Kazi Shahrukh Omar

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PROFESSIONAL SUMMARY

Computer Science PhD researcher with **5+ years** of experience in Visualization and Visual Analytics, Applied Machine Learning, Data Science, and Human-Computer Interaction (HCI). Experienced in developing predictive models and designing scalable visual analytics systems with intuitive user interfaces to support complex data exploration and decision-making tasks. My work also involves open-sourcing projects to foster further research, with published first-author works in leading venues such as **IEEE TVCG** and **IEEE Transactions on Big Data**.

EDUCATION

University of Illinois Chicago (UIC)   *Chicago, IL*
Doctor of Philosophy (PhD), Computer Science, GPA(Current): 4.00/4.00   *Aug 2021 - Dec 2026 (Expected)*
Advised by Prof. Fabio Miranda
Relevant coursework: *Introduction to Data Science - Visual Data Science - Data Mining and Text Mining - Big Data Visualization and Analytics - Visualization and Visual Analytics - Human Computer Interaction - Computer Graphics.*

Military Institute of Science and Technology (MIST)   *Dhaka, Bangladesh*
Bachelor of Science (BSc), Computer Science and Engineering (CSE), GPA: 3.71/4.00   *Feb 2015 - Aug 2019*

WORK EXPERIENCE

Electronic Visualization Laboratory (EVL), University of Illinois Chicago (UIC)   *Chicago, IL*
Graduate Research Assistant (Advisor: Prof. Fabio Miranda)   *Aug 2021 - Present*
Research on visualization & visual analytics, applied machine learning, and big data analysis with projects spanning:

- **oCUDS** [*Aug 2024 - Present*]**:** Developing a visualization framework for cross-domain urban decision making tasks, integrating an LLM interface to support intuitive scenario queries.
- **3D View Computation** [*Jan 2024 - Present*]**:** Developed a neural field-based model for 3D urban exploration, supporting visibility analysis, solar exposure evaluation, and visual impact assessment. Achieved 0.046 RMSE in semantic view prediction, outperforming KNN and random forest baselines. Delivered real-time performance with ~4M views/sec throughput and a 2.4 MB memory footprint.
- **VIGMA** [*Jan 2023 - Jul 2024*]**:** Developed an open-access visual analytics framework for gait and motion analysis. Demonstrated support for multivariate gait data—kinetic, kinematic, and spatiotemporal—using 120+ trials from healthy and stroke patients across two time points. Validated the system with 5 domain experts achieving 4–5/5 usefulness ratings and supporting tasks such as disease tracking, and group comparison.
- **Gait Event Detection** [*Jul 2023 - Jun 2024*]**:** Developed a Bi-GRU-based automated gait event detection model achieving >97% accuracy and <14 ms mean error in both regular and perturbed walking. Analyzed gait data from 307 healthy older adults, demonstrating the model's robustness across challenging perturbed walking scenarios where traditional force plate methods fail.
- **Deep Umbra** [*May 2022 - Dec 2023*]**:** Developed a conditional generative adversarial network model to quantify accumulated shadows. A method 6x faster compared to the state-of-the-art techniques. Open-sourced a comprehensive shadow dataset for over 100 cities, validated by the model's low RMSE (~0.06).
- **Sidewalk Data Quality** [*Jul 2022 - Sep 2022*]**:** Conducted a comparative study of OSM sidewalk data across 54 major U.S. cities, revealing that 80% cities had sidewalk tags on less than 5% of roads, indicating severe data scarcity. Developed a trustworthiness index from historical OSM edits, showing that even available data is often unreliable—e.g., in Chicago, only 24.4% of roads had a trust index ≥ 0.5, with similar trends in Seattle and NYC.
- **NeuralCubes** [*Aug 2021 - Dec 2021*]**:** Developed in-memory machine learning model to accurately approximate spatiotemporal mobility-flow queries. Achieved below 2% error with a minimal memory footprint of 114 KB.

Department of Computer Science, University of Illinois Chicago (UIC)   *Chicago, IL*
Graduate Teaching Assistant   *Jan 2022 - Present*

- Courses served as TA: (1) User Interface Design and Programming, (2) Visualization and Visual Analytics, and (3) Computer Graphics.
- Served as TA for 4 semesters, conducting office hours for 40–60 students per semester.
- Graded assignments and exams, provided feedback on design and code.
- Assisted instructors in creating course materials and managing platforms like Blackboard and Piazza.

Epsilon   *Chicago, IL*
PhD Data Visualization Intern   *May 2025 - Aug 2025*
- Built a pipeline to process ~1 million DiME activity logs, extracting user sessions for analysis across user groups.
- Developed a pattern mining algorithm to extract recurring usage patterns and identify usage bottlenecks.
- Developed a visual analytics system that allowed stakeholders to easily uncover patterns in user sessions.

