Akash Deep Singh

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Education

University of California, Los Angeles (UCLA) — Los Angeles, CA
Ph.D. in Electrical and Computer Engineering — *Sep. 2018 – Mar. 2023*

University of California, Los Angeles (UCLA) — Los Angeles, CA
MS in Electrical and Computer Engineering — *Sep. 2018 – Mar. 2020*

IIIT-Delhi — New Delhi, India
B.Tech in Electronics and Communication Engineering — *Aug. 2014 – May 2018*

Experience

Applied Scientist, Machine Learning — April 2023 – Present
Ownwell Inc — *Austin, TX*

- First Machine Learning hire at Ownwell, leading all ML/AI efforts.
- Developed models for property tax prediction, document processing, and question-answering.
- Conducted prompt engineering and fine-tuning of Large Language Models (LLMs) to optimize performance and adapt them for custom tasks.
- Collaborated with cross-functional teams to brainstorm and successfully integrate new AI functionalities into the product.
- Utilized machine learning techniques to automate and significantly improve the efficiency of internal and external processes.
- ML Stack: Transformers, multi-modal fusion, gradient boosting, and temporal self-attention
- Tech Stack: Python, PyTorch, Scikit-learn

Applied Scientist Intern — June 2022 – September 2022
Amazon — *Seattle, WA*

- Developed ML models to detect fraud from user behavior patterns (mouse, keyboard gestures) and browsing data for the Buyer Risk Prevention (BRP) Team. Improved the performance of the production model by 6.96%.
- ML Stack: Temporal models such as LSTMs, multi-modal fusion, gradient boosting, and temporal self-attention
- Tech Stack: Python, PyTorch, Scikit-learn

Research Intern — June 2021 – August 2021
Nokia Bell Labs — *Virtual*

- Developed a self-supervised framework for extracting features from RF+camera data using contrastive learning. The framework outperformed its supervised counterpart on downstream tasks even with less training data – accepted at IEEE ICC 2022.
- ML Stack: Self-supervised learning, contrastive learning, CNNs, multi-modal fusion, and self-attention
- Tech Stack: Python, PyTorch, Scikit-learn

Awards, Achievements and Leadership Roles

- AI Application of the Year **2023**, The 2nd Annual IMN SFR Industry Awards
- Amazon Doctoral Fellowship**, 2021-22** – Tuition and Stipend
- Electrical and Computer Engineering (ECE) Departmental Fellowship**, 2018-19** – Tuition and Stipend
- Travel Grant, USENIX Security 2021
- Graduate Student Association (GSA) Presidential Service Award**, 2020-21**
- Semi-finalist, UCLA Grad Slam**, 2020**
- Served as the Elections Commissioner / Attorney General for the GSA, 2 terms**, 2020-22**
- Founding committee, ECE mentor of the year award (awarded to the best mentors in the department)**, 2021**
- Dean's List for academic achievement, IIIT-D**, 2017**
- First Prize, Innovation Challenge, Innovation Challenge (IIIT-D)**, 2017**
- National Talent Search (NTSE) Scholar, Government of India**, 2010**

Patents

[US Patent App. 18/055,772] Systems and Methods for Using Ultrawideband Audio Sensing Systems (Pending)

Peer Reviewed Publications

[CVPR 2023] **Singh, A.D.**, Ba, Y., Sarker, A., Zhang, H., Kadambi, A., Soatto, S., Srivastava, M. and Wong, A., 2023. Depth estimation from camera image and mmwave radar point cloud. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (pp. 9275-9285)

[Nature SR 2022] Bednarski, B.P., **Singh, A.D.**, Zhang, W., Jones, W.M., Naeim, A. and Ramezani, R., 2022. Temporal convolutional networks and data rebalancing for clinical length of stay and mortality prediction. Scientific Reports, 12(1), p.21247

[JAMIA 2021] Bednarski, B.P., **Singh, A.D.** and Jones, W.M., 2021. On collaborative reinforcement learning to optimize the redistribution of critical medical supplies throughout the COVID-19 pandemic. Journal of the American Medical Informatics Association, 28(4), pp.874-878

[Usenix Security 2021] **Singh, A.D.**, Garcia, L., Noor, J. and Srivastava, M., 2021. I always feel like somebody's sensing me! A framework to detect, identify, and localize clandestine wireless sensors. In 30th USENIX Security Symposium (USENIX Security 21) (pp. 1829-1846)

[mmNets 2019] **Singh, A.D.**, Sandha, S.S., Garcia, L. and Srivastava, M., 2019, October. Radhar: Human activity recognition from point clouds generated through a millimeter-wave radar. In Proceedings of the 3rd ACM Workshop on Millimeter-wave Networks and Sensing Systems (pp. 51-56)

