Arth Shukla

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EDUCATION

University of California, San Diego September 2021 – June 2025

Bachelor of Science in Mathematics-Computer Science GPA – 4.0

Relevant Coursework

Completed: Supervised Machine Learning, Optimizations for Data Science I and II, Design and Analysis of Algorithms, Theory of Computation, Advanced Data Structures, Computer Organization and Systems Programming, Data Structures and Object-Oriented Design, Computer Science and Object-Oriented Programming - Java, Networks and Digital Communications, Data Warehousing to Big Data, Statistical Methods and Probability, Enumerative Combinatorics, Abstract Algebra I and II, Linear Algebra, Multivariable Calculus, Vector Calculus, Differential Equations

Planned for Fall 2023: Deep Learning for 3D Data (Graduate Level), Rec Systems and Web Mining, Intro to Computer Vision

EXPERIENCE

AI Research @ Su Lab

AI Research Intern June 2023 – Present

Technologies Used: Development: Jax, Pytorch, OpenAI Gymnasium, D4RL, Maniskill, Mujoco, Adroit; Tools: WandB, Docker, Nautilus, Kubernetes (kubectl, PVCs, etc), Mamba/Conda

Personal AI Projects: https://github.com/arth-shukla; https://wandb.ai/arth-shukla/projects

Technologies Used: Development: Pytorch (Torch, TorchVision, Datasets, Dataloaders, Cuda), OpenAI Gym, HuggingFace Transformers Library, TensorFlow, Keras, Gensim; Concepts: Reinforcement Learning (PPO, DDQN, DQN), NLP (Transfer Learning, Embeddings, Attention); Tools/Technologies: WandB, BERT/DistilBERT Pretrained, Conda

Reinforcement Learning

- Use Pytorch to make PPO Agent (w/ entropy regularization, advantage normalization, early stop w/ approx. KL Div, GAE, etc) and Gymnasium to consistently beat Mario level 1-1 and 1-4 in under 1600-2000 episodes of training: https://github.com/arth-shukla/ppo-mario
- Use Pytorch to implement DDQN from *Human-level control through deep reinforcement learning*, Deep Mind 2015 in Gymnasium to beat Mario level 1-1 in under 13000 episodes of training: https://github.com/arth-shukla/ddqn-mario
- Use Pytorch to make simple PPO Agent and Gymnasium to consistently beat CartPole in under 140 episodes of training: https://github.com/arth-shukla/ppo-gym-cartpole

Natural Language Processing

- Use HuggingFace Transformers library to fine-tune DistilBERT model (transfer learning) trained on Stanford Question-Answer 2.0 (SQuAD 2.0) to answer a question given some context (article, paragraph, etc): https://github.com/arth-shukla/squad2.0-bert-question-answer
- Use Pytorch and HuggingFace to fine-tune DistilBERT model (trainsfer learning) to classify and approximate sentiment for Stanford Sentiment140 1.4-million Tweet Dataset: https://github.com/arth-shukla/sentiment140-bert-transfer-learning
- Use TensorFlow Keras to build LSTM and CNN and use Gensim to refit GLoVE word embeddings for IMDB Review Sentiment Classification: https://github.com/arth-shukla/gensim-embedding-training-imdb

Computer Vision

- Use Pytorch (Datasets and Dataloaders) and TorchVision to implement *PointNet: Deep learning on point sets for 3d classification and segmentation*, Qi et al. 2017 for part segmentation on chair point clouds: https://github.com/arth-shukla/pointnet-part-segmentation

ACM AI's Element.AI Competition https://github.com/acmucsd/Element.AI

I led development and organization of Element.AI, an $8000 RL competition at UCSD with over 200 participants.

