Piyush Tiwary

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EDUCATION BACKGROUND

Indian Institute of Technology Patna (IIT Patna) **July. 2017-May. 2021**
B.Tech, Electrical Engineering *CPI: 8.18/10*

- **Relevant Topics**: Machine Learning, Linear Algebra, Ordinary Differential Equations, Complex Analysis, Partial Differential Equations, Probability Theory and Random Process, Control Theory, Communication Systems, Digital Signal Processing, Advanced Bio-Medical Signal Processing.
- **MOOCs**: Algorithmic Toolbox, Algorithms on Strings, Discrete Mathematics, SQL for Data Science, Convolutional Neural Networks, Sequence Models.

PUBLICATIONS

- Ankur Pandey, **Piyush Tiwary**, Sudhir Kumar and Sajal K Das, Residual Neural Networks for Heterogeneous Smart Device Localization in IoT Networks, 29th International Conference on Computer Communication and Networks, **ICCCN**, IEEE, Honolulu, Hawaii, USA, pp. –, 2020 (h5 index: 23) Accepted.
- 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. In Proceedings of the 20th International Conference on Distributed Computing and Networking, **ICDCŃ19 ACM, 2019**. "click here to view".

RESEARCH EXPERIENCE

Establishing Research Lineage via Citation Significance **IIT Patna, India**
Guide:* • *AI-NLP-ML Lab IIT Patna *Aug. 2020-Present*

- Working 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.

Localization in Generic $\kappa - \mu$ Faded Environment **IIT Patna, India**
Guide:* • *Dr. Sudhir Kumar, IIT Patna* • *Prof. Sajal Das, Missouri University *April. 2020-July 2020*

- Proposed a generic localization framework using $\kappa - \mu$ fading model.
- The major contribution of the work are **approximate MLE for $\kappa - \mu$ fading** and an **Adaptive Order** based likelihood maximization using a look-up table.
- Manuscript is submitted to a Journal for publication.

Localization in Rayleigh Faded Environment **IIT Patna, India**
Guide:* • *Dr. Sudhir Kumar, IIT Patna* • *Prof. Sajal Das, Missouri University *Dec. 2019-March 2020*

- Proposed a MLE based approach to localize a device in Rayleigh faded environment.
- The major contribution of the work are **MLE for Rayleigh fading** with simultaneous parameter estimates and an **Adaptive Mini-Batch** gradient ascent method to quickly maximize the log-likelihood using current convergence state.
- Manuscript is submitted to a Journal for publication.

Residual Network for Localization **IIT Patna, India**
Guide:* • *Dr. Sudhir Kumar, IIT Patna* • *Prof. Sajal Das, Missouri University *July 2019-Oct. 2019*

- Proposed a novel Skip-connected Residual network for device localization in an IoT Network.
- The 2 main contribution of the work are a **Neural filter** to remove noise present in sensor readings and **Residual Neural Network** to handle device heterogeneity and it's added advantage on multi-sensor, virtually non-correlated data to give high localization accuracy.
- Work accepted at **ICCCN'20**.

Research Intern **Bangalore, India**
Guide: • Dr. Manish Gupta, Chair Professor IIIT Bangalore *May. 2019-July. 2019*

- Worked as a part of R&D Team of VideoKen (a IIITB based startup) and explored different methods of Speaker Diarization. Studied and made a *Pytorch* implementation of Google's **UIS-RNN**.
- Made a primitive model able to **diarize 2 speakers** with maximum delay of 30 seconds for "Interview" type of audios.

Hybrid Classifier for Localization **IIT Patna, India**
Guide: • Dr. Sudhir Kumar, IIT Patna • Prof. Sajal Das, Missouri University *May. 2018-June. 2018*

- Proposed concept of **Cascaded Sequential Classifiers** for localization, consisting of a primary and a meta classifier.
- The primary classifier is supposed to extract rich features from raw data and meta classifier is used for prediction.
- Work published at **ICDCN'19** held at IISC Bangalore.

INDUSTRIAL EXPERIENCE

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

- Working with Research team of CapitalVia, to implement deploy-able framework for various trading strategies.
- Made a UI in Python using **Flask** & **BeutifulSoup** to extract live data from NSE website.
- Developed a Flask framework to provide optimum parameter for a certain strategy based on back-testing results on previous data.

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

- 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.
- Made an Order Page for Q-Eats in the Capstone Challenge enabling user to see his/her orders and provided various functionalities.

PROJECTS

Shakespeare In Your Service **IIT Patna**
Sequence Model to Generate Poem *July 2020*

- Made a 3-layered Character generation sequence model in Pytorch to generate poem based on initial phrase given by the user as input.
- The model is trained on Shakespeare's famous poem - Sonnet, so that the generated poem has Shakespearean taste to it.

Gender Predictor **IIT Patna**
Sequence Model to Predict Gender *May 2020*

- Made a Many to One Sequence Model in Pytorch to predict the gender of the person, by taking the name of the person as input.
- The model is a single layer RNN, which is trained on Indian, Arabic & American names.

Notes Seperator **IIT Patna**
Developer Student's Club *May. 2019- July. 2019*

- Developing an app for students of IIT Patna which can automatically detect whether a given image is of someone's notes or not and will suggest you to delete them.
- Implemented different CNN architectures such as LeNet, AlexNet, VGGNet, GoogleNet and ResNet for classification.

Crime Predictor **IIT Patna**
Data Science Course Project CS244 *Jan. 2019-Apr. 2019*

- Project to Forecast crimes in the city of California using OSN dataset.
- Using various ML algorithms (Decision Tree, Random Forest, SVM, Naive Bayes, etc) to see which one best fits the data most accurately.

Celvika **IIT Patna**
ChatBot *Jan. 2018*

- Used the concept of **LSTMs** and **RNNs** to make a Real time primitive chatbot capable of doing conversation through GUI (like command line or shell).
- The bot is modeled using Tensorflow's seq2seq module with attention. The architecture uses 3 layers which can be configured to be either LSTM or GRU based.

ACHIEVEMENTS

- Selected and attended in **AI Summer School** hosted by Google Research India. *Aug. 2020*
- Secured a Global Rank of **60** in Codechef July Long Challenge'19. *Jul. 2019*
- Specialist(Blue) on Codeforces and 4-star(Purple) on Codechef. *Coding*
- Ranked in top 5000 on UVa Online Judge. *UVa*
- Secured **All India Rank 4880** in JEE Advanced 2017 among **150,000** candidates. *JEE Adv.*

SKILLS

- **Programming Languages:** • C/C++ • Python • Julia • Haskell
- **Deep Learning Tools:** • Tensorflow • Keras • PyTorch
- **Data Analytic Softwares:** • SQL • MATLAB.
- **Tools & Libraries:** • Flask • LaTeX

Positions Of Responsibility

Advisor **IIT Patna, India**
NJACK IIT Patna *April 2020-Present*

- 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.
- Mentoring students and guiding club to maintain a healthy Machine learning culture in the college.

Badminton Coordinator **IIT Patna, India**
Student Gymkhana IIT Patna *Aug 2019-Present*

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