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Pramodkumar Choudhary

Education

Oct. 2021 - Nov. 2024 **M. Sc., Informatics**, *Technical University of Munich(TUM)*, Munich
Grade: *1.9, German scale*
Focus Area: Machine Learning, Robotics, Scientific Computing and High Performance Computing(HPC).

Aug. 2016 - Oct. 2020 **B. Eng., Computer Engineering**, *University of Mumbai*, Mumbai
Grade: *8.38/10, CGPA*

Research Experience

Jan. 2024 - Jun. 2024 **Robot-adaptive Neural Inverse Kinematics**, *TUM*, Munich
Master thesis, Supervisor: Prof. Dr. Matthias Althoff
- Use of self-supervised learning to design a single, robot-adaptive model that generalises across arbitrary serial kinematic chains (2-6 DOF), eliminating the need for robot-specific models and pre-computation.
- Demonstrate a unified approach for generating diverse, collision-aware inverse kinematics (IK) solutions for manipulators in complex, unseen environments with obstacles.

May 2023 - Nov. 2023 **Benchmarking Hybrid Reinforcement Learning for Robot Morphology Optimization**, *TUM*, Munich
Guided research, Supervisor: Prof. Dr. Matthias Althoff
Continuation work of Master practical course.
- Perform a systematic benchmark of multiple deep reinforcement learning algorithms based on parameterized action space for the task of robot morphology optimization.
- Analyze algorithm performance in terms of convergence speed, final reward, and computational cost, providing insights into their suitability for complex design synthesis problems.

Nov. 2022 - Jun. 2023 **Optimizing temperature controllers of Multi-stage continuous Adiabatic Demagnetization**, *TUM and Kiutra GmbH*, Munich
Interdisciplinary project, Supervisor: Prof. Dr. Christian Pfleiderer & Dr. Alexander Regnat
- Design control parameters of an adiabatic demagnetisation refrigeration(ADR) process as a sequential Markov Decision Process(MDP) to precisely control temperature setpoints to replace manually tuned PID controllers.
- Conduct a systematic study to mitigate policy-induced noise caused by deep reinforcement learning to ensure a stable and robust control required for sub-kelvin temperature regulation.

Oct. 2022 - Mar. 2023 **Hybrid Reinforcement Learning for Robot Morphology Optimization**, *TUM*, Munich
Master practical course, Supervisor: Prof. Dr. Matthias Althoff
- Formulate the robot design problem as a Markov Decision Process(MDP) with a hybrid discrete-continuous action space to simultaneously select robot modules and their parameters.
- Implement a search heuristic to construct task-specific robot morphologies in 2D and 3D environments while satisfying reachability and obstacle-avoidance constraints.

Apr. 2022 - Sep. 2022 **NeRF based Kinematic Calibration**, *TUM*, Munich
Course project: Advanced deep learning for Robotics
- Extend Neural Radiance Fields (NeRFs) to learn camera parameters and the noisy configuration of a robot arm within the scene.
- Couple a robot's forward kinematic chain as a differentiable component within the neural rendering optimization to calibrate camera parameters and robot joint angles.

Aug. 2019 - Oct. 2020 **Trail Tracker: Anti-Poaching Intelligence**, *University of Mumbai*, Mumbai
Bachelors project, Supervisor: Asst. Prof. Vidya Zope
- Train a computer vision model to predict and identify poaching activities from sensor data, optimized for low-power edge deployment.
- Define and deploy edge-computing architecture using IoT that enables AI inference for operational robustness in remote environments.

Work Experience

Dec. 2024 - **current** **Software developer**, *Kiutra GmbH*, Munich
Design, develop, and maintain the software lifecycle for cryogenic control systems, from architecture and automation to CI/CD and release management.

Mar. 2022 - Nov. 2024 **Working student software developer**, *Kiutra GmbH*, Munich
Build a centralized control software with integrated real-time visualization backed by high-frequency data storage and communication systems.

May 2020 - Jun. 2020 **Web development intern**, *Indian Institute of Technology - Bombay*, Mumbai
Collaborate on a data-driven media platform featuring user personalization, an analytics dashboard, and an integrated AWS video-on-demand pipeline.

Jun. 2019 - Jul. 2019 **Deep learning intern**, *Konsultera Solutions Pvt. Ltd.*, Mumbai
Discover a lightweight emotion recognition model by applying transfer learning over existing architectures and analyze optimizations achieved.

Jun. 2018 - Jul. 2018 **Deep learning intern**, *Konsultera Solutions Pvt. Ltd.*, Mumbai
Build and deploy an object detection model for automated attendance tracking integrated into a real-time system.

Publications

IJCRT 2020 V. Zope, S. Relekar, **P. Choudhary**, M. Ochaney, & R. Bhagtani. *Trail-tracker: Anti-poaching Intelligence Using AI and IoT*. In IJCRT Vol. 8, No. 4, 2020.

Seminars and Workshops

Mar. 2023 **Beyond Deep Learning: Selected Topics on Novel Challenges**, *TUM*, Munich
Topic: Continual Learning

Nov. 2019 **Object Detection API using TensorFlow**, *Mumbai*
Conducted as part of the Computer Society of India

Oct. 2019 **React workshop**, *Mumbai*
Conducted as part of the Computer Society of India

Feb. 2019 **Python workshop**, *Mumbai*
Conducted as part of the Computer Society of India

Extra Curricular Activities

Jun. 2019 - Mar. 2020 Teaching Volunteer in U&I Organization at Vision Rescue, Kalwa Center

Jul. 2019 - Apr. 2020 Senior technical member: Computer Society of India(CSI)-VESIT Council

Jul. 2018 - Apr. 2019 Executive committee member: Computer Society of India(CSI)-VESIT Council

Technical skills

Programming	Python, C++, Bash
ML Concepts	Deep learning, Reinforcement learning, Self-supervised learning
HPC	PyTorch Distributed Data Parallel(DDP), CUDA
Web	React, Next.js, Node.js, Redux, Webpack, Flask, Quart
Data	Pandas, SQL, MongoDB
Miscellaneous	Git, Docker, Redis, Ansible, Proxmox
API	REST, Websockets, GraphQL