Babak Badnava

Phone: 785-312-0432
Email: Babak.badnava@ku.edu
              Babak.badnava@gmail.com
LinkedIn: linkedin.com/in/badnava

About Me

PhD in Computer Science. Having worked in both industry and academia, I am a highly skilled and motivated software and machine learning engineer with nearly a decade of experience in software development, machine learning, and academic research. My expertise spans a range of programming languages, including Python, Java, and SQL, as well as frameworks and tools such as TensorFlow, Keras, and PyTorch. I am passionate about solving complex problems and driving technological advancements through rigorous research and development. My goal is to leverage my technical skills and research expertise to contribute to innovative R&D initiatives in the tech industry.

Professional Skills

Programming Languages:
- Python, Java, SQL, C/C++, Matlab.

Database and Database Management:
- PostgreSQL, Oracle DB, MySQL, MongoDB, Redis,

Machine Learning and AI:
- Reinforcement Learning (DQN, DDQN, A3C, PPO, PPG, etc.)
- Bandit Methods (UCB, Contextual MAB, NeuralUCB)
- Supervised Learning (SVM, ensemble learning, etc.)
- Unsupervised Learning (t-SNE, PCA, k-means, etc.)
- Deep Learning (CNN, RNN, LSTM)
- TensorFlow, Keras, PyTorch, Scikit-learn, SciPy.
- NumPy, Pandas, Matplotlib

Development Tools:
- GIT, IntelliJ IDEA, Eclipse IDE, DBeaver, SQL Developer, MySQL Workbench

Work Experience

Graduate Research and Teaching Assistant   University of Kansas, KS, USA   2020 - Present
- Developed PPO and PPG for the problem of rate adaptation in a 3D video streaming application.
- Simulated a wireless 3D video streaming application using real-world network and video datasets in python.
- Developed DQN, UCB, and contextual UCB algorithms to solve the problem of task offloading in edge computing platforms.
- Analyzed and visualized communication and computational tradeoffs in video streaming applications (Matplotlib).
- Developed a mathematical model of an edge computing platform and simulated in ns-3.
- Investigated the problem of user scheduling for high-quality video streaming applications and employed contextual UCB methods to improve user's quality of experience.
- Collaborated with Ph.D. students to implement LSTM, RNN, GRU, and Transformers models for wind power forecasting.
- Simulated UAVs' wireless communication networks using ns-3 simulator.
- Employed deep neural networks to learn dynamics of an autonomous vehicle.
- Assessed how drones can provide a reliable communication infrastructure for first responders.
- Authored and presented 7+ papers in prestigious conferences such as IEEE GLOBECOM, IEEE ISIT.
- Taught undergraduate labs on C and MATLAB programming, and circuit design.
- Instructed college algebra to over 70 students.

Software Engineer and Senior Python Developer   System Negar Saina – Tehran, Iran   2019 - 2020
- Refactored News Box software stack, reducing deployment costs by 50%.
- Enhanced software performance by 500% through redesigning the software stack and implementing microservices architecture.

- **Tools and technologies:** Python, PostgreSQL, Kafka, Sentry, Redis, and Celery.

Java/J2EE Developer   Dotin (Fanap) – Tehran, Iran   2015 - 2018
- Developed and maintained multiple subsystems of the insurance software.
- Analyzed different needs of the insurance industry in collaboration with business analysts to devise new features, in the software, that suits the customer's needs.
- Boosted the software performance and user experience by optimizing the SQL queries.
- Developed tools to generate multiple types of financial/business charts and reports.

Freelance Web and Android Developer,   Freelance - Yazd, Iran   2014 - 2015
- Developed multiple WordPress websites, plugins, and an Android application to connect teachers and parents.

Education

Ph.D. in Computer Sciences	University of Kansas	2024

- **Research topic:** modeling, simulating, and control of computer systems

M.Sc. in Artificial Intelligence and Robotics	Iran University of Science and Technology	2017
B.Sc. in Computer Engineering	Payame Noor University	2014

Selected Publications

Google Scholar: https://scholar.google.com/citations?user=sbqDPWAAAAAJ&hl=en

1. **Babak Badnava**, K. Roach, K. Cheung, M. Hashemi and N. B. Shroff, "Energy-Efficient Deadline-Aware Edge Computing: Bandit Learning with Partial Observations in Multi-Channel Systems," 2023 IEEE Global Communications Conference
2. **Babak Badnava**, Mona Esmaeili, Nasser Mozayani, and Payman Zarkesh-Ha. "A New Potential-Based Reward Shaping Method for Reinforcement Learning Agent," 2023 IEEE Annual Computing and Communication Workshop and Conference.
3. **Babak Badnava**, Sravan Chintareddy, Morteza Hashemi. "QoE-Centric Multi-User mmWave Scheduling: A Beam Alignment and Buffer Predictive Approach." 2022 IEEE International Symposium on Information Theory.
4. Iman Askari, **Babak Badnava**, Thomas Woodruff, Shen Zeng, Huazhen Fang. "Sampling-Based Nonlinear MPC of Neural Network Dynamics with Application to Autonomous Vehicle Motion Planning." 2022 American Control Conference.
5. Zeinab Akhavan, Mona Esmaeili, **Babak Badnava**, Mohammad Yousefi, Xiang Sun, Michael Devetsikiotis, Payman Zarkesh-Ha, "Deep Reinforcement Learning for Online Latency Aware Workload Offloading in Mobile Edge Computing," 2022 IEEE Global Communications Conference,
6. Reza Bagherpour, Nasser Mozayani, **Babak Badnava**. "Improving Demand-Response Scheme in Smart Grids using Reinforcement Learning." International Journal of Energy Research, 2021.
7. **Babak Badnava**, Taejoon Kim, Kenny Cheung, Zaheer Ali, Morteza Hashemi. "Spectrum-Aware Mobile Edge Computing for UAVs Using Reinforcement Learning." Proceeding of The Sixth ACM/IEEE Symposium on Edge Computing, 2021.
8. Reza Bagherpour, Nasser Mozayani, **Babak Badnava**. "Optimizing Dynamic Pricing Demand Response Algorithm Using Reinforcement Learning in Smart Grid," 25th International Computer Conference (CSICC).