Department of Computer Science, Uttara University   *Dhaka, Bangladesh*
Lecturer   *Jul 2019 – Jun 2021*
- Taught 7 core undergraduate CS courses, consistently earning 4.5+/5 student feedback ratings across semesters.
- Supervised 6+ undergraduates on final-year projects and theses, supporting their successful graduation.
- Created exams, assignments, lab materials, and contributed to curriculum development of courses.

Solution Arts Ltd   *Dhaka, Bangladesh*
Software Development Intern   *Nov 2017 - Dec 2017*
- Completed a 2-month internship as part of BSc industrial training, where I:
    - Designed database schema for a hotel management system, improving data organization.
    - Developed part of the frontend interface that supports intuitive booking for end-users.

TECHNICAL SKILLS

- **Programming Languages**: Python, C/C++, JavaScript, TypeScript, Java, R, MATLAB, Shell Scripting.
- **Database:** MySQL, PostgreSQL, SQLite, MongoDB.
- **Web & Mobile App:** React, Angular, Flask, HTML, CSS, Bootstrap, React Native, Android Studio.
- **Data Visualization:** d3.js, three.js, Vega-lite, WebGL, Matplotlib, Seaborn, Plotly, Shiny.
- **Data Processing:** NumPy, Pandas, Dask, SciPy.
- **Machine Learning:** TensorFlow, Keras, PyTorch, scikit-learn, nltk.
- **Other:** Version control - Git, Latex/Overleaf.

PUBLICATIONS

- **K.S. Omar**, G. Moriera, C. Veiga, and F. Miranda, "Developing an Open Computational Framework for Decision Support Across Transportation, Weather, and Public Health", *Sustainability Research + Innovation Congress,* 2025 [**Poster**]. [pdf]
- **K.S. Omar**, S. Wang, R. Kungumaraju, T. Bhatt and F. Miranda, "VIGMA: The Visual Gait and Motion Analytics Framework", *IEEE Transactions on Visualization and Computer Graphics,* vol.31, no. 10, pp. 8143-8158, 2025. [pdf]
- S. Wang, **K.S. Omar,** F. Miranda and T. Bhatt, "Automatic Gait Event Detection in Older Adults During Perturbed Walking", *Journal of NeuroEngineering and Rehabilitation,* vol. 22, no. 1, p. 40, 2024. [pdf]
- **K.S. Omar**, G. Moreira, D. Hodczak, M. Hosseini, M. Lage and F. Miranda, "Deep Umbra: A Global-Scale Conditional Generative Adversarial Approach for Sunlight Access and Shadow Accumulation in Urban Spaces", *IEEE Transactions on Big Data*, vol. 11, no. 2, pp. 388–401, 2024. [pdf]
- **K.S. Omar**, G Moreira, D Hodczak, M Hosseini and F Miranda, "Crowdsourcing and Sidewalk Data: A Preliminary Study on the Trustworthiness of OpenStreetMap Data in the US", *ASSETS'22 UrbanAccess Workshop,* 2022. [pdf]
- **K.S. Omar**, M.N. Islam, and N.S. Khan, "Exploring Tree-Based Machine Learning Methods to Predict Autism Spectrum Disorder", *Neural Engineering Techniques for Autism Spectrum Disorder,* vol 1, pp 165–183. *Academic Press*, 2021 [pdf].
- **K.S. Omar**, A. Anjum, T. Oannahary, R.K. Rizvi, D. Shahrin, T.T. Anannya, S.N. Tumpa, M.M. Karim, M.N. Islam and F. Rabbi, "An Intelligent Assistive Tool for Alzheimer's Patient", *The 1st International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT)*, 2019. [pdf]
- **K.S. Omar**, P. Mondal, N.S. Khan, M.R.K. Rizvi, M.N. Islam, "A Machine Learning Approach to Predict Autism Spectrum Disorder", *International Conference on Electrical, Computer and Communication Engineering (ECCE)*, 2019. [pdf]

SERVICES

- Paper reviewer for PacificVis 2024, EuroVis 2023-2024, IEEE VIS 2022-2024.   *2022, 2023, 2024*
- Volunteer for CAVE3 demos hosted by EVL, UIC.   *2023, 2024*
- Vice President of Media of Bangladeshi Student Association at UIC.   *2022 - 2023*
- IEEE VIS Satellite Event volunteer. Held at EVL, UIC.   *2021*
- Class Representative, Department of CSE at MIST.   *2018*

HONORS AND AWARDS

- Merit Scholarship for academic performance, Military Institute of Science and Technology.   *2018*
- Dean's List (two consecutive years), Military Institute of Science and Technology.   *2016, 2017*