Avi Amalanshu

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ABOUT ME

I am an undergraduate at IIT-KGP, one of the most competitive engineering schools in the world. I am interested in a career in R&D. I am looking for internships broadly in machine learning systems, unsupervised learning and distributed systems.

EDUCATION

Dual Degree (B.Tech+M.Tech)
Indian Institute of Technology Kharagpur
B.Tech Electronics & Electrical Comm. Engg.
M.Tech Vision & Intelligent Systems
Minor Computer Science & Engineering
GPA: 8.86/10.00
Guide: Prof. Jithin Ravi
2020 - 2025

INTERESTS

Distributed Learning · Multi-Agent Learning · Self-supervised Learning · Online Algorithms · Information Theory

SKILLS & BACKGROUND

Tools: PyTorch (Ignite, Lightning & Geometric) · Gym · OpenCV · Scipy
Coursework *(broad topics)*: Machine Learning · Reinforcement Learning · Probability & Statistics · Optimization · Comp. Neuro. · Comm. Theory & Signal Processing · Data Structures & Algorithms · Computer Architecture & Embedded Sys. · Circuit Design · OS · System Security

HIGHLIGHTS

- Published researcher
- Seasoned programmer (C/C++, Python, JavaScript, MATLAB)
- Skilled engineer with vast coursework & projects

WEB PRESENCE

avi-amalanshu
avi-amalanshu
avi-amalanshu.github.io
@avi_amalanshu

HONORS & AWARDS

2023 - SURF, Purdue University
2023 - SRIP, IIT Gandhinagar
2022 - MLRC 2021, PapersWithCode
2021 - Branch Change, IIT Kharagpur

EXTRACURRICULARS

Scrabble, Word Games, Quiz, Guitar, Drums, Swimming, Basketball

EXPERIENCE

Purdue University - West Lafayette, US-IN — May '23 – Aug '23
Summer Undergraduate Research Fellow
- Guided by Prof. David Inouye, Probabilistic & Understandable ML Lab.
- Responsible for literature review, synthesis, coding experiments, paper-writing.

Autonomous Ground Vehicle - Kharagpur, IN-WB — Jun '21 – ongoing
Deep Learning Team Leader (Aug '23 – ongoing)
- Responsible for directing the research efforts in robotic perception of a student-run research group.

Software and AI Team Member (Jun '21 – Aug '23)
- Worked on problems of robotic perception, particularly trajectory prediction.
- Participated in various conference workshop competitions on deep learning.
- Won the Machine Learning Reproducibility Challenge, 2021.
- One of 15 selections out of 300+ applicants. One of 3 who completed all 5 selection tasks. Tasks were to program a broad range of image processing problems.

KEY PROJECTS

Distributed Inference under Communication Constraints — Ongoing
w/ Prof. Jithin R, IIT-KGP
- Asymptotics for distributed detection with two inferring agents.
- Algorithmic development for hypothesis tests and multi-armed bandits.

Domain Adaptation in Breast Cancer Detection — Dec '23
w/ Prof. Chetan Arora, IIT Delhi
- Wrote internal scripts and analyzed data to investigate poor domain adaptation performance of MRT (Zhao et. al. ICCV '23) on Indian mammograms.
- Replacing self-attention with focal modulation to improve baseline for domain adaptation in breast cancer detection. Devised an appropriate input mask.

Decoupled Vertical Federated Learning — Oct '23
Bachelor's Thesis, w/ Prof. Jithin R, IIT-KGP and Prof. David Inouye, Purdue University
- A localized strategy for neural network training on vertically partitioned data.
- Immune to inference attacks, graceful performance degradation with crash faults.
- Comparable to SplitNN under perfect conditions. Can leverage weak supervision.
- **Manuscript submitted to conference for double-blind review.**

Localized Deep Learning in Decentralized and Dynamic Environments — Aug '23
SURF, Purdue University
- Towards Internet Learning, a novel, highly decentralized and fault tolerant training regime for neural networks.
- Besides developing the baseline, investigated possible localized/energy-based approaches to this problem.
- Published a paper at ICML 2023 Workshop on Localized Learning. [2]

MLRC 2021 — Mar '22
Software and AI Team Member, AGV
- Reproduced a state-of-the-art A* conference paper (*Mangalam et. al From Goals, Waypoints & Paths To Long Term Human Trajectory Forecasting*). Showed its transfer learning capability.
- Conducted literature review and reading groups. Ported the code to PyTorch Lightning. Reproduced some experiments. Wrote the report.
- Report published in ReScience C 2021 journal, [1] invited to present poster at NeurIPS 2022.

PUBLICATIONS

[1] A. Shukla, S. Roy, Y. Chawla, A. Amalanshu, S. Pandey, R. Agrawal, A. Uppal, V. N, P. Mondal, A. Dasgupta, D. Chakravarty in ML Reproducibility Challenge 2021 (Fall Edition), **2022**.
S. Ganguli, A. Amalanshu, A. Ranjan, D. I. Inouye in ICML Workshop on Localized Learning (LLW), **2023**.