Omkar Chekuri

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omkarchekuri

Analytics Researcher
Data Science, Software Engineering

Professional Summary

- PhD in Computer Science with over 6 years of experience designing scalable software architectures for visualization and analytics.
- Extensive experience applying machine learning, statistical analysis, and optimization techniques to solve complex, real-world problems and guide data-driven decision-making.
- Proficient in using statistical and analytics tools such as SAS, R, and Python (pandas, statsmodels), along with optimization libraries like Gurobi, CPLEX, and AMPL to build predictive models and support decision optimization.
- Experienced in developing and deploying generative AI models and leveraging open-source machine learning frameworks to enhance predictive analytics and enable innovative data-driven solutions.
- Skilled in building interactive visual analytics tools and interfaces, backed by data-driven evaluation and usability studies.
- Published researcher and developer with expertise in analytical applications and visualization systems across domains.
- Over 10 years of experience in data engineering, operational analytics, and reporting, including hands-on work with SAS for data workflows, statistical modeling, and business intelligence.
- Strong background in project management, cross-functional collaboration, and stakeholder communication, ensuring alignment between technical solutions and business goals.

Education

2018 – May-2025 **PhD in Computer Science**, *University of Oklahoma*, Norman, OK, USA, *GPA: 3.48/4.0.*
Minor Field: Information Visualization and Visual Analytics
Advisor: Dr. Chris Weaver
Dissertation Title: *Enhancing Hierarchical Visualizations with Topology-Centric Representations and Interactions*

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.*

Professional Affiliations

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

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

Skills & Certifications

Certifications	Tableau Designer(2020), Tableau Developer(2020), Advanced Google Analytics(2020)
Programming	JavaScript, Python, Java, SAS, R, SQL, C#, GraphQL, Neo4j, C, CUDA
Libraries & Tools	Tableau, PowerBI, D3.js, Web-GL, Streamlit, Flask, Django, Vizard (VR), Improvise, LWJGL, MNE-Python, 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
Soft Skills	Project Management, Team Management, Client Communication & Stakeholder Management

Experience

08/2021 – 05/2025 **Python Course and Lab Instructor**, *University of Oklahoma*, Norman, OK.
- Instructed Python to 75+ students per semester across 10 semesters through lectures and labs.
- Developed and improved lab materials to boost clarity, engagement, and practical application.
- Supervised teaching assistants and coordinated course projects to promote collaboration.
- Acted as primary student liaison, leveraging communication and problem-solving skills to support project-based learning.

05/2023 – 08/2023 **Power Apps Developer**, *University of Oklahoma*, Norman, OK.
- Led end-to-end design and development of a replacement Effort Reporting System using Microsoft 365 tools, ensuring smooth migration from a legacy system anchored in a Red Hat-based Horizon environment.
- Automated data entry and approval workflows with Power Automate, reducing manual effort by 40% and saving 120 labor hours monthly—approximately $18,000 annually.
- Collaborated with cross-functional teams and stakeholders to gather requirements, validate workflows, and align the system with business processes and compliance standards.
- Integrated the system with Microsoft 365 services (SharePoint, PowerApps, Power Automate, Power BI) for seamless data synchronization and improved user accessibility.
- Managed project timelines and budget by leveraging no-code/low-code platforms to deliver cost-effective, robust functionality; facilitated user adoption through training and documentation, driving continuous improvements from feedback and performance monitoring.

05/2022 – 08/2022 **Virtual Reality Developer**, *University of Oklahoma*, Norman, OK.
- Developed multi-user VR environments in Python for the "Smart Learning in Multi-person VR" project, integrating biometric sensors including fNIRs, eye-tracking, and haptic feedback to capture and visualize user engagement.
- Designed and implemented immersive user interfaces and interactive learning scenarios based on a Semantic Network Model to support personalized, non-text-based smart learning experiences.
- Designed and implemented a data dashboard to overlay biometric sensor information onto learning scenarios for further research and analysis.
- Engineered data pipelines to process real-time biometric data, ensuring accurate synchronization and visualization within the VR environment.
- Conducted iterative testing and usability evaluations to optimize user interaction and engagement metrics.
- Managed software development lifecycle including version control, documentation, and deployment for scalable VR applications.

06/2021 – 08/2021 **Research Assistant – Severe Weather Communications**, *University of Oklahoma*, Norman, OK.
- Supported NOAA-affiliated research by analyzing interdisciplinary discussions on severe weather forecasting and emergency response coordination.
- Produced clear, actionable summaries and technical reports that distilled complex meteorological insights, strengthening communication between scientists, stakeholders, and policy makers.
- Contributed to ongoing documentation efforts to ensure continuity in multi-agency collaboration and improve accessibility of critical research findings.

08/2019 – 5/2021 **Visual Analytics Researcher**, *University of Oklahoma*, Norman, OK.
- Designed and tested *gesture-based interaction techniques* for intuitive data manipulation, improving interface usability and user performance.
- Engineered a high-performance TypeScript coordination library for D3.js enabling seamless interaction across 30+ synchronized visualizations handling 10,000+ data points, ensuring smooth performance and enhanced user analytics.

