INDRAJIT PAL

Personal Website | LinkedIn | GitHub | Email

EDUCATION

Bachelor of Engineering, Electronics and Communication Engineering CGPA: 8.11/10
Birla Institute of Technology, Mesra, Ranchi, India *First Class with Distinction*

Higher Secondary (Class 12), Central Board of Secondary Education (CBSE)
All India Senior School Secondary Examination 94.6%
Delhi Public School, Ruby Park, Kolkata, India

Secondary (Class 10), Central Board of Secondary Education (CBSE)
All India School Secondary Examination 95% (A1)
Delhi Public School, Ruby Park, Kolkata, India (*Secured highest possible A1 grade in all 5 major subjects)*

WORK EXPERIENCE

Senior Data Scientist

Noodle.ai (August 2021 – Present) | Location - Bangalore, India

Noodle.ai is an Artificial Intelligence startup specializing in building machine learning applications for enterprises to reduce industrial waste.

Role Synopsis

- Building predictive Sequential / Time Series Forecasting machine learning models which generate Demand-Supply recommendations to limit waste, enable efficient distribution of inventory in disrupted supply chains.
- Developing Noodle's Proprietary AI algorithms (*ML/RL*) for flagship "*Supply Chain AI*" product suite – *Demand Flow* | *Inventory Flow* to optimize Digital Supply Chains.
- Improved efficiency in AI Deployment Pipelines by increasing development & deployment speeds by ***3×*** times with trained AI models which outperform *baseline* SAP's projections by ***more than 20%*** *wMAPE*.

Machine Learning Engineer

Business Intelligence Unit, Axis Bank (July, 2018 – July 2021) | Location - Bangalore, India

Role Synopsis

- Developed machine learning models in Python (*scikit-learn, Spark MLlib, TensorFlow, Keras*) to predict credit-risk, customer churn & customer-behavioral scores.
- Created APIs & data pipelines for extracting, analyzing model features in big-data, distributed computing platforms using Spark.
- Enabled data-driven decision-making by deploying ML models in real-time through REST (*RESTful*) APIs & *Docker* containers.

PROJECTS AND RESEARCH PUBLICATIONS

Complete collection of – My projects: here | My Research publications: here

Gamified Reinforcement Learning with Interactive AI Agents

Project Webpage: https://indropal.github.io/AIArcade/ | [Link]

- Explored Reinforcement Learning (*RL*) Algorithms (like *PPO, SARSA, Q-Learning*) & built *RL AI Agents* to interact with users in real-time.
- Deployed interactive-environment with trained RL Agents to interact with users in real-time which is easily accessible via web-browser.

Intercorrelation of Major DNA/RNA Sequence Descriptors – A Preliminary Study

Journal: *Current computer-aided drug design, Volume 12, Number 3, 2016, pp. 216-228(13)*
Authors: Dwaipayan Sen, Subhadeep Dasgupta, **Indrajit Pal**, Smarajit Manna, C. Basak, G.D. Grunwald | DOI: 10.2174/1573409912666160525111918
Link: https://www.ingentaconnect.com/content/ben/cad/2016/00000012/00000003/art00005

- Various techniques for Graphical Representation & Numerical Characterization (*GRANCH*) of bio-molecular sequences (DNA/RNA) have been explored & their relative efficacies in clustering molecules based on molecular similarities via unique sequence descriptors which encode non-redundant structural information have been assessed.
- Observations through *Principal-Component-Analyses* along with a broad study in correlation of calculated DNA-descriptors among various techniques suggests strong inter-correlation & redundancy in structural information among some techniques.

Generative Deep Learning with Multiple Modalities

GitHub Repository: https://github.com/indropal/GenerativeDeepLearningwithMultimodality | [Link]

- Explored State-Of-The-Art architectures in Generative Deep Learning like *CLIP* & *VQGAN*.
- Developed a *Text-to-Image* Deep Learning (*DL*) architecture which can generatively create images from contextual information present in text.
- The developed DL architecture is capable of producing artistic styling like *Sfumato*.

Circuit-Level Technique to Design Variation and Noise-Aware Reliable Dynamic Logic Gates

Journal: *IEEE Transactions on Device and Materials Reliability, vol. 18, no. 2, pp. 224-239, June 2018*
Authors: **Indrajit Pal**, Aminul Islam | DOI: 10.1109/TDMR.2018.2819019
Link: https://ieeexplore.ieee.org/document/8323211

- Proposed novel circuit-level approach to mitigate delay variations due to *Process/Voltage/Temperature* (*PVT*) fluctuations – improving *PVT* robustness with ***50% reduction*** in delay variability & enhancing noise immunity for near-threshold operation of Dynamic logic gates.
- Developed theoretical model of proposed Dynamic logic topologies and performed extensive robustness study by Monte Carlo simulations in HSPICE

A VDTA-based robust electronically tunable memristor emulator circuit

Journal: *Analog Integrated Circuits and Signal Processing, 2019*

Authors: **Indrajit Pal**, Vikash Kumar, Nilay Aishwarya, Abhijeet Nayak, Aminul Islam | DOI: 10.1007/s10470-019-01575-y

Link: https://doi.org/10.1007/s10470-019-01575-y

- Designed a *Voltage Differencing Transconductance Amplifier* (*VDTA*) - based memristor emulator with tunable memristive properties & derived a mathematical model of the circuit which is robust to PVT fluