KAMAL ACHARYA

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ACADEMIC PROFILE

- Ph.D. (Dissertation Defended) in Information Systems with an independent research program focused on Neurosymbolic AI and data-driven demand modeling for Advanced Air Mobility systems.
- Published researcher in leading venues including International Joint Conferences on Artificial Intelligence Organization (IJCAI) and high impact journals including IEEE TAI, IEEE TITS with experience on NASA-funded research initiatives.
- Over 10 years of university-level teaching experience in computer science and engineering, with strong commitment to student mentorship and curriculum development.

RESEARCH INTERESTS

Neurosymbolic AI for safety-critical decision systems; theory-guided and data-driven demand modeling; Advanced Air Mobility and intelligent transportation systems; reinforcement learning and optimization; trustworthy and interpretable AI.

TECHNICAL SKILLS

Programming	Python, C, C++, PHP, SQL
Machine Learning	Deep Learning, Reinforcement Learning, Neurosymbolic AI
Tools	MATLAB, Git, MySQL
Soft Skills	Project Management, Team Leadership, Critical Thinking
Languages	English, Nepali, Hindi

TEACHING EXPERIENCE & COURSES TAUGHT

- **Programming and Software Development:** C, C++, PHP, Python (emphasizing algorithmic thinking, data structures, and real-world application development)
- **Systems and Computer Architecture:** Computer Organization, Computer Architecture and Microprocessors (8085/8086) with hands-on assembly programming and hardware interfacing
- **Artificial Intelligence and Data Science:** Data Mining and Artificial Intelligence, including supervised/unsupervised learning, pattern discovery, and applied analytics
- **Digital Systems and Communication:** Digital Logic Design; Analog and Digital Communication, integrating theoretical foundations with circuit-level understanding
- **Networking and Distributed Systems:** Data Communication, Computer Networks, and Advanced Internetworking, with practical exposure to protocols, routing, and network design
- **Capstone Supervision and Mentorship:** Supervised undergraduate capstone projects, guiding students through problem formulation, implementation, and technical reporting
- **Curriculum Development and Pedagogy:** Designed course materials and assessments, incorporating project-based learning, lab-driven instruction, and outcome-based education
- **Research-Led Teaching:** Integrated contemporary topics (e.g., AI, cybersecurity, and data-driven systems) into coursework to prepare students for graduate research and industry practice

WORK EXPERIENCE

Graduate Research Assistant Aug 2023 – Present
University of Maryland, Baltimore County (MD, USA)

· Led doctoral research under the NASA University Leadership Initiative (ULI) project on mobility-energy coordinated infrastructure planning for AAM operations.

- Designed and implemented a rolling-horizon trip request generation framework supporting scalable, time-dependent AAM demand simulation.
- Developed data-driven and neurosymbolic models for temporal AAM flight demand estimation, enabling policy and infrastructure relevant decision analysis.

Teaching Assistant
Operationalizing AI/Machine Learning for Cybersecurity Training May 2024 – Aug 2024
University of Maryland, Baltimore County (MD, USA)

- Supported a multidisciplinary graduate training program on Artificial Intelligence, Machine Learning, and Cybersecurity supported by NSF grants (OAC-2309760 and OAC-2229976).
- Assisted instructors in delivering hands-on instruction on AI-driven cybersecurity and cyberinfrastructure tools.
- Mentored interdisciplinary student teams conducting research projects integrating AI and cybersecurity applications.
- Provided guidance on project implementation, technical reports, and final research presentations.

Research Assistant Aug 2022 – Aug 2023
Embry-Riddle Aeronautical University (FL, USA)

- Worked on the Center for Advanced Transportation Mobility (CATM) project: "Improving Air Mobility in Emergency Situations".
- Data pre-processing and visualization: data gathering, cleansing, integration, and visualization.
- Built deep learning models for prediction of micro-level and macro-level air mobility.
- Built learning-to-optimize models based on prediction models to optimize air mobility.

