Vaibhav **Ganatra**

Predoctoral Research Fellow, Microsoft Research

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Education

July 2023 **Aug 2019**	**Birla Institute of Technology and Science (BITS) Pilani** B.E. (Hons.), Computer Science, **GPA: 9.6/10** Course: Data Structures & Algorithms, Database Management Systems, Operating Systems, Analysis of Algorithms, Computer Networks, **Foundations of Data Science**, **Applied Statistical Methods**, **Deep Learning**	**Goa, India**

Experience

Present **Jul 2023**	**Microsoft Research | Technology and Empowerment (TEM) Group** [🌐] *Predoctoral Research Fellow | Advisors: Dr. Mohit Jain and Dr. Nipun Kwatra* Working, in collaboration with clinicians, on the development of low-cost smartphone-based patient diagnostic solutions for diseases such as keratoconus, dry eye disease and anemia.	**Bengaluru, India**
June 2023 **Jan 2023**	**Microsoft | M365 Research Group** [🌐] *Research Intern (Undergraduate Thesis) | Advisor: Dr. Anjaly Parayil* Conducted an empirical study to evaluate the pitfalls of automated monitoring in cloud services using data-driven analysis of unstructured data to improve cloud efficiency.	**Bengaluru, India**
Jan 2023 **Aug 2022**	**Amazon | Ads Trust Team** *Applied Scientist Intern | Advisor: Pooja A* Trained and benchmarked a multilabel neural network model for labelling of ads- achieved a 15x reduction in training time from 30 hours to 2 hours, while also achieving a small gain (1-2%) in model performance.	**Bengaluru, India**
Aug 2022 **May 2022**	**Ecole Polytechnique de Montreal | MOOSE Lab** [🌐] *MITACS Globalink Research Intern | Advisor: Prof. Heng Li* Utilised Quantum Machine Learning algorithms for detecting anomalies in software logs. Also, developed a novel quantum embedding for encoding classical data in quantum circuits.	**Montreal, Canada**
Aug 2021 **May 2021**	**IISER Kolkata | NLD Lab** [🌐] *Summer Research Intern | Advisor: Prof. Soumitro Banerjee* Devised a novel computational algorithm to sketch the 1D stable manifolds of non-invertible 2D maps.	**Remote**

Publications

C=Conference, W=Workshop, J=Journal

[C.4] **SmartKC++: Improving the Performance of Smartphone-Based Corneal Topographers**
Vaibhav Ganatra, Siddhartha Gairola, Pallavi Joshi, Anand Balasubramaniam, Kaushik Murali, Arivunithi Varadharajan, Bellamkonda Mallikarjuna, Nipun Kwatra and Mohit Jain
IEEE/CVF Winter Conference on Applications of Computer Vision   **[IEEE WACV '25]**

[J.2] **DEDector: Smartphone-based Non-Invasive Screening of Dry Eye Disease**
Vaibhav Ganatra, Soumyasis Gun, Pallavi Joshi, Anand Balasubramaniam, Kaushik Murali, Nipun Kwatra, Mohit Jain
Proc. ACM on Interactive, Mobile, Wearable and Uniquitous Techonologies   **[ACM IMWUT '24]**

[C.3] **PRECISe : Prototype-Reservation for Explainable Classification under Imbalanced and Scarce-Data Settings**
Vaibhav Ganatra and Drishti Goel
Machine Learning for Healthcare Conference   **[MLHC '24]**

[W.1] **Logarithm-transform aided Gaussian Sampling for Few-Shot Learning**
Vaibhav Ganatra
4th Visual Inductive Priors for Data Efficient Machine Learning Workshop @ ICCV '23   **[ICCV Workshop '23]**

[C.2] **Detection Is Better Than Cure: A Cloud Incidents Perspective**
Vaibhav Ganatra, Anjaly Parayil, Supriyo Ghosh, Yu Kang, Minghua Ma, Chetan Bansal, Suman Nath, Jonathan Mace
ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering   **[FSE '23]**

[C.1] **p-LSTM: A Novel LSTM Architecture for the Glucose Level Prediction Problem**
Abhijeet Swain, Vaibhav Ganatra, Snehanshu Saha, Archana Mathur and Rekha Phadke
International Conference on Neural Information Processing   **[ICONIP '22]**

[J.1] **Sketching 1D Manifolds of 2D Maps without the Inverse**
Vaibhav Ganatra and Soumitro Banerjee
International Journal of Bifurcation and Chaos   **[IJBC '22]**

Select Projects

qLogAnomaly: Applying Quantum Machine Learning for System Log Anomaly Detection [🌐]   May '22 - Aug '22
Advisor: Prof. Heng Li

> Compared the performance of classical and quantum ML models on the task of anomaly detection in software logs
> Proposed *qRot*, a novel quantum embedding mechanism for training quantum Support Vector Machines (qSVMs).
> Established, through experiments, that qSVMs and qNNs are superior few-shot learners to their classical counterparts.

p-LSTM: A Novel LSTM architecture for Blood Glucose Level Prediction   Jan '22 - May '22
Advisor: Prof. Snehanshu Saha

> Proposed a novel activation - the *parametric Elliot function* and incorporated it within the LSTM architecture to facilitate effective utilization of a modest sized dataset.
> Identified noisy features in the dataset as a bottleneck in model performance. Subsequently, utilized Granger Causality and Transfer Entropy to identify causal features in the dataset.
> Reduced the prediction error from 18.27% to 6.04%. This work is published in ICONIP '22.

Bifurcations in the sinusoidally forced Hodgkin-Huxley Neuron   Aug '21 - Dec '21
Advisor: Prof. Gaurav Dar

> Analyzed the spike patterns and transitions in mode-locking of the sinusoidally forced Hodgkin-Huxley Neuron Model.
> Reduced the 4-dimensional model to 3 and 2 dimensions, and studied the bifurcation pattern of the reduced Hodgkin Huxley Model

Fusion of Synthetic Aperture Radar and Visible Spectrum Remote Sensing Images [🌐]   May '21 - July '21
Advisor: Prof. Manish Bhatt

> Reviewed techniques of remote sensing image fusion, viz pixel-level, feature-level and decision-level fusion methods.
> Reproduced results from an existing deep-learning based method for fusion of visible and infrared images.
> Extended the method for fusion of synthetic aperture radar (microwave) images with images in the visible spectrum of remote sensing.

Honours and Awards

Merit Scholarships: '19 - '23 Received **100% tuition fee waiver** for **7 out of 8 semesters** and **80% waiver for 1 semester** for my bachelors at BITS Pilani, Goa awarded the academically **best 1% students** in a batch of **900 students**.

MITACS Globalink Research Internship '22 Selected for a Summer Internship at Polytechnique Montreal, Canada

Summer Internship Assistance '22 Received a scholarship award of INR 10,000 for my research in Nonlinear Dynamics

Prof. Suresh Ramaswamy Memorial Award '21 [🌐] Received a grant of INR 40,000 for our work on "Smart stick for visually impaired". This work was featured in local newspapers - **The Goan** and **The Navhind Times**

Impact Hackathon '21 Won **1st position** in the Virtual Accessibility Hackathon organized by GiftAbled

BITS BIRAC BioNest Hackathon '21 Secured **1st position** in the Hackathon

IISc Social Innovation Challenge '20 Won **1st position** in the Healthcare domain in the Social Innovation Challenge,2020 jointly organized by IISc Bengaluru and Keio University, Japan

Teaching and Volunteering

CS F213: Object Oriented Programming | *Teaching Assistant*   Aug'21 - Dec '21

> Assisted in conducting and evaluating weekly labs related to Object-Oriented Programming principles for 250 students.
> Supervised a group of 20 students for their major project submission.

PHY F242: Quantum Mechanics - I | *Teaching Assistant* [🌐]   Jan '22 - May '22

> Created and evaluated problem sheets/ assignments for 70 students.
> Developed a computational simulation of time-evolution of quantum systems using the Schrodinger's Equation.

Developers' Society (DevSoc), BITS Goa | Senior Developer   Aug '19 - May '22

> Brainstormed, developed and released multiple software utilities for on-campus students at BITS Goa