# Piyush Tiwary

(+91) 9834943057
: piyushtiwary31@gmail.com
: backpropagator
: backpropagator.github.io

## Education

2021-Present **Indian Institute of Science**, *Prime Minister's Research Fellow - Ph.D., Division of EECS*,
Guide: Dr. Prathosh A.P CGPA: *9.15/10.0*.

2017-2021 **Indian Institute of Technology Patna**, *Bachelor of Technology in Electrical Engineering*,
**Thesis**: Mitigating Device Heterogeneity for Indoor Localization
Guide: Dr. Sudhir Kumar CGPA: *8.53/10.0* .

**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).

## Publications

* denotes co-authorship

### Journals

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

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

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

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

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

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

### Conferences

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

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

COMSNET'21 **Piyush Tiwary**, Ankur Pandey, Sudhir Kumar. "Differential $d$-Vectors for RSS based Localization in Dynamic IoT Networks". $13^{th}$ International Conference on COMmunication Systems & NETworkS (COMSNETS), 2021. [**Best Poster Presentation Award**] [PDF]

ICCCN'20 Ankur Pandey, **Piyush Tiwary**, Sudhir Kumar and Sajal K Das, "Residual Neural Networks for Heterogeneous Smart Device Localization in IoT Networks," $29^{th}$ International Conference on Computer Communications and Networks (ICCCN), 2020. [PDF]

ICDCN'19 Ankur Pandey, **Piyush Tiwary**, Sudhir Kumar, and Sajal K Das. "A hybrid classifier approach to multivariate sensor data for climate smart agriculture cyber-physical systems". $20^{th}$ International Conference on Distributed Computing and Networking (ICDCN), 2019. [PDF]

## Workshops

NeurIPS'22 Arnab Mondal, **Piyush Tiwary**, Parag Singla and Prathosh A. P., "Few Shot Generative Domain Adaptation Via Inference-Stage Latent Learning in GANs," In NeurIPS 2022 Workshop on Distribution Shifts: Connecting Methods and Applications, Virtual. [PDF]

NAACL'21 Kamal Varanasi, Tirthankar Ghosal, **Piyush Tiwary** and Muskaan Singh, "IITP-CUNI@3C: Supervised Approaches for Citation Classification (TaskA) and Citation Significance Detection (Task B)," The $2^{nd}$ Workshop on Scholarly Document Processing at Annual Conference of the North American Chapter of Association for Computational Linguistics (NAACL) 2021, Virtual. [PDF]

## Thesis

B.Tech **Piyush Tiwary**, "Localization in Heterogeneous IoT Environment", In partial fulfillment of the requirements for the award of the degree Bachelor Of Technology. [PDF]

## Preprints / Under Review

Conference **Piyush Tiwary**, Atri Guha, Subhodip Panda and Prathosh A.P, "Adapt then Unlearn: Exploiting Parameter Space Semantics for Unlearning in Generative Adversarial Networks". [PDF]

Conference **Piyush Tiwary**, Kumar Shubham, Vivek Kashyap and Prathosh A.P, "Constructing Bayesian Pseudo-Coresets using Contrastive Divergence". [PDF]

Conference Arnab Mondal, **Piyush Tiwary**, Parag Singla and Prathosh A.P, "SoLAD: Sampling over Latent Adapter for Few Shot Generation".

# Research Experience

March 2021 - Dec. 2022 **Few-Shot Generative Domain Adaptation**, *IISc*,
Guide: • Dr. Prathosh A.P, IISc • Dr. Parag Singla, IIT Delhi.

- 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.
- 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.

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

- Worked on a research project to identify Significant Citations in a Research Paper.
- The aim is to establish a Research Lineage & Identify how knowledge is transferred through research papers by creating a Citation graph through a feature engineering approach.

Dec. 2019 - Dec. 2020 **Localization under Generic Fading Models**, *IIT Patna*,
Guide: • Dr. Sudhir Kumar, IIT Patna • Prof. Sajal Das, Missouri University.

- Worked on localization using generic fading models using an MLE based approach.
- Rayleigh Fading: 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.
- $\kappa - \mu$ Fading: 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.
- $\eta - \mu$ Fading: Proposed a **weighted approximation** for MLE of $\eta - \mu$ fading model which can use multiple Bessel function approximations to localize a smart device.

May 2019 - July 2019 **Research Intern**, *IIIT Bangalore*,
Guide: • 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.

# Industrial Experience

May 2020 - July 2020 **Software Development Intern**, *Remote (due to COVID-19)*,
CapitalVia Global Research Limited - Investment Advisor.

- 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.
- Made a UI in Python using **Flask** & **BeutifulSoup** to extract live data from NSE website.

June 2019 - July 2019 **Crio Summer Of Doing - 2019**, *Remote*, Crio.Do.

- 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.

## Technical Skills

Languages C++, Python

Others Pytorch, Flask, LaTeX

## Achievements

PMRF Recipient of prestigious **Prime Minister's Research Fellowship** in August-2022 cycle.

COMSNET'21 Received **"The Best Poster Presentation Award"** at COMSNETS-2021.

Google AI Selected and attended **AI Summer School** hosted by Google Research India.

Codechef Secured a Global Rank of **60** in Codechef July Long Challenge'19.

Comp Coding Specialist on Codeforces, 4-star on Codechef and Ranked in top 5000 on UVa Online Judge.

JEE Adv. Secured **All India Rank 4880** in JEE Advanced 2017 among **150,000** candidates.

## Teaching Experience

GTU-W Conducted Workshop on Theoretical Basis for Machine Learning at Gujrat Technical University [Video Lectures].

NPTEL Teaching Assistant for NPTEL NOC23-CS24: Deep Learning (Instructor: Dr. Sudarshan Iyengar) [Video Lectures].

E9-333 Teaching Assistant for E9-333: Advanced Deep Representation Learning (Instructor: Dr. Prathosh A.P.).

## Services

Reviewer CVPR 2022, NeurIPS 2023, AISTATS 2024

Volunteer IEEE International Conference on Signal Processing (SPCOM) 2022, NeurIPS 2021

## Positions Of Responsibility

May 2020 - April 2021 **Advisor**, *NJACK IIT Patna*.

- 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 - July 2020 **Badminton Coordinator**, *Student Gymkhana IIT Patna*.

- 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