

Enna Sachdeva

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Currently working as a Research Intern at *Honda Research Institute, USA*, on predicting, explaining, and grounding evolving relationships for intelligent multiagent systems. Have extensive experience and in-depth knowledge of machine learning, and deep-reinforcement learning. Passionate about mathematics and evolving AI research, have a problem-solving and curious mindset. Actively looking for full-time roles in Machine learning, Data Science, and Reinforcement learning from January-2021.

SKILLS

Packages: Pytorch(*Advanced*), Tensorflow(*Basic*), Jupyter Notebook(*Advanced*), OpenCV(*Intermediate*), CUDA(*Basic*), Scikit Learn (*Intermediate*), Pandas(*Intermediate*), Numpy(*Advanced*), NLTK(*Basic*), Matplotlib(*Advanced*), XGBoost, Decision Tree, SVM, Clustering and Classification, OpenAI, Mujoco

Tools: Python (*Advanced*), C (*Basic*), C++ (*Basic*), MATLAB (*Advanced*), CUDA

Graduate Courses: Machine learning, Deep learning, Deep-Reinforcement learning, Graph Theory, Embodied AI, Multiagent Systems, Sequential Decision making, Computer Vision

EXPERIENCE

Research Intern, Honda Research Institute (HRI), San Jose

Sept 2020 - Dec 2020

- Working on trajectory prediction and explainability of evolving dynamic multi agent relationships.
- Using Graph Neural networks to predict dynamic relational latent representation between multiple agents, in complex traffic scenes, and grounding those relations using domain knowledge.

Software Intern, CodeDay Labs

July 2020

- Developed an autonomous resume classification system for diverse job roles, using supervised machine learning.
- Built a web API to deploy the trained model for an end-to-end system.

Graduate Student Researcher, Oregon State University

Jan 2019 - June 2020

- Advised by [Prof. Kagan Tumer](#).
- Worked on addressing tightly coupled sequential multiagent coordination tasks with sparse rewards.
- Developed a novel sample efficient hybrid algorithm using Neuroevolution and Policy Gradient Reinforcement learning to address temporal credit assignment problems in long time horizon tasks.

Graduate Teaching Assistant and Researcher, IIIT-Hyderabad

Jan 2016 - May 2018

- Delivered in-depth class lectures for graduate students, formulated assignments, mentored graduate projects for the course *Introduction to Robotics*.
- Published research papers in Robotics conferences and Workshops, like IROS-2017, RSS-2018 workshop, ROBIO-2018.

Electronics Engineer, Havells India Limited, Noida, India

June 2014 - Aug 2015

- Autonomously managed design, development, large scale production of the most sold LED products of the firm.
- Coordinated product design responsibilities among software engineers, mechanical designers, electronics engineers, vendors, and subcontractors.

PUBLICATIONS

Enna Sachdeva, Shauharda Khadka, Somdeb Majumdar, Kagan Tumer: **Dynamic Skill Selection for learning Joint Actions**, 20th International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2021), Extended Abstract.

PROJECTS

Extracting persons' key information from resumes, CodeDay Labs

July 2020

- Preprocessed text data, extracted key features like GPA, Major, School, Projects, from the resume.
- Tokenized the key features, word-embedding, training an LSTM model for resume classification.

- Achieved a percentage accuracy of 98% with resumes of 35 different categories.
- Built a server to deploy the trained model that extracts key features from the resume. [Video](#)

Predicting Employee Turnover using Scikit Learn, Self

July 2020

- Preprocessed data, visualized class imbalance, identified feature importance, encoded categorical features.
- Built a decision tree and random forest to predict the employee turnover, with interactive GUI.
- Achieved a percentage accuracy of 99%.

Multiagent learning via Dynamic Skill Selection, Intel@AI Lab-OSU Collaboration

Feb 2020 - Aug 2020

- Designed a novel sample efficient algorithm using Neuroevolution and Policy gradient Reinforcement learning to address credit assignment problems in multiagent coordination.
- Leveraged various semantically meaningful local skills, to optimize sparse team-based rewards for multi agents.
- Achieved 60% percentage improvement over state-of-the-art multiagent coordination algorithm- MADDPG.

Visual Navigation based environment exploration and mapping, OSU

Oct 2019 - Dec 2019

- Trained policy using Proximal Policy Optimization algorithm to maximize exploration with limited time constraint.
- Generated an oracle policy using Travelling Salesman Problem with an added constraint of time, on "Tunnel Dataset" generated with Multimodal Gaussian distribution.
- Achieved 78.38% percentage exploration with trained policy, as compared to 89.21% with TSP. [Video](#)

Time-Segmented Evolutionary Reinforcement learning, Intel@AI Lab-OSU Collaboration

June 2019 - Dec 2019

- Worked in joint collaboration with OSU and Intel Artificial Intelligence Labs.
- Designed a hybrid Neuroevolution Reinforcement learning algorithm to address credit assignment in a long time horizon task.
- Used multithreading and multiprocessing across different sub-agents for optimization over different time scales.
- Achieved 40% percentage improvement on MuJoCo environments like Half Cheetah, Humanoid, etc. over vanilla RL agent.

Autoencoders to enhance Multiagent Coordination in a Tightly-Coupled Domain, OSU

Jan 2019 - March 2019

- Generated and processed training datasets from a multiagent coordination environment "Rover domain".
- Trained Autoencoders to generate rich state representation of partially observable tightly coupled multiagent environments.
- Used Deep Deterministic Policy Gradient (DDPG) to learn decentralized policies for multiple agents with sparse global rewards.
- Achieved same performance (100% multiagent coordination) with encoded state space as with full state space. [Video](#)

Recurrent Multiagent Deep Deterministic Policy Gradient with Difference Rewards, OSU

Oct 2018 - Dec 2018

- Leveraged Recurrent Neural Networks with Multiagent Deep Deterministic Policy Gradient (MADDPG) to address multiagent coordination in a partially observed environment. [Code](#)
- Used reward shaping with difference rewards and achieved 32% performance improvement over MADDPG. [Report](#)

Modeling of robot design parameters as Convex Optimization problem, IIIT-Hyderabad

Oct 2016 - Feb 2017

- Formulated optimal spring stiffness and friction coefficient as a convex optimization problem for In-Pipe Climbing robot.
- Published this work in 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). [Paper](#) [Video](#)

EDUCATION

Oregon State University (OSU), OR, USA, Master of Science in Robotics	<i>GPA: 3.88/4.00</i>	Sept 2018 - Dec 2020
IIIT -Hyderabad, Hyderabad, India, Master of Science in Robotics	<i>GPA: 4.00/4.00</i>	Jan 2016 - July 2018
YMCAUST, Faridabad, India, Undergrad in ECE	<i>GPA: 3.65/4.00</i>	Aug 2010 - May 2014