Piyush Tiwary

EECS Ph.D. student, Indian Institute of Science

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Education

Present **Aug 2021**	**Indian Institute of Science**	**GPA: 9.15/10**

Prime Minister's Research Fellow - Ph.D., Division of EECS (Supervisor: Dr. Prathosh A.P)
Relevant Coursework: Stochastic Models & Applications (10/10), Pattern Recognition & Neural Network (10/10), Reinforcement Learning (10/10), Advanced Image Processing (9/10), Information Theory (9/10), Computational Methods in Optimization (8/10), Foundations of Data Science (8/10), Measure Theoretic Probability Theory (Audit), Stochastic Approximation Algorithms (Audit), Interacting Particle Systems (Audit)

Jun 2021 **Jul 2017**	**Indian Institute of Technology, Patna**	**GPA: 8.53/10**

Bachelor of Technology in Electrical Engineering (Supervisor: Dr. Sudhir Kumar)
Thesis: Mitigating Device Heterogeneity for Indoor Localization

Publications
*- Shared Authorship, US=Under submission, P=Preprints, C=Conference, W=Workshop, J=Journal

Journals

[J6] **Bessel Function Mixture Model for Localization in Generalized $\eta - \mu$ IoT Fading Environment** [%]
Ankur Pandey, Piyush Tiwary and Sudhir Kumar
IEEE Transaction on Network Science and Engineering, 2024   **[IEEE-TNSE]**

[J5] **Cycle Consistent Twin Energy-based Models for Image-to-Image Translation** [%]
Piyush Tiwary, Kinjawl Bhattacharyya and Prathosh A.P
MICCAI Medical Image Analysis, 2023   **[MICCAI-MedIA]**

[J4] **FadeLoc: Smart Device Localization for Generalized $\kappa - \mu$ Faded IoT Environment** [%]
Ankur Pandey*, Piyush Tiwary*, Sudhir Kumar and Sajal K Das
IEEE Transaction on Signal Processing, 2022   **[IEEE-TSP]**

[J3] **Towards Establishing a Research Lineage via Identification of Significant Citations** [%]
Tirthankar Ghosal*, Piyush Tiwary*, Robert Patton and Christopher Stahl
Special Issue of Quantitative Science Studies (QSS) on "Scientific Knowledge Graphs and Research Impact Assessment"   **[MIT-QSS]**

[J2] **Novel Differential r-Vectors for Localization in IoT Networks** [%]
Piyush Tiwary, Ankur Pandey, Sudhir Kumar and Moustafa Youssef
IEEE Sensor Letters, 2021   **[IEEE-SENSL]**

[J1] **Adaptive Mini-Batch Gradient Ascent based Localization for Indoor IoT Networks under Rayleigh Fading Conditions** [%]
Ankur Pandey, Piyush Tiwary, Sudhir Kumar and Sajal K Das
IEEE Internet of Things Journal, 2021   **[IEEE-JIoT]**

Conferences

[C6] **Bayesian Pseudo-Coresets via Contrastive Divergence** [%]
Piyush Tiwary, Kumar Shubham, Vivek Kashyap and Prathosh A.P
Conference on Uncertainty in Artificial Intelligence (UAI), 2024   **[UAI'24]**

[C5] **Few Shot Image-Generation Via Inference-Stage Latent Mixing in GANs** [%]
Arnab Mondal, Piyush Tiwary, Parag Singla and Prathosh A.P
International Conference on Learning Representation (ICLR), 2023 (Top 25%)   **[ICLR'23]**

[C4] **Implicit Minority Oversampling for Imbalanced Data via Class-Preserving Regularized Auto-Encoders** [%]
Arnab Mondal, Lakshya Singhal, Piyush Tiwary, Parag Singla and Prathosh A.P
International Conference on Artificial Intelligence and Statistics (AISTATS), 2023   **[AISTATS'23]**

[C3] **Differential d-Vectors for RSS based Localization in Dynamic IoT Networks** [%]
Piyush Tiwary, Ankur Pandey and Sudhir Kumar
International Conference on COMmunication Systems & NETworkS (COMSNETS), 2021   **[COMSNET'21]**

[C2] **Residual Neural Networks for Heterogeneous Smart Device Localization in IoT Networks** [%]
Ankur Pandey, Piyush Tiwary, Sudhir Kumar and Sajal K Das
International Conference on Computer Communications and Networks (ICCCN), 2020   **[ICCCN'20]**

[C1] **A hybrid classifier approach to multivariate sensor data for climate smart agriculture cyber-physical systems** [%]
Ankur Pandey, Piyush Tiwary, Sudhir Kumar and Sajal K Das
International Conference on Distributed Computing and Networking (ICDCN), 2019   **[ICDCN'19]**

Workshops

[W2] **Few Shot Generative Domain Adaptation Via Inference-Stage Latent Learning in GANs** [%]
Arnab Mondal, <u>Piyush Tiwary</u>, Parag Singla and Prathosh A.P
NeurIPS Workshop on Distribution Shifts: Connecting Methods and Applications, 2022 [**NeurIPS-W**]

[W1] **IITP-CUNI@3C: Supervised Approaches for Citation Classification (TaskA) and Citation Significance Detection (Task B)** [%]
Kamal Varanasi, Tirthankar Ghosal, <u>Piyush Tiwary</u> and Muskaan Singh
Workshop on Scholarly Document Processing at Annual Conference of the North American Chapter of Association for Computational Linguistics (NAACL), 2021 [**NAACL-W**]

Preprints/Under Submission

[P/US] **Adapt then Unlearn: Exploiting Parameter Space Semantics for Unlearning in Generative Adversarial Networks** [%]
<u>Piyush Tiwary</u>, Atri Guha, Subhodip Panda and Prathosh A.P
ArXiV 2309.14054 [**ArXiV**]

[US] **SoLAD: Sampling over Latent Adapter for Few Shot Generation**
Arnab Mondal, <u>Piyush Tiwary</u>, Parag Singla and Prathosh A.P
Under Submission

Research Experience

Mar 2021 **Dec 2022**	**Few-Shot Generative Domain Adaptation** *Advisors:* ● *Dr. Prathosh A.P, IISc* ● *Dr. Parag Singla, IIT Delhi*	**IISc**

> Worked on the problem of adapting a pre-trained GAN on a target domain under a few-shot setting.

