

Vaibhav Balloli

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EDUCATION

University of Michigan, Ann Arbor

2023 - Present

Ph.D. in Computer Science and Engineering

Advisor: [Prof. Elizabeth Bondi-Kelly](#)

GPA: 4.07/4.0

BITS Pilani, Hyderabad Campus

2016 - 2020

B.E in Electronics and Communication Engineering

GPA: 8.46/10

TOEFL: 111(R:30, L: 28, S: 25, W: 28)

RESEARCH EXPERIENCE

Microsoft Research India

June 2022 - June 2023

Research Fellow

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

June 2021 - June 2022

SCAI Research Fellow

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

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

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 - <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: *Human-AI Collaboration, Image Retrieval, Wildlife Conservation*
NeurIPS'23 | [Talk](#) | [Code](#)
1. **Video Streaming using Scalable Video Coding over Opportunistic Networks**
Abhishek Thakur, **Vaibhav Balloli**, Arnav Dhamija.
Topics: *Human-AI Collaboration, Image Retrieval, Wildlife Conservation*
WiSPNET'19 | [Code](#)

Workshop Publications

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.

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

- 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 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)