Devendra R. Parkar

Personal Information

Devendra Rajendra Parkar
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Research Interests

My broad research interest lies in understanding and building complex systems with distributed agents. My current research explores techniques from multi-agent optimization, stochastic processes and reinforcement learning to build and study multi-agent behaviors.

Education

M.S. Computer Science Arizona State University, Tempe, Arizona, USA *(Expected) May 2024*
On-going Thesis. Evolving Stochastic Algorithms for Self-Organizing Particle Systems
Advisor. Prof. Joshua Daymude
GPA 4.00/4.00

B.E. Computer Engineering University of Mumbai, Mumbai, India *May 2018*
Bachelors Thesis. Simulation of Autonomous Swarm Behavior
Advisor. Prof. Jayant Gadge
GPA 7.96/10

Expected Publications

Jamison Weber, Dhanush Giriyan, **Devendra Parkar**, Andréa Richa, Dimitri Bertsekas, *Distributed Online Rollout for Multivehicle Routing in Unmapped Environments*, https://doi.org/10.48550/arXiv.2305.15596 [Preprint]

Kaustuv Mukherji*, **Devendra Parkar***, Lahari Pokala, Dyuman Aditya, Clark Dorman, Paulo Shakarian, *Scalable Semantic Non-Markovian Simulation Proxy for Reinforcement Learning with Temporal Logic Programming*, [Manuscript in preparation] *contributed equally

Devendra Parkar, Joshua Daymude, Kirtus Leyba, *Evolving Collective Behaviors in Self-Organizing Particle Systems*, [Manuscript in preparation]

Presentations

Devendra Parkar, Vaibhav Panchal, Prem Bhat and Rishi Shah, *Efficient Energy Management System for Indian households*, [Short-paper presentation] International Conference and Workshop on Electronics and Telecommunication Engineering at Thakur College of Engineering and Technology, ICWET 2015

Research Experience

Research Assistant under Prof. Joshua Daymude(ASU) *Sep 2022 - Present*
Project: *Evolving Stochastic Algorithms for Self-Organizing Particle Systems*
- Developed models to achieve collective behaviours of Aggregation, Separation and Object Coating using bio-inspired optimization algorithms - Genetic Algorithms, Particle Swarm Optimization
- Developed distributed parallelized implementation of simulation pipeline using HPC-MPI framework

Graduate Service Assistant under Prof. Paulo Shakarian(ASU) *May 2023 - Present*
Project: *IARPA Haystack - Movement Generation*
- Researching constrained optimization using Reinforcement Learning for non-episodic agent trajectory refinement problem

Project: *PyReason-Gym simulations for Symbolic Reinforcement Learning*
- Developed a new Deep-Q-Net algorithm to handle non-markovian time based dynamics
- Successfully demonstrated transfer of interpretable policies learnt in PyReason-Gym on PySC-II and AFSIM simulators

Research Volunteer under Prof. Andréa Richa(ASU), Prof. Dimitri Bertsekas(ASU) *Jan 2023 - May 2023*
Project: *Decentralized Multi-agent Heuristic Rollout*
- Developed a new Decentralized Multi-agent Rollout algorithm to solve vehicle routing problem in unmapped environments
- Successfully deployed the algorithm on physical robots in Robotarium testbed

Research Assistant under Prof. Jayant Gadge(MU) *Jan 2017 - May 2018*
Project: *Simulation of Autonomous Swarm Behaviors*
- Successfully evolved behaviors for flocking and herd evasion in ARGoS simulator
- Demonstrated a new prey-predator based co-evolution approach to develop nascent communication through LED signaling in Foot-bots

Awards

Graduate Engineering Fellowship Ira A. Fulton Schools of Engineering (ASU) *2023 - 24*

Mentoring Experience

Matthew Groholski Barrett, The Honors College Thesis(ASU) *Aug 2023 - Present*

On-going Thesis. Evolving bridging behaviour for self-organizing particle system model

Raylene Faerber Undergraduate Research(ASU) *Aug 2023 - Present*

Industry Experience

Senior Software Developer DreamSetGo, Mumbai, India *May 2020 - Jul 2022*

Achievements:

- Built the entire product backbone with key features - payment processing, order management, coupons creation, invoice generation, data gathering pipeline
- Built the initial infrastructure on AWS with automated CI/CD capabilities

Fullstack Software Developer Games24x7, Mumbai, India *Jun 2018 - May 2020*

Achievements:

- Developed and deployed cruicial features - leaderboards, partial payments, tournament tickets which generate over 53% of revenue and handle over 1 million concurrent users(peak)
- Achieved 15% - 20% overall performance improvement by initiating migration of web application from React 15 to React 16

Intern Kartographers, Mumbai, India *Jul 2017 - Apr 2018*

Helped secure project funding by successfully implementing the feature to live track hosts in maps with intra-zonal accuracy

Community Outreach

Psyche Programming Intern NASA Psyche Mission(ASU) *Aug 2022 - Dec 2022*

Assist undergraduate students to host, debug and maintain capstone projects (web/mobile apps, AR/VR/WebXR apps, server-database services)

References

Prof. Joshua Daymude
Assistant Professor at School of Computing and Augmented Intelligence, Biodesign Center for Biocomputing, Security and Society at Arizona State University, **Email:** jdaymude@asu.edu

Prof. Paulo Shakarian
Associate Professor at School of Computing and Augmented Intelligence, Center for Cybersecurity and Trusted Foundations Affiliates at Arizona State University, **Email:** pshak02@asu.edu

Prof. Spring Berman
Associate Professor at School for Engineering of Matter, Transport and Energy, Global Security Initiative, Center for Human, Artificial Intelligence, and Robot Teaming at Arizona State University, **Email:** spring.berman@asu.edu