> Our first solution advocates use of a latent adapter network which is prepended before the pre-trained GAN (cf. C5).

> The first solution although superior to many SoTA methods, suffers through large inference time. We solved this in the consequent work where we use a hyper-network to sample the parameters of the latent-adapter (cf. US).

Dec 2019 **Jul 2021**	**Localization under Generic Fading Models** *Advisors:* ● *Dr. Sudhir Kumar, IIT Patna*	**IIT Patna**

> Worked on localization using generic fading models using an MLE based approach.

> <u>Rayleigh Fading</u>: Proposed **MLE for Rayleigh fading model** with simultaneous parameter estimates and an **Adaptive Mini-Batch** gradient ascent method to quickly maximize the log-likelihood to find the location estimate (cf. J1).

> <u>$\kappa - \mu$ Fading</u>: Proposed an **approximate MLE for $\kappa - \mu$ fading model** and an **Adaptive Order** based likelihood maximization using a look-up table to localize a smart device (cf. J4).

> <u>$\eta - \mu$ Fading</u>: Proposed a **weighted approximation** for MLE of $\eta - \mu$ fading model which can use multiple Bessel function approximations to localize a smart device (cf. J6).

Aug 2020 **Oct 2020**	**Establishing Research Lineage via Citation Significance** *Lab:* ● *Oak Ridge National Laboratory CDA Group*	**IIT Patna**

> Worked on a research project to identify Significant Citations in a Research Paper.

> The aim was to establish a Research Lineage & Identify how knowledge is transferred through research papers by creating a Citation graph through a feature engineering approach (cf. J3).

Other Experiences

May 2020 **Jul 2020**	**CapitalVia Global Research Limited - Investment Advisor** *Software Development Intern* Worked with Research team of CapitalVia, to implement deploy-able framework for various trading strategies aimed to provide optimum parameter for a certain strategy based on back-testing results. Created a UI in Python using **Flask** & **BeutifulSoup** to extract live data from NSE website.	**Remote**

May 2019 **Jul 2019**	**International Institute of Information Technology** *Research Intern | Advisor: Dr. Manish Gupta, Professor IIIT Bangalore (Currently Head of Google Research India)* Worked as a part of R&D Team of VideoKen (a IIITB based startup). Studied and made a *Pytorch* implementation of Google's **UIS-RNN** and developed a model to **diarize 2 speakers** with maximum latency of 30 seconds for "Interview" type of audios.	**Bangalore, India**

Jun 2019	Crio.Do	**Remote**
Jul 2019	*Crio Summer of Doing*	

Developed Back-end of Q-Eats (a food Ordering App) using Spring framework in Java. Learnt and implemented many Industry related tools/technologies like - REST APIs, MongoDB, Caching and Docker, and used it to create an Order Page for Q-Eats in the Capstone Challenge.

Achievements

PMRF	Recipient of prestigious **Prime Minister's Research Fellowship** in August-2022 cycle.
COMSNET	Received **"The Best Poster Presentation Award"** at COMSNETS-2021
Google AI	One of the 50 participants out of 1000+ applicants in the HCI track.
Coding	Specialist on Codeforces, 4-star on Codechef and Ranked in top 5000 on UVa Online Judge. Secured a Global Rank of **60** in Codechef July Long Challenge'19.
IIT JEE	Secured **All India Rank 4880** in JEE Advance 2017 among **150,000** candidates.

Teaching Experience

N-MA39	Teaching Assistant for NPTEL NOC24-MA39: Probability and Statistics (Instructor: Dr. Somesh Kumar) [%].
N-CS24	Teaching Assistant for NPTEL NOC23-CS24: Deep Learning (Instructor: Dr. Sudarshan Iyengar) [%].
E9-333	Teaching Assistant for E9-333: Advanced Deep Representation Learning [Fall 2022, 2023].
E1-213	Teaching Assistant for E1-213: Pattern Recognition and Neural Networks [Spring 2023, 2024].
GTU-W	Conducted Workshop on Theoretical Basis for Machine Learning at Gujrat Technical University [%].

Academic Services

Reviewer	CVPR 2022, NeurIPS 2023, AISTATS 2024, Complex & Intelligent Systems, IEEE Transactions on Dependable and Secure Computing
Volunteer	NeurIPS 2021, SPCOM 2022

Positions of Responsibility

May 2020	**Advisor**	**NJACK IIT Patna**
Apr 2021		

> Advisor of Machine Learning Department at NJACK, Computer Science Club of IIT Patna.
> Conducted classes for students to make them familiar with basic concepts of Machine Learning.

Aug 2018	**Badminton Coordinator**	**Student Gymkhana IIT Patna**
Jul 2020		

> Lead the Badminton team of IIT Patna in various Sports tournament. Represented IIT Patna in 51st (at IITM), 52nd (at IITG) & 53rd (at IITBBS) **Inter IIT Sports Meet** along with 4 other teammates.