Information Technology Coordinator 2014 – 2021
College of Applied Business and Technology (Kathmandu, Nepal)

- Helped establish a research and development unit in the IT sector in the college.
- Taught multiple undergraduate computing and programming courses within the institution.
- Conducted guest lectures and special seminars; supervised and coordinated faculty duty rosters.
- Counseled students; hired IT-related faculty in consultation with leadership.
- Developed and administered non-credit IT courses; organized annual IT symposium/workshops and competitions.
- Encouraged student publications (magazines, newspapers, journals).

Web Developer 2013 – 2014
Uniweb Technologies (Kathmandu, Nepal)

- Developed and maintained websites/web applications using HTML, CSS, JavaScript, and PHP.
- Designed responsive interfaces for cross-device/browser compatibility.
- Managed and optimized databases using complex SQL queries; improved performance via refactoring and caching.
- Integrated third-party APIs (payment gateways, social media); performed unit/integration/UAT testing.

Visiting Lecturer 2012 – 2021
Various Colleges Affiliated to Tribhuvan and Purbanchal Universities (Kathmandu, Nepal)

- Taught: C, C++, Computer Organization, Computer Architecture, Digital Logic, Advanced Internetworking.
- Supervised major and minor projects; involved in BIM, BCA, and BIT programs.

Lecturer 2012 – 2013
Janakpur Engineering College (Kathmandu, Nepal)

- Delivered assigned courses; encouraged assignments and student counseling.
- Guided field work; engaged students in research/projects; prepared detailed course plans.
- Supervised minor and major projects.

RESEARCH FUNDING EXPERIENCE

- NASA University Leadership Initiative (ULI): Mobility–Energy Coordinated Platform for Advanced Air Mobility Operations — Doctoral Research Contributor.
- National Science Foundation (NSF): AI/ML Cybersecurity Training Program (Grants OAC-2309760, OAC-2229976) — Teaching Assistant.
- Experience working within large-scale, multi-institutional funded research collaborations.

EDUCATION

Ph.D., Information Systems May 2026
University of Maryland, Baltimore County (UMBC)
Dissertation: Enhancing Demand Modeling for Advanced Air Mobility Using Data-Driven Learning and Neurosymbolic AI
Advisor: Dr. Houbing H. Song
Co-Advisor: Dr. Alvaro Velasquez
Dissertation Committee: Dr. Nirmalya Roy, Dr. Lei Zhang, Dr. Liang Sun, Dr. Kai Sun
Dissertation defense successfully completed
Selected Doctoral Coursework: Neurosymbolic AI; UAV Cybersecurity; Data Driven Modeling; Artificial Intelligence; System Safety & Certification

M.Sc., Information System Engineering 2019
Himalayan Institute of Science and Technology (HIST), Purbanchal University
Thesis: An Analysis of Classification Algorithms for Nepali News
Selected Graduate Coursework: Data Mining and Warehousing; Distributed and Cloud Computing; Advanced Database Management; Software Engineering; Operations Research; Information Security; Research Methodology; Data Communication and Computer Networks

Bachelor of Electronics and Communication Engineering 2011
Himalaya College of Engineering (HCOE), Tribhuvan University
Final Year Project: Distance and Speed Measurement Using Ultrasound
Selected Undergraduate Coursework: Probability and Statistics; Numerical Methods; Control Systems; Signal Analysis; Digital Signal Processing; Computer Architecture; Microprocessors; Communication Systems; Computer Programming