[ACM Sensys 2020] Wang, Z., Chen, Z., **Singh, A.D.**, Garcia, L., Luo, J. and Srivastava, M.B., 2020, November. UWHear: Through-wall extraction and separation of audio vibrations using wireless signals. In Proceedings of the 18th Conference on Embedded Networked Sensor Systems (pp. 1-14)

[ICC 2022] Alloulah, M., **Singh, A.D.** and Arnold, M., 2022, May. Self-supervised radio-visual representation learning for 6g sensing. In ICC 2022-IEEE International Conference on Communications (pp. 1955-1961)

[IEEE RadarCon 2018] **Singh, A.D.**, Ram, S.S. and Vishwakarma, S., 2018, April. Simulation of the radar cross-section of dynamic human motions using virtual reality data and ray tracing. In 2018 IEEE Radar Conference (RadarConf18) (pp. 1555-1560)

[WPC 2019] Gupta, N., **Singh, A.D.**, Shrivastava, P. and Bohara, V.A., 2019. A two-way cooperative D2D communication framework for a heterogeneous cellular network. Wireless Personal Communications, 109, pp.579-593

[IEEE RadarCon 2017] **Singh, A.D.**, Vishwakarma, S. and Ram, S.S., 2017, May. Co-channel interference between WiFi and through-wall micro-doppler radar. In 2017 IEEE Radar Conference (RadarConf) (pp. 1297-1302)

[ACM Sensys 2022] Wang, Z., Sarker, A., Wu, J., Hua, D., Dong, G., **Singh, A.D.** and Srivastava, M., 2022, November. Capricorn: Towards real-time rich scene analysis using RF-vision sensor fusion. In Proceedings of the 20th ACM Conference on Embedded Networked Sensor Systems (pp. 334-348)

[ACM TOPS 2022] de Gortari Briseno, J., **Singh, A.D.** and Srivastava, M., 2022. Inkfiltration: Using inkjet printers for acoustic data exfiltration from air-gapped networks. ACM Transactions on Privacy and Security, 25(2), pp.1-26

[ACM Sensys 2022] Wang, Z., Sarker, A., Wu, J., Hua, D., Dong, G., **Singh, A.D.** and Srivastava, M., 2022, November. Towards Real-Time Rich Scene Analysis Using Vision-Guided Wireless Vibrometry. In Proceedings of the 20th ACM Conference on Embedded Networked Sensor Systems (pp. 786-787) (Poster)

[ACM Mobisys 2024] Dong, G., Wu, J., De Gortari Briseno, J., **Singh, A.D.**, Feng, J., Sarker, A., Sehatbakhsh, N. and Srivastava, M., 2024, June. RefreshChannels: Exploiting Dynamic Refresh Rate Switching for Mobile Device Attacks. In Proceedings of the 22nd Annual International Conference on Mobile Systems, Applications and Services (pp. 359-371)

Reviewer Experience

- [Program Committee] The International Workshop on Security and Privacy of Sensing Systems 2023 @ ACM Sensys
- Nature Scientific Reports 2023-Present
- ACM Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) 2021
- IEEE Transactions on Mobile Computing 2020
- IET Radar, Sonar & Navigation 2023-Present
- IET Electronic Letters 2020-Present
- IEEE Sensors 2023
- IEEE Access 2021

Software and Datasets

[Human Activity Recognition using Radar] https://github.com/nesl/RadHAR

[Human Activity Recognition Dataset] https://github.com/nesl/RadHAR/tree/master/Data

[Depth Estimation using Radar and Camera] https://github.com/nesl/radar-camera-fusion-depth

Leadership & Service

Elections Commissioner / Attorney General 2020-2022
Graduate Student Association (GSA) *Los Angeles, CA*

- Conducted free and fair elections for the GSA Executive Positions
- Increased the number of candidates that ran for the elections
- Served two consecutive terms.

Student Group Conduct Board 2021-22
University of California, Los Angeles *Los Angeles, CA*

- The Group Conduct Board is a student-majority panel appointed by the Vice Chancellor, Student Affairs to hear allegations of violations of group-specific and University policies
- The Group Conduct Board issues findings of policy violations

ECE Mentor of the Year Award Committee 2021-22
University of California, Los Angeles *Los Angeles, CA*

- The Mentor of the Year award in Electrical and Computer Engineering (ECE) at UCLA is established to honor faculty mentors who exceptionally exceed their responsibilities in aiding graduate students facing challenges, and in supporting them to achieve their goals
- I was the founding member of this award and served on the committee

Co-ordinator, Student Senate 2017-18
IIIT-Delhi *New Delhi, India*

- Student Senate is the elected body that serves as a representative for students in academic matter.
- Co-ordinator was the highest position (President) in 2017-18