

# Vaibhav Balloli

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🎓 [Google Scholar](#)  
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## EDUCATION

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### University of Michigan, Ann Arbor

2023 - Present

*Ph.D. in Computer Science and Engineering*

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

GPA: 4.15/4.0

### 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

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### 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

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### 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.  
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

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### 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

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### 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

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### 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

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- 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

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- Reviewer for CompSust Workshop @ NeurIPS'23.
- Reviewer for CV4Animals Workshop @ CVPR'24.

## PROFESSIONAL RESPONSIBILITIES

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- 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)