Technologies Used: Python, Conda, Java, Maven, OpenAI Gym, PettingZoo, PyGame, Jackson, Squid, Bash

Lead Developer July 2022 – Feb 2023

- Use Python with Conda and PettngZoo ParrallelEnv to create multi-agent gym environment based on popular PaperIO game
- Use Java with Maven and Jackson to create Java sdk for 45 participants (~22.5% of all participants)
- In coordination with UCSD ITS, use Squid proxy, IPTables and bash scripts to create instructor tools, allowing us to enable/revoke access to wifi, whitelist sites, enable/revoke access to files, and in general control the competition accounts with granularity, both targeted and en masse
- Write proposals and attend meetings to obtain $8000 in sponsorships, attracting 200 participants (limited primarily by the number of UCSD Linux lab machines) with over 100 submissions

Nefeli Networks
Technologies Used: Backend: Go, Docker, Kubernetes, etcd; Frontend: Angular, Less; DevOps: Git, Coder, Agile
Software Engineering Intern June 2023 – August 2023

- Use Go and Docker to integrate Infracost API in backend for Terraform cloud object cost and diff calculation, code used in production (23.09 release)

ACM AI UCSD
ACM AI is UCSD's largest AI student org which fosters a community for those interested in AI and research.
Technologies Used: AI/ML Workshops and Projects: Python, PyTorch, TensorFlow, Google Colab; Web Development: TypeScript, React, LESS
Board – President May 2023 – Present

- Lead Operations, Competitions, Dev, and Marketing teams to develop competitions and workshops, and revamp our forward-facing resources (website, GitHub, ACM AI Wiki)

Board – Director of Operations May 2022 – May 2023

- Lead team of 7 event leads in creation of competitions, workshops, and socials related to ML/AI
- Coordinate with marketing and development teams to market events and create competitions

Board – Event Lead January 2022 – May 2022

- Coordinate with marketing, social, and other event leads to host workshops on NLP, deep learning, and ML topics
- Develop and organize competitions run by ACM AI (100-200 submissions on average)
- Mentor intermediate and beginner ACM Projects teams in developing AI/ML projects

ACM Projects – Machine Learning Engineer September 2021 – January 2022

- Create model to convert human faces to Cat-Human hybrid using DCGAN, PatchGAN, CycleGAN, and StyleGAN
- Coordinate with team of 3 front- and back-end devs to implement model into user-friendly tool

Bittner Development Group
Technologies Used: Web Development: React, SCSS, Node.js; DevOps: GitLab, Git, WSL; Scripting and Automation: TypeScript, JavaScript, Java; Development Standards: WCAG 2.1 AAA, Aria APG, Norton Design System; Processes: Agile Methodology
Software Engineering Intern November 2019 – June 2023

- Use React and SCSS to develop component library and enterprise web application 'Interactive Builder'
- Web development, QA, and devops of over 10 education interactive projects in React to WCAG accessibility standards
- Manage and train two interns to complete projects using React and SCSS, GitLab, Git, and WSL
- Propose, lead, and develop internal and for-client automation projects using Node and native JavaScript

Personal Web Development Projects: https://github.com/arth-shukla
Technologies Used: Web Development: TypeScript, React, Rollup, Jest, Webpack, Storybook, SCSS; DevOps: Netlify, Git, GitHub Pages, GitHub Packages; Development Standards: WCAG 2.1 AAA, Aria Authoring Practices Guide (APG)
Independent Developer

- Personal website using React Typescript, SCSS, and Material UI, accessible by WCAG 2.1 AA standard: https://arth.website
- Icon Library with React TypeScript and SCSS, publish to GitHub packages: https://github.com/arth-shukla/arth-components; code demos and documentation: https://arth-shukla.github.io/my-icons-documentation
- Code mobile-compatible Dice Roller web app on React: https://arth-shukla.github.io/dice-roller

SKILLS

- **Programming Languages** – Python, C++, Go, TypeScript, JavaScript, Node, React, Java, Ruby, Bash, SCSS, LESS, CSS, C, R
- **Packages and Libraries** – Pytorch, TorchVision, Jax, Keras, HuggingFace, OpenAI Gym, PettingZoo, Rollup, Jest, Webpack
- **Programs and Software** – Nautilus, Docker, WandB, Tensorboard, Git, GitHub, GitLab, Mamba/Conda, Maven, Visual Studio Code, WSL, Netlify, Storybook, Android Studio, Matlab, Microsoft Office, Microsoft Excel, Microsoft Powerpoint
- **Development Standards** – Web Content Accessibility Guidelines (WCAG) 2.1 AAA, Aria Authoring Practices Guide (APG)
- **Languages** – Fluent in English and French, Spoken Hindi