

SHASHANK RAO MARPALLY

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SUMMARY

Robotics and Autonomous Systems senior with project and internship experience in Robotics, AI and Simulation. Seeking full-time positions from May 2021 in Software Development for Robots and AI.

EDUCATION

M.S, Robotics and Autonomous Systems (AI) Arizona State University, Tempe, AZ	Graduating May 2021 4.0 GPA May 2019
B.Tech, Mechanical Engineering National Institute of Technology, Karnataka, IN	3.88 GPA

TECHNICAL SKILLS

Frameworks: ROS, ROS2, TensorFlow, PyTorch, OpenCV
Software: Gazebo, CoppeliaSim, AutoCAD, Fusion360
Programming: Python, C, C++, Java, MATLAB, Linux, PDDL, Visual Studio Code
Hardware: ABB's YuMi, Fetch Robot, Raspberry Pi, Arduino

WORK EXPERIENCE

Autonomous Systems and Intelligent Robots Lab, ASU: Research Assistant	Jan 2020 – Present
<ul style="list-style-type: none">Interfaced PDDLgym with an Action Model Learning algorithm to showcase black-box nature of the algorithm. 📄Co-designed a prototype setup for Human-Robot Collaboration for Co-Assembly of an automotive part (NSF-Funded project) 🔗	
Toyota Material Handling: Robotics Intern	Jun 2020 - July 2020
<ul style="list-style-type: none">Developed functionality to merge laser-scan data from multiple LiDAR sensors in gazebo simulation.Served as Scrum MasterROS2, Gazebo, Docker, Azure DevOps, C++, CMake	
Intelligent Systems and Control Lab, IIT Kanpur: Robotics Research Intern	May 2018 - Aug 2018
<ul style="list-style-type: none">Achieved 98% accuracy in modeling inverse kinematics of simulated robot arm using Deep Feed-Forward Networks from self-generated data. 🔗Investigated applicability of RNNs for mimicking motion planners.Technologies: Python, ROS, Gazebo, MoveIt!, TensorFlow	
Autonomous Robots and Multi-Robot Systems Lab, IIT Bombay: Robotics Research Intern	May 2018 - Aug 2018
<ul style="list-style-type: none">Achieved 100% exploration of any maze environment by robots using a decentralized multi-robot graph-based exploration algorithm. 🔗Technologies: Python, ROS, Gazebo	
Systemantics India Pvt. Ltd. (Bangalore, IN): UX Design Intern	May 2018 - Aug 2018
<ul style="list-style-type: none">Re-designed Android App UI for Control of a Robot to be more intuitive and practical by using Material Design concepts.Technologies: Android App Development (Java, XML)	

PROJECTS

Explanation Generation in Human-Robot Teaming 🔗 📄

- Implemented a framework that uses inverse reinforcement learning to learn the preferred order of explanations provided by an AI agent to humans to minimize the cognitive load in collaborative tasks. 🔗
- Co-designed human-study experiments to evaluate the proposed algorithm

Mimicking Snakes using Genetic Algorithms 🔗

- Developed a framework that uses genetic algorithms to mimic snake motion from a video onto a simulated robot snake (Python, CoppeliaSim).

Follow - Me Robot 🔗

- Developed a simulation of a robot which follows a simulated human using a vision based controller for tracking (using ROS, Gazebo and OpenCV).

Deep Reinforcement Learning Nanodegree

- Trained an AI Agent using DQN, DDQN, and DDDQN to navigate in an environment and pick up specific objects. [🔗](#)
- Trained a simulated double-jointed robot arm using DDPG to reach specified cartesian goals. [🔗](#)
- Trained multi-agent AI using MA-DDPG to play tennis. [🔗](#)
- Software used: Python, PyTorch, Unity ML-Agents

ABU-ROBOCON (Representing National Institute of Technology, Karnataka) [🔗](#)

- Designed, developed, prototyped, fabricated and assembled (as a team) two industry-level robots that were to play a cooperative game of shuttlecock throwing.

Stable Control of an Inverted Pendulum [🔗](#)

- Adapted Particle Swarm Optimization method to achieve 100% stabilization of a simulated inverted pendulum system

Smart City Model

- Interfaced multiple sensors and actuators to model a smart building and established communication between Arduino and central Raspberry Pi Server with I2C protocol. The resulting model was able to send statistics of the smart building to the central server to perform necessary actions by analyzing sensor readings and accordingly operating actuators
- Collaborated with a team of 25+ students to achieve project goals

PUBLICATIONS

Pulkit Verma, **Shashank Rao Marpally**, and Siddharth Srivastava. Asking the Right Questions: Learning Interpretable Action Models Through Query Answering. Proceedings of the AAAI Conference on Artificial Intelligence, 2021(to appear). [📄](#)

Mehrdad Zakershahrak, **Shashank Rao Marpally**, Akshay Sharma ,Ze Gong , and Yu Zhang. Order Matters: Generating Progressive Explanations for Planning Tasks in Human-Robot Teaming (In Review at ICRA 2021). [📄](#)

Shashank Rao Marpally, M.S. Nagarakshith, Arjun Sadananda and K.R. Guruprasad. Geometrical Mapping of an Initially Unknown Region by a Mobile Robot. 2019 IEEEEDISCOVER, Manipal, India, 2019. [📄](#)