

Vaibhav Balloli

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EDUCATION

University of Michigan, Ann Arbor
Ph.D. in Computer Science and Engineering
GPA: 4.15/4.0

2023 - Present

BITS Pilani, Hyderabad Campus
B.E in Electronics and Communication Engineering
GPA: 8.46/10
TOEFL: 111(R:30, L: 28, S: 25, W: 28)

2016 - 2020

RESEARCH EXPERIENCE

Microsoft Research India
Research Fellow

June 2022 - June 2023

Advisors: [Dr. Akshay Nambi](#) & [Tanuja Ganu](#)

Topics: Reinforcement Learning, Integer Linear Programming, Large-scale Optimization, Large Language Models.

Projects: [Vasudha](#), [VeLLM](#)

Microsoft Research India
SCAI Research Fellow

June 2021 - June 2022

Advisors: [Dr. Akshay Nambi](#), [Tanuja Ganu](#) & [Dr. Venkat Padmanabhan](#)

Topics: Computer Vision, Contextual Bandits, Visual Localization, End-to-End systems

Projects: [HAMS](#)

PUBLICATIONS

Under review

2. **Breaking Language Barriers with a LEAP: Learning Strategies for Polyglot LLMs**
Akshay Nambi, **Vaibhav Balloli**, Mercy Ranjit, Kabir Ahuja, Tanuja Ganu, Sunayana Sitaram, Kalika Bali
Topics: Large Language Models, Contextual Bandits, Multilingual Evaluation, Human Feedback.
[Preprint](#)
1. **EnCortex: A General, Extensible and Scalable Framework for Decision Management in New-age Energy Systems**
Vaibhav Balloli*, Millend Roy*, Anupam Sobti, Tanuja Ganu, Akshay Nambi.
Topics: Large-scale Reinforcement Learning(Model-free, Offline), Imitation Learning, Integer Linear Programming.

Conference Publications

2. **Chanakya: Learning Tradeoffs for Adaptive Streaming Perception via Contextual Bandits**
Anurag Ghosh, **Vaibhav Balloli**, Akshay Nambi, Aditya Singh, Tanuja Ganu.
NeurIPS'23 | [Talk](#) | [Code](#)
1. **Video Streaming using Scalable Video Coding over Opportunistic Networks**
Abhishek Thakur, **Vaibhav Balloli**, Arnav Dhamija.
WiSPNET'19 | [Code](#)

Theses

1. **Multi-objective Neural Architecture Search via Reinforcement Learning.**
Vaibhav Balloli.
Undergraduate Thesis, 2020. A Grade.

SOFTWARE

1. **EnCortex - Stochastic Optimization for Renewable Energy sources.**

Microsoft Research India

Reinforcement Learning(PyTorch, Stable-Baselines3) | Stochastic Optimization | MLOps on Azure.

RL and Stochastic optimization algorithms running large-scale optimizations that are currently used by customers at Microsoft to maximize their profitability and sustainability goals.

2. **Automated License Testing - Microsoft Research India.**

Microsoft Research India

This system contains Computer Vision algorithms that perform Visual SLAM, Object Detection, and Trajectory analysis. As of August 2022, 📍 4 sites have been deployed successfully in different parts of India.

INTERNSHIPS

1. **IST Austria**

- Explored how RL algorithms can be adapted for Structured Pruning(channel, 2:4 sparsity) in computer vision models.

2. **AlphaICs**

- Devised efficient data structures, algorithms, and protocols for AlphaIC's hardware accelerator and deep learning library.
- Built an application in Python for the inter-operability of deep learning models and quantization of these models for faster inference using TensorFlow, ONNX, and PyQT5.

PROJECTS

1. **Offlax**

Offline Reinforcement Learning library in JAX. Implements SOTA algorithms with an efficient file IO interface.

2. **NFNets and Adaptive Gradient Clipping GitHub 317★**

Re-implemented DeepMind's NFNets and Adaptive Gradient Clipping for all optimizers in PyTorch..

3. **SmartCampus**

- Co-founded SmartCampus, a student group that built Cashless system on campus, handling transactions worth 25 million rupees during my tenure.
- Built an Android app and a web backend on a free server to handle **3000 active users per minute**.
- Built a prototype recommender system using information retrieval and modern recommender system techniques.

4. **VECTORS**

- Scalable Video Coding encoded video on a DTN(Disruption Tolerant Network) developed for Android devices under the supervision of Dr. Abhishek Thakur.
- Developed an Android App cross-compiling SHM and JSVC for ARM processors to encode recorded video to send on the network
- Used Opportunistic Network Environment(ONE) to run simulations and automatic generation of reports from results.

5. **Open Source: Google's Swift For Tensorflow, JAX/Flax**

- Contributed to the core framework implementing different optimization algorithms and layers.
- Image classification models to the Swift for TensorFlow models repository.
- Feature additions to JAX/Flax.

SELECT AWARDS AND HONORS

- Awarded Rackham Travel Grant to attend and present at NeurIPS'23 2023
- Selected for the [Harvard/MIT - HAIST/MAIA Intro Fellowship](#) on AI Safety 2023
- **Press:** HAMS Automated License Testing featured in [Punjab News Express](#) 2022
- **Winner** of [Microsoft Global Hackathon, 2021\(Future Of Edge Computing Track\)](#) 2021
- **SmartCampus** successfully managed **₹25 million** in transactions. 2020
- Talk at WiSPNET'19 presenting our paper Video Streaming using Scalable Video Coding over Opportunistic Networks(VECTORS). 2019

SERVICE

- Reviewer for CompSust Workshop @ NeurIPS'23.

PROFESSIONAL RESPONSIBILITIES

- Selected as Teaching Assistant for ClimateChange.ai Summer School *2023*
- **Head of SmartCampus** at BITS Pilani Hyderabad Campus
- **Member of Automation and Robotics Club** at BITS Pilani Hyderabad Campus. Organized microcontroller workshop for a group of 100 students
- **Volunteer** at ClimateChange.ai
- **Founder and Organizer** of ML Reading Group at BITS Pilani Hyderabad Campus
- **Mentorship**
 - Jonathan Samuel (Research Intern @ MSR -> SDE Gojek)
 - Isha Singh (Research Intern @ MSR)