PUBLICATIONS

Journal

- Vasiloff K, **Acharya K**, Wang Z, Song H, Sun L.Demand Forecast and Energy-Aware Portal Siting for Regional Air Mobility (**Under Major Revision**), *Journal of Air Transport Management*, 2026
- **K. Acharya**, W. Raza, K. Vasiloff, Z. Wang, L. Sun and H. H. Song, "Demand Modeling for Advanced Air Mobility: Challenges, Opportunities, and Future Directions," in IEEE Transactions on Intelligent Transportation Systems, doi: 10.1109/TITS.2026.3671002.
- **Acharya, K.**, Song, H. A Comprehensive Review of Neuro-symbolic AI for Robustness, Uncertainty Quantification, and Intervenability. Arab J Sci Eng (2025). https://doi.org/10.1007/s13369-025-10887-3 (**Invited Paper**)
- De Macêdo AR, Jagatheesaperumal SK, Da Costa KA, **Acharya K**, Song H, Guizani M, De Albuquerque VH. "Quantum AI-Enhanced IoT–Fog Communication: A Survey From Cybersecurity and Data Privacy Perspective," in IEEE Communications Surveys & Tutorials, vol. 28, pp. 3637-3665, 2026, doi: 10.1109/COMST.2025.3622378.
- **K. Acharya**, A. Velasquez and H. H. Song, "A Survey on Symbolic Knowledge Distillation of Large Language Models," in IEEE Transactions on Artificial Intelligence, vol. 5, no. 12, pp. 5928-5948, Dec. 2024, doi: 10.1109/TAI.2024.3428519
- **K. Acharya**, W. Raza, C. Dourado, A. Velasquez and H. H. Song, "Neurosymbolic Reinforcement Learning and Planning: A Survey," in IEEE Transactions on Artificial Intelligence, vol. 5, no. 5, pp. 1939-1953, May 2024, doi: 10.1109/TAI.2023.3311428. (**Selected for IEEE CIS Publication Spotlight, Nov. 2024**)

- Raza W, Ma X, Song H, Ali A, Zubairi H, **Acharya K**. Long Short-Term Memory Neural Network assisted Peak to Average Power Ratio Reduction for Underwater Acoustic Orthogonal Frequency Division Multiplexing Communication. KSII Transactions on Internet & Information Systems. 2023 Jan 1;17(1), doi: 10.3837/tiis.2023.01.013

Book Chapter

- Hakim, S.B., Adil, M., **Acharya, K.** and Song, H.H. (2025). AI for Android Malware Detection and Classification . In AI for Cybersecurity (eds H.H. Song, E. Bertino, A. Velasquez, H.H. Wang, Y. Shoshitaishvili and S.K. Jha). https://doi.org/10.1002/9781394293773.ch15

Conference Proceedings

- **Acharya K**, Vasiloff K, Wang Z, Song H, Sun L. Urban Air Mobility Flight Demand Modeling for Airports in New York City. InAIAA SCITECH 2026 Forum 2026 (p. 1475). https://doi.org/10.2514/6.2026-1475
- **Acharya K**, Sharif I, Lad M, Sun L, Song H. Integrating neurosymbolic AI in advanced air mobility: a comprehensive survey. In Proceedings of the Thirty-Fourth International Joint Conference on Artificial Intelligence (IJCAI '25). Article 1151, 10362–10370. https://doi.org/10.24963/ijcai.2025/1151
- **K. Acharya**, M. Lad, L. Sun and H. Song, "Neurosymbolic Approach for Travel Demand Prediction: Integrating Decision Tree Rules into Neural Networks," 2025 International Wireless Communications and Mobile Computing (IWCMC), Abu Dhabi, United Arab Emirates, 2025, pp. 600-605, doi: 10.1109/IWCMC65282.2025.11059465.
- **K. Acharya**, M. Lad, L. Sun and H. Song, "A Data-Driven Approach to Enhancing Gravity Models for Trip Demand Prediction," 2025 IEEE Conference on Artificial Intelligence (CAI), Santa Clara, CA, USA, 2025, pp. 815-820, doi: 10.1109/CAI64502.2025.00145.
- **Acharya K**, Lad M, Song H, Sun L. Regional air mobility flight demand modeling in tennessee state. InAIAA SCITECH 2025 Forum 2025 (p. 2783). https://doi.org/10.2514/6.2025-2783
- Hakim, S.B., Adil, M., **Acharya, K.**, Song, H.H. (2025). Decoding Android Malware with a Fraction of Features: An Attention-Enhanced MLP-SVM Approach. In: Song, H.H., Di Pietro, R., Alrabaee, S., Tubishat, M., Al-kfairy, M., Alfandi, O. (eds) Network and System Security. NSS 2024. Lecture Notes in Computer Science, vol 15564. Springer, Singapore. https://doi.org/10.1007/978-981-96-3531-3_10
- M. Lad, **K. Acharya**, L. Sun and H. Song, "Enhancing Forecasting for Advanced Air Mobility," 2024 IEEE International Conference on Big Data (BigData), Washington, DC, USA, 2024, pp. 2908-2913, doi: 10.1109/BigData62323.2024.10825414.
- **K. Acharya**, M. Lad, L. Sun and H. Song, "Demand Modeling for Advanced Air Mobility," 2024 IEEE International Conference on Big Data (BigData), Washington, DC, USA, 2024, pp. 2855-2863, doi: 10.1109/BigData62323.2024.10825121.
- **K. Acharya**, A. Velasquez, Y. Liu, D. Liu, L. Sun and H. H. Song, "Improving Air Mobility for Pre-Disaster Planning with Neural Network Accelerated Genetic Algorithm," 2024 IEEE 27th International Conference on Intelligent Transportation Systems (ITSC), Edmonton, AB, Canada, 2024, pp. 1290-1295, doi: 10.1109/ITSC58415.2024.10920105.
- Zhu L, Lan Q, Velasquez A, Song H, **Kamal A**, Tian Q, Niu S, "SKGHOI: Spatial-Semantic Knowledge Graph for Human-Object Interaction Detection," 2023 IEEE International Conference on Data Mining Workshops (ICDMW), Shanghai, China, 2023, pp. 1186-1193, doi: 10.1109/ICDMW60847.2023.00155.