06/2018 – 12/2018 **Application Developer – Oklahoma Department of Transportation**, *University of Oklahoma*, Norman, OK.
- Developed a web-based dispatch and mobile system for transit providers using *ASP.NET Core*, *Entity Framework*, and *SQL Server*, streamlining scheduling and ride management.
- Built responsive mobile-friendly interfaces with *Blazor* and *Bootstrap*, improving usability for field operators and administrative staff.
- Integrated system components with backend APIs for real-time data updates and reporting.
- Collaborated with cross-functional teams to align technical development with transportation service goals.

06/2017 – 05/2018 **Research Assistant – Academic and Departmental Support**, *University of Oklahoma*, Norman, OK.
- Supported the Biomedical Engineering Director in faculty recruitment, contributing to the hiring of 2 faculty members.
- Identified and recommended approximately $150K in graduate student funding sources, aiding departmental growth and student success.

01/2018 – 05/2018 **Data Analytics Intern**, *Cloud Nine Development LLC*, Norman, OK.
- Developed a Google Analytics dashboard to keep track of the KPI's, boosting KPI forecast accuracy by 12%, and a Flask/React dashboard visualizing ML forecasts and ARIMA models, cutting manual reporting time by up to 25%.
- Implemented time series models to automate metric forecasts, speeding decision-making by 10–15%.
- Analyzed user page navigation behavior to identify UI bottlenecks and redesigned user interface, page layout, increasing targeted page visits by 22%.

01/2013 – 08/2015 **SAP CMMS Engineer – Python & SAS**, *Construction Development Company LLC*, Doha, Qatar.
- Engineered and automated SAP CMMS data workflows using *Python*, *SQL*, and *SASPy*, significantly streamlining legacy data extraction and reporting for maintenance and engineering teams.
- Developed and maintained robust, modular *Python scripts* for comprehensive data cleaning, transformation, and validation, seamlessly integrating outputs with *SAS* procedures for advanced statistical analysis and reliability modeling.
- Designed and implemented custom *ETL pipelines* to ingest CMMS records into analytics dashboards, enabling real-time insights into asset utilization, downtime, and preventive maintenance trends.
- Built predictive models using Python libraries (*pandas*, *scikit-learn*, *statsmodels*) to accurately forecast equipment failures, resulting in improved maintenance scheduling and a 15% reduction in unplanned downtime.
- Developed automated reporting solutions by combining *SAS* macros and Python-based schedulers, drastically reducing turnaround time for weekly and monthly operational reports.
- Created interactive visualizations using *Matplotlib*, *Plotly*, and *Dash* to facilitate data-driven engineering reviews and executive decision-making.
- Collaborated cross-functionally to resolve data integrity issues and standardize reporting workflows across maintenance, production, and procurement departments.

06/2012 – 12/2012 **Engineer – Reporting & Resource Analytics**, *Aker Solutions*, Kakinada, India.
- Supported the generation of *Material & Logistics reports* to aid resource planning and offshore procurement coordination.
- Automated manual reporting workflows using *Python scripting* and *Excel macros*, significantly reducing data entry time and improving reporting accuracy.
- Contributed to building an internal framework for tracking resource usage and equipment data, laying the groundwork for future predictive analytics initiatives.
- Utilized *SAS-based reporting tools* to actively assist in data extraction and preparation for senior analysts.
- Digitized legacy records and systematically structured operational logs, significantly improving data quality, consistency, and accessibility. This enhancement streamlined reporting cycles, enabled more reliable analytics, and supported informed decision-making across the organization.

Selected Projects

2024 **Hierarchical Visualization System** – Designed a visualization pipeline and software architecture featuring eight topology-enhanced techniques for representing and interacting with composite hierarchical data to support complex interactive operations. Evaluated the visualizations' ability to support effective representation and interaction.

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** – Developed an end-to-end social media platform with a *React.js and D3.js* frontend and a *Python (Django)* backend. Utilized *MongoDB* for flexible NoSQL data storage and implemented backend algorithms to identify complex user relationships through interaction data, demonstrating strong full-stack development and data processing skills.

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 *novel multi-agent SARSA* algorithm from scratch, improving pathfinding speed by over 17% for dynamically generated mazes.

2021 **Distributed Systems** – Engineered a distributed Sudoku solver leveraging *Docker containers* for scalable, independent services. Implemented robust inter-process communication (IPC) with *encrypted channels* and *Round Robin load balancing* across worker nodes, ensuring system redundancy, high availability, and efficient task distribution.

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. Leveraged SAS for comprehensive statistical analysis, including normality tests and hypothesis testing (e.g., T-tests, Mann-Whitney-Wilcoxon tests), to derive insights from eye fixation metrics and inform effective marketing strategies.

Publications & Presentations

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.***

2025 **Chekuri, Omkar, Weaver, C.**, "C4D3: A View-Level Abstraction and Coordination Library for Building Coordinated Multiple Views with D3". In Proc of the 20th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications - IVAPP

2025 **Chekuri, Omkar, Weaver, C.**, "A Model of Representational Suitability of Tree Visualizations",(In Revision)

2025 **Chekuri, Omkar, Weaver, C.**, "Towards Explicitly Representing Topologies in Tree Visualizations", (In Review)

2022 (Presentation) **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.