Aidin Ferdowsi (Ph.D.)
Capital One | Principal Machine Learning Engineer
Virginia Tech | Electrical and Computer Engineering
U.S. Permanent Resident

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Qualifications Summary

- Expert in building and operating high-traffic distributed systems for AI-driven search and discovery experiences, with a focus on conversational AI and deep learning.
- Extensive experience leading cross-functional teams in designing advanced ML/AI solutions, particularly in Generative AI and Large Language Models (LLMs), to enhance user interaction.
- Proven track record in executing 0-1 projects in highly ambiguous environments, delivering top-tier scalable and robust systems.
- Skilled in collaborating in a hybrid, multidisciplinary environment, leading projects with diverse engineering and machine learning teams across multiple geographies.
- Proficient in cloud technologies with certification in AWS solutions architecture, ensuring the development of scalable and efficient systems.
- Strong analytical and problem-solving skills, adept at navigating complex project requirements to achieve strategic business outcomes.

Professional Experience

- **Capital One** — McLean, VA
  Lead Machine Learning Engineer — *July 2023 - Current*
  - **Conversation Platform**: Served as the lead engineer, focusing on natural language understanding and generation.
  - **Gen AI**: Designed and developed a Gen AI based information retrieval for Capital One Chatbot.
  - **Site Search**: Contributed to the development and enhancement of the site search feature, improving user experience and search efficiency.
  - **Auto-Complete**: Developed an LLM based autocomplete feature for EASE mobile application, enhancing user interaction and search functionality.

- **Capital One** — McLean, VA
  Principal Machine Learning Engineer — *November 2021 - July 2023*
  - **Conversational AI**: Led the team to design and deploy a new generation of dialog manager for Capital One's chatbot, Eno, using Rasa. The new dialog manager integrates transformers, a deep learning framework, which can handle multi-turn conversations, improving conversation success rate by 20%.
  - **Transformer-based Conversation Grading Model**: Developed a conversation grading component using a transformer model that is used as a performance metric for Capital One's conversational platform.

- **Hughes Network Systems** — Germantown, MD
  Machine Learning Researcher - Member of Technical Staff — *July 2020 - October 2021*
  - **Predictive Modeling**: Implemented a convolutional neural network (CNN) architecture using Keras and Tensorflow to forecast rain fades of satellite signals using GOES-16 images that achieved a 90% f1-score.
  - **Dynamic Inroute Association**: Developed a reinforcement learning algorithm to dynamically allocate the inroute links to terminals of a satellite network that maximizes throughput of the system.
  - **Dynamic Resource Allocation**: Developed an LSTM model to predict future traffic characteristics of a satellite communications network.

- **Carvana** — Tempe, AZ
  Data Scientist — *May 2019 - Aug. 2019*
  - **Deep Learning**: Implemented a neural network architecture using Keras that improved the win-rate predictor accuracy at Carvana by 15%. This win-rate predictor predicts Carvana's probability of winning any given vehicle at auction as a function of bid price and some other factors.

- **Data Visualization**: Created a Tableau dashboard for data reporting, resulting in a more effective comparison of 2018 and 2019 vehicle auction sales.

- **National Science Foundation** Blacksburg, VA
  Applied Machine Learning Engineer *Dec. 2016 - July 2020*
  - **Vehicle Network Optimization**: Developed an optimized control and learning system to improve traffic flow and reduce accident risk in autonomous vehicle networks.
  - **Cyber-Physical Security**: Worked on enhancing the security of autonomous connected vehicles' networks against cyber and physical attacks.
  - **IoT Signal Authentication**: Designed a dynamic IoT signal authentication algorithm using Long Short Term Memory (LSTM) models.
  - **Distributed Data Generation**: Developed a Generative Adversarial Network (GAN) framework for distributed and privacy-preserving data generation.
  - **UAV Wireless Connectivity**: Explored machine learning techniques for enhancing wireless connectivity for UAVs.
  - **UAV Security**: Worked on security measures for cellular-connected UAVs.

- **Sarveen Tech** Tehran, Iran
  Signal Processing and Software Developing Engineer *June 2014 - May 2016*
  - **Android Application**: Designed, developed, and implemented an Android application in JAVA for real time audio signal processing.
  - **iOS Application**: Designed the back-end process for a multimedia iOS application in C.

Education

- **Virginia Tech** Blacksburg, VA
  Doctor of Philosophy and Master of Science, Electrical and Computer Engineering; GPA: 3.82 *Dec. 2016 – July 2020*
  - **Dissertation: Distributed Machine Learning for Autonomous and Secure Cyber-physical Systems**: Developed analytical foundations for performance analysis, optimization, and security of cyber-physical systems. In particular, applied several machine learning algorithms as well as control theoretic solutions to optimize the performance of self-driving cars, unmanned aerial vehicles, and the Internet of Things networks. Moreover, applied notions of optimization and game theory to maximize the security and resilience of such cyber-physical systems against adversarial attacks.

- **University of Tehran** Tehran, Iran
  Bachelor of Science, Electrical and Computer Engineering; *Sept. 2011 – May 2016*

Achievements

- **Winner of 2021 Outstanding Dissertation Award in the "Science, Technology, Engineering and Mathematics"**: Awarded by Virginia Tech's graduate school for the best dissertation completed in 2020 across all schools/departments in the STEM category.
- **Winner of the Bill and Larue Blackwell Graduate Research Award**: Awarded by Virginia Tech ECE department for the best dissertation at Virginia Tech's ECE department in 2020.
- **Recipient of 2017 Wireless@VT Fellowship**: Awarded to only one Ph.D. student by the Wireless research group at Virginia Tech.

Technical Proficiency

- **Software and Programming Skills**: Python, SQL, AWS S3, PySpark, Node JS, Docker, MATLAB, TypeScript
- **Data Science, Machine Learning, and AI**: Tensorflow, Keras, Numpy, Pandas, PyTorch, Reinforcement Learning, Deep Learning, OpenCV
- **Cloud Technologies**: AWS (Certified Solutions Architect), Azure, GCP