GUEST LECTURE

- "Neurosymbolic AI for Advanced Air Mobility: Foundations, Technical Advances, and an Approach to Travel Demand Modeling," IS 792 – Advanced Topics in Information Systems, UMBC, Nov 20, 2025.

PROFESSIONAL SERVICE & LEADERSHIP

Professional Leadership

- Co-Chair, IEEE Baltimore Technical Colloquium & Professional Development Conference 2026
- Vice-Chair Elect (2026), IEEE Baltimore Section

- Conference Secretary, IEEE Baltimore Technical Colloquium & Professional Development Conference 2025
- IEEE Day 2025 Ambassador, IEEE Region 2
- Region 2 Lead, IEEEXtreme 18.0 and 19.0
- Technical Program Committee Member, The Twenty-First International Multi-Conference on Computing in the Global Information Technology (ICCGI 2026)
- Experience contributing to academic governance, conference organization, and peer-review coordination.

Editorial & Review Service

- Newsletter Editor, ACM EIGTRUST (Emerging Interest Group on Trustworthy AI and Autonomous Systems), Association for Computing Machinery (ACM), 2026–Present
- IEEE Transactions on Intelligent Transportation Systems, 2022–Presesnt
- IEEE Transactions on Artificial Intelligence, 2023–Present
- IEEE Transactions on Neural Networks and Learning Systems, 2024–Present
- IEEE Transactions on Consumer Electronics, 2024–Present
- IEEE SMC Magazine, 2024–Present
- IEEE Internet of Things Journal, 2025–Present
- Journal of Big Data, 2024–Present
- Arabian Journal for Science and Engineering, 2025–Present
- KSII Transactions on Internet and Information Systems, 2024–Present

CERTIFICATIONS

- Neuro-Symbolic AI Essentials (IBM)
- AI Alignment Fast-Track, Intro to Transformative AI (BlueDot Impact)
- Mathematical Thinking in Computer Science (Coursera)
- Neural Networks and Deep Learning (Coursera)
- Python for Everybody (Coursera)
- Machine Learning with Python and NLP (Udemy)

MEMBERSHIP

- Graduate Student Member, IEEE
- ACM Student Member
- Phi Kappa Phi
- Registered Engineer, Nepal Engineering Council

HONORS & AWARDS

- Conference Travel Grant ($1000), Department of Information Systems, UMBC, 2026
- Professional Development Grant ($750), Graduate Student Association, UMBC, 2026
- Outstanding Reviewer (2024–2025), IEEE Transactions on Neural Networks and Learning Systems, IEEE Computational Intelligence Society, Dec 2025
- Doctoral Research Poster Award, UMBC, May 2025
- IEEE CIS Publication Spotlight Recognition, IEEE Computational Intelligence Society, Nov 2024