Hari N. Iyer

Mesa, AZ

Biographical Sketch

Hari Iyer is currently a PhD student and Graduate Research Assistant at Dr. Heejin Jeong's Human-in-Mind Engineering Research (HiMER) Lab, Arizona State University.

Previously, he has worked for Optimal Synthesis Inc. as a Research Engineer (2018-2022) on NASA's $10 Million ULI grant, focusing on prognostics and reliability research for (Part-121) US-NAS (National Airspace System) and other SBIRs. Hari's role included building PARA-ATM and GNATS for Air Traffic Management (ATM), Pilot/Controller error models, look-ahead flight simulation using In-time Risk Assessment (IRA), and optimizing 6-DOF Inertial Measurement Unit (IMU) using real-time embedded signal processing for Inertial Navigation Systems (INS) applications for trajectory guidance simulation.

Other positions held by Hari include being a Visiting Researcher at Indian Institute of Technology (IIT) Bombay, working on Air Traffic Controller (ATCo) workload and expertise analysis. He has interned for App Orchid Inc., a Silicon Valley startup, working on machine learning and building probabilistic models for Natural Language Processing (NLP) and Tribal Knowledge Inferencing for insurance/legal industry partners.

Contact Information

Email: hari.iyer@asu.edu
LinkedIn: https://www.linkedin.com/in/iyerhari1729

Professional Experience and Training

December 2022 - Present
Graduate Research Assistant: Arizona State University, Mesa, AZ

- Working on Computer Vision and Neural Networks to analyze ergonomics and posture for physical tasks.
- Building technology and hardware to set up HiMER lab at ASU.

June 2018 - July 2022
Research Engineer: Optimal Synthesis Inc., Los Altos, CA

- Designing, building, and testing simulation systems for US-NAS Air Traffic Management as part of NASA's $10 million ULI grant. Contributed to GNATS software as the deliverable.
- Implemented first ever Gate to Gate Flight Simulation for improving aviation safety metrics and scope by 50%. Used by FAA, NASA AMES, UC Berkeley, and dozens of aerospace researchers.
- Bridged third party simulators like X-Plane with GNATS, presented Python-driven real-time accident simulation of US Airways (Cactus) 1549 on the Hudson to NASA. Presented

and demonstrated GNATS at the NASA ULI conference hosted by Southwest Research Institute (SwRI), San Antonio, TX.
- Optimized 6-DOF Inertial Measurement Unit (IMU) using real-time embedded signal processing for Inertial Navigation Systems (INS) applications.

December 2019 - February 2020
Visiting Researcher: IIT Bombay, India
- Programmed Air Traffic Controllers' (ATCo) traffic controlling strategies to assess prospective memory and situational awareness (Including real-time at Mumbai ATC for over 60 ATCo).
- Disproved traditional factors (age/experience) for ATCo proficiency, reinforcing cognitive ability as a criterion. This work was part of a research initiative with the Airports Authority of India (AAI).

December 2017 - January 2018
Research Assistant: Arizona State University, Tempe, AZ
- Co-founded and wrote software for PARA-ATM, a flight prognostics and route simulation system. This work was presented to NASA AMES and taken over by Southwest Research Institute.
- Set up a continuous real-time flight data exchange between FAA System Wide Information Management (SWIM) and ASU, attaining 100% automation for the process. PARA-ATM is open sourced on GitHub for community research purposes and being used by over 25 research groups globally.

Summers: 2016, 2017
Engineering Intern: App Orchid Inc., San Ramon, CA
- Built an accident data/document classifier and search engine over unstructured data for a pool of insurance companies. Implemented classifier using an auto-enhancing Naive Bayes model using Spark ML Pipeline that automated 40% of the manual workload.
- Inferred structure from tribal knowledge using Stanford NLP and Ontologies to build a knowledge graph.
- Created 100K data point training set with Word2Vec out of unstructured text with a WebSocket listener.

Education

2018
Arizona State University
MS, Software Engineering

2016
University of Mumbai, India
BE, Computer Science and Engineering

Publications

Summary of Publication
Conference Proceedings: 5
Journal Articles: 4

Journal Articles

Wang, Y., Pang, Y., Chen, O., **Iyer, H. N.**, Dutta, P., Menon, P. K., & Liu, Y. (2021). Uncertainty quantification and reduction in aircraft trajectory prediction using Bayesian-Entropy information fusion. *Reliability Engineering & System Safety*, *212*, 107650. https://doi.org/10.1016/j.ress.2021.107650

Gjorcheski, S., **Iyer, H.**, Nikolovski, G., & Trajchev, D. (2018). Autonomous Flight Navigation Mechanism for Air-Route Optimization. *The International Journal of Science & Technoledge*, *6*(3). Retrieved from https://www.internationaljournalcorner.com/index.php/theijst/article/view/129561

Iyer H., Desai H., Bhansali D., Patil A. (2015). Weather Optimized Routing Algorithm for Aircraft. *International Journal of Innovations & Advancement in Computer Science, 4*(10).

Iyer, H., Gandhi, M., & Nair, S. (2015). Sentiment analysis for visuals using natural language processing. *Int. J. Comput. Appl*, *128*(6), 31-35. https://doi.org/10.5120/ijca2015906581

Conference Proceedings

Sharma, K., **Iyer, H.**, & Pant, R. (2022). Cognitive Ability Criterion for Expertise in Air Traffic Control Task. In *AIAA SciTech 2022 Forum* (p. 2449). https://doi.org/10.2514/6.2022-2449

Menon, P. K., Dutta, P., **Iyer, H. N.**, & Chen, O. (2021). An In-Time Aviation Safety Prognostics System. In *AIAA Aviation 2021 Forum* (p. 2365). https://doi.org/10.2514/6.2021-2365

Menon, P. K., Dutta, P., Chen, O., & **Iyer, H. N.** (2020). Metrics for Air Transportation System Safety Analysis. In *AIAA Aviation 2020 Forum* (p. 2910). https://doi.org/10.2514/6.2020-2910

Menon, P. K., Dutta, P., Chen, O., **Iyer, H.**, & Yang, B. J. (2019). A modeling environment for assessing aviation safety. In *AIAA Aviation 2019 Forum* (p. 2937). https://doi.org/10.2514/6.2019-2937

Gao, Y., Liu, Y., Dutta, P., Chen, O., **Iyer, H.**, & Yang, B. J. (2019). Active Learning-based Efficient Separation Risk Assessment in National Airspace System. In *AIAA Aviation 2019 Forum* (p. 2942). https://doi.org/10.2514/6.2019-2942

Invited Talks and Service

- Instructor, “AI for Air Traffic Safety Enhancement”, 2023, American Institute of Aeronautics and Astronautics (AIAA).
- Guest speaker, “The next generation of engineers in the US ATM industry”, 2022, Radar Contact, FoxATM.
- Human Factors and Ergonomics Society (HFES) Conference Reviewer: 2023.