

# RISHABH PATRA

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## EDUCATION

<b>Birla Institute of Technology and Sciences</b> B.E.(Hons) in Electronics and Communications engineering CGPA - 8.21/10	Goa, India <i>Aug. 2018 – Jul. 2022</i>
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## TECHNICAL SKILLS

**Github:** <https://github.com/hades-rp2010>  
**Languages:** Python, C++, Java, R, MATLAB, BASH  
**Frameworks & Libraries :** PyTorch, JAX, NumPy, Pandas, Matplotlib

## RESEARCH EXPERIENCE

<b>Student Collaborator</b>	Sept 2021 - Jan 2023
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*APPCAIR, BITS Goa in Collaboration with TCS DataLab* | Advisor: Dr. Ramya Hebbalaguppe

- Studied Model Overconfidence and Calibration, specifically in CNNs
- Developed a novel auxiliary loss and training paradigm using data pruning
- Developed a new calibration metric, emphasizing on only samples with high model predicted confidence
- Achieved SOTA calibration results on academic and medical image datasets
- Work published at WACV 2023 as a **Spotlight Paper** (24 citations)

<b>Summer Research Intern</b>	May 2021 – July 2021
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*TCS Research, India* | Advisor - Dr. Gautum Shroff, Dr. Lovekesh Vig

- Worked on explainability of Deep Learning models in a human understandable concept space to aid and inform the diagnosis of arrhythmia from ECG signals

<b>Student Collaborator</b>	Jan 2021 – May 2021
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*APPCAIR, BITS Goa* | Advisor - Prof. Ashwin Shrinivasan

- Analysis of Paper Machine web break data for classification and prediction of web breaks well before occurrence
- Developed a Neural Network model, conducting Layerwise Relevance Propagation analysis to identify crucial factors in predicting web-breaks

## PUBLICATIONS

1. Rishabh Patra, Ramya Hebbalaguppe, Tirtharaj Dash, Gautam Shroff, and Lovekesh Vig. Calibrating deep neural networks using explicit regularisation and dynamic data pruning. In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, pages 1541–1549, January 2023 (**Spotlight Paper**)
2. Rishabh Patra, Shridhar Prabhuraman, and Arnab Das. Ai & ml based implementation of the underwater channel model in the tropical littoral waters of the indian ocean region (ior). In *OCEANS 2022-Chennai*, pages 1–8. IEEE, 2022

## WORK EXPERIENCE

<b>Software Development Engineer</b>	July 2022 – Present
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*Amazon Appstore, Devices and Services, Amazon Development Center, India*

- Developing and maintaining high-availability microservices in the Amazon Appstore developer pipeline, serving millions of FireOS devices.
- Contributed to a broad re-architecture of 15+ services, owning end-to-end design and implementation for 3+ services, improving reliability and maintainability.
- Redesigned components of a tier-1 compatibility service and improved device-onboarding flows, reducing customer-facing issues for new device launches.

- Enabled local deployment and testing for 15 key services, reducing typical iteration time from 30+ minutes to 5 minutes per change.

### **Software Development Intern**

Jan 2022 – July 2022

*Amazon Appstore, Devices and Services, Amazon Development Center, India*

- Designed and implemented a new profile type for Amazon Profiles on FireOS devices, from requirements gathering and proof-of-concept to rollout via OTA updates on Fire TV.

### **Research Fellow**

Oct 2020 – April 2021

*Maritime Research Centre, Pune | Advisor - Dr. (Cdr.) Arnab Das*

- Validating and testing an ML-based acoustic channel model for estimating the transmission loss between two communicating entities in the IOR, leading to an **80%** reduction of time taken as compared to contemporary method
- Developed a Passive Sonar simulator, for real time ambient noise mapping of the IOR, complete with backend inference models and a UI

## PROJECTS

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### **GenRL | Python Reinforcement Learning library | CODE**

Aug 2020 – Feb 2021

- Collection of SOTA algorithms in Deep and Classical RL along with various utilities
- Contains both Model based and Model-free RL algorithms
- Currently has 50+ forks and 400+ stars on GitHub

### **Study of optimizers | CODE**

Jan 2019

- Compares optimizers: Gradient Descent, Stochastic Gradient Descent, SGD with Nesterov momentum, AdaGrad, RMSProp, and their convergence rates
- Implementation of optimizers is in JAX, plotted using Matplotlib

## MENTORING AND LEADERSHIP ROLES

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### **Mentor, Introduction to Causal Inference | CERTIFICATE**

Jan 2021 - May 2021

*Centre for Technical Education, BITS Goa*

- Part of the team mentoring and teaching a course on "Causal Inference" to a 50+ group of students at BITS Goa
- Involved in creation of the course structure and topics, labs, and personally took a few lectures
- CTE is part of a peer-to-peer learning initiative amongst the students of BITS Goa

### **Core Member**

Oct 2020 – April 2021

*Society for Artificial Intelligence and Deep Learning*

- Part of the committee that routinely held reading sessions, induction assignments and AI research symposiums
- Also part of a few institution-wide projects and open-source initiatives such as GenRL
- This position was part of a broader initiative to make Deep Learning and Artificial Intelligence research accessible

## RELEVANT COURSEWORK

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Multivariate Calculus, Probability and Statistics, Linear Algebra and complex analysis, Non-linear Dynamics and Chaos, Statistical Mechanics, Quantum Information and Circuits, Meta-learning (As part of the course Study of Advanced Topics), **Convolutional Neural Networks for Image Recognition\*** (Stanford's CS231n), **Deep Reinforcement Learning\*** (UC Berkeley's CS285), **Natural Language Processing\*** (Stanford's CS224n), **Reinforcement Learning\*** (UCL's COMPM050), **Deep Unsupervised Learning\*** (UCB's CS294-158), **Multi-task and Meta-learning\*** (Stanford's CS330)  
(\* = online)