noval tree visualizaiton designs to support operations on various relations in hierarchical visualizations.
- Developed software and **Multi-Person VR** environments integrated with fNIRs, eye-tracking, and haptic devices, to enhance non-text-based smart learning experiences. This included creating training materials, developing user interface elements, and visualizing captured data from users to assess engagement and learning outcomes.
- Designed **gesture-based interactions** to facilitate **direct manipulation** of visual interfaces for data entry.
- Designed and developed an **Effort Reporting System**, driving significant cost savings, improved functionality and streamlining deployment process, resulting in enhanced efficiency and alignment with existing workflows.
- Supported researchers and forecasters at *NOAA - National Severe Storms Laboratory* by summarizing key findings from meetings, facilitating effective communication and informed decision-making in severe weather research.

2021 – Present **Teaching Assistant**, *University of Oklahoma*, Norman, OK.
- Instructed Python programming course for 70 students and supervised other teaching assistants.
- Developed course material and Instructed lab sessions on an average of 75 students per semester for 6 semesters, improving student performance through practical, hands-on instruction.

01/2018 – 05/2018 **Data Analytics Intern**, *Cloud Nine Development LLC*, Norman, OK.
- Developed custom **analytics dashboards** using Google Analytics, improving KPI forecasting accuracy by 10%.
- Implemented time series models to automate business metric predictions, leading to more effective business decisions.

01/2013 – 02/2015 **SAP CMMS Engineer**, *Construction Development Company LLC*, Doha, Qatar.
- Managed asset tracking, data collection, cleaning, and management for EPIC(Engineering, Procurement, Installation, Commissioning) projects, streamlining **reporting processes** and reducing data handling time by 30%.
- Managed 5 client projects across various roles, showcasing strong communication by coordinating with vendors and resolving issues during regular meetings to ensure smooth collaboration and continuous progress.

06/2012 – 12/2012 **Mechanical Engineer**, *Aker Solutions*, Kakinada, India.
- Conducted visual inspections and prepared detailed **Material & Logistics reports** to allocate resources efficiently.
- Maintained safety check records, ensuring compliance with industry standards through regular inspections.

Selected Projects

2024 **Usability and User Experience Study** – Designed protocols, developed visualizations, and conducted a user study to evaluate their ***usability and utility***, focusing on improving visualization effectiveness.

2023 **Breast Cancer Prediction** – Aimed to enhance breast cancer detection by applying ***Parameter-Efficient Transfer Learning (PETL)*** to fine-tune a 328M foundation model, achieving 78.9% accuracy. Developed a smaller 36M ***Vision Transformer (ViT)*** model, which outperformed the larger model with 80.4% accuracy.

2023 **Full Stack Social Media Application** – Used ***MERN Stack*** *(MongoDB, Express, React, and Node)* to develop end-to-end social media application capable of identifying relations using interactions.

2022 **Frontend Reporting Dashboard** – Built a reporting dashboard using ***Streamlit*** with data from a ***Snowflake*** database to display key performance indicators, driving data-driven decisions.

2021 **Reinforcement Learning for Maze Solving** – Implemented ***Q-Learning***, a ***noval multi-agent SARSA*** algorithm from scratch, improving pathfinding speed by over 17% for dynamically generated mazes.

2021 **Distributed Systems** – Developed a distributed Sudoku solver using Docker, implementing secure communication with public key encryption and Round Robin scheduling to ensure system redundancy and seamless client-server interactions for efficient puzzle solving.

2020 **Game Development** – Developed a 2.5D platformer game incorporating animation, collision detection, shaders, particle systems, and basic physics, applying a ***Milestone-Driven approach*** and ***Test Driven Development*** to ***software development*** to gain proficiency in advanced computer graphics techniques.

2017 **Evaluation of Commercials** – Conducted an ***eye-tracking*** experiment to analyze user behavior and assess the impact of skip functionality on YouTube commercials to inform more effective marketing strategies.

Publications

2024(Revision) **Chekuri, Omkar, Weaver, C.**, "C4D3: View-level Abstraction for Building Coordinated Multiple View".

2024(Revision) **Chekuri, Omkar, Weaver, C.**, "A Model of Representational Suitability of Tree Visualizations".

2024 **Chen, X., Chekuri, Omkar**, "David vs. Goliath: Large foundation models are not outperforming small models in multi-view mammogram breast cancer prediction", SPIE Medical Imaging, 2024. Secured **Second Place** in Computer-Aided Diagnosis category ***Best Paper Award.***

2022 **Chekuri, Omkar., Weaver, C.**, "An Investigation into the Representational Suitability of Tree Visualizations", ***Poster***, IEEE VIS 2022.

Key Achievements

2024 **Best Paper Award - Second Place** in Computer-Aided Diagnosis category, SPIE Medical Imaging

2023 **State of Outreach Innovation Award** — Designer and Developer of the "Effort Reporting System".

2023 **Richard L. O'Shields Engineering Scholarship** — Awarded for academic excellence.

2022 **CS Alumni Graduate Fellowship** — Recognized for outstanding research contributions.

2018 **PhD Recruitment Excellence Fellowship** — Recognized for academic excellence as a new PhD student.

Leadership, Volunteering & Service

2023-Present **Conference Reviewer** for the IEEE VIS and EuroVis conferences.

2022-Present **Mentored** four Master's students and one junior PhD student on curriculum and career planning.

Oct-2022 **Student Volunteer** for IEEE VIS 2022 conference, providing technical support and helping organize sessions.

2018-2019 **Graduate Student Community Member**, advocated for representation and inclusivity for graduate students.

2016-2017 **ROTC Cadet**, led community events such as blood drives and charity marathons, raising awareness for veterans.

References

References available on request.