

Vaibhav Balloli

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EDUCATION

University of Michigan, Ann Arbor
Ph.D. in Computer Science and Engineering
Advisor: [Prof. Elizabeth Bondi-Kelly](#)
GPA: 4.07/4.0

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](#): [VeLLM Press](#) - [Satya Nadella](#), [Times of India](#)

Impact: VeLLM is currently being deployed in schools across India

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](#): [HAMS Press](#) - [Punjab News Express](#)

Impact: HAMS is successfully deployed across India

PUBLICATIONS

Conference Publications

3. [Are They the Same Picture? Adapting Concept Bottleneck Models for Human-AI Collaboration in Image Retrieval](#)
[Vaibhav Balloli](#), Sara Beery, Elizabeth Bondi-Kelly
Topics: Human-AI Collaboration, Image Retrieval, Wildlife Conservation
[IJCAI'24 Human-Centered AI Track](#) | [Code](#) | [Project](#) | - [<5% Acceptance Rate](#)
2. [Chanakya: Learning Tradeoffs for Adaptive Streaming Perception via Contextual Bandits](#)
Anurag Ghosh, [Vaibhav Balloli](#), Akshay Nambi, Aditya Singh, Tanuja Ganu.
Topics: Object detection and tracking, Computer Vision, Multi-arm bandits
[NeurIPS'23](#) | [Talk](#) | [Code](#)
1. [Video Streaming using Scalable Video Coding over Opportunistic Networks](#)
Abhishek Thakur, [Vaibhav Balloli](#), Arnav Dhamija.
Topics: Delay-Tolerant Networks, Video Compression
[WiSPNET'19](#) | [Code](#)

Workshop papers

1. [Are They the Same Picture? Adapting Concept Bottleneck Models for Human-AI Collaboration in Image Retrieval](#)
[Vaibhav Balloli](#), Sara Beery, Elizabeth Bondi-Kelly
Topics: Human-AI Collaboration, Image Retrieval, Wildlife Conservation
[CVPR'24 @ CV4Animals Workshop](#)

Theses

1. **Multi-objective Neural Architecture Search via Reinforcement Learning.**

Vaibhav Balloli.

Undergraduate Thesis, 2020. A Grade.

Under review

2. **Bridging the Gap: Dynamic Learning Strategies for Improving Multilingual Performance in LLMs**
Somnath Kumar*, **Vaibhav Balloli***, Mercy Ranjit, Kabir Ahuja, Tanuja Ganu, Sunayana Sitaram, Kalika Bali, Akshay Nambi

Topics: Large Language Models, 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.

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 340★](#)**

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 Weinberg Institute Travel Grant to attend CVPR'24 - \$1000 2024
- 2nd Place in the Google x MHacks Hackathon - \$1500 Press: Mentioned by [labs.google](#) 2024
- Press: [VeLLM](#) mentioned by [Satya Nadella](#) and featured in [Times Of India](#), [FirstPost](#) 2024
- 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 NeurIPS'24.
- Reviewer for CompSust Workshop @ NeurIPS'23.
- Reviewer for CV4Animals Workshop @ CVPR'24.

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)