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 learning agents, especially, its implications in understanding human brain. 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

Submissions

Kaustuv Mukherji*, **Devendra Parkar***, Lahari Pokala, Dyuman Aditya, Paulo Shakarian, Clark Dorman, *Scalable Semantic Non-Markovian Simulation Proxy for Reinforcement Learning*, International Conference on Semantic Computing (ICSC 2024) [Accepted], https://doi.org/10.48550/arXiv.2310.06835 *contributed equally

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 [Submitted and under review]

On-going Work

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 behaviors 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 (in collaboration with Leidos Inc.)*
- Researching constrained optimization of agent trajectory in knowledge infused graphs using heuristic based graph traversal algorithms

Project: *PyReason-Gym simulations for Symbolic Reinforcement Learning*
- Designed 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/MIT) *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
- Extended the algorithm for real world application with physical robot simulations (Robotarium testbed) and verified the cost improvement properties

Research Assistant under Prof. Jayant Gadge(MU) *Jan 2017 - May 2018*
Project: *Simulation of Autonomous Swarm Behaviors*
- Demonstrated a new prey-predator based co-evolution approach to develop nascent communication using Foot-bots in ARGoS simulator

Awards

Engineering Graduate 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 systems

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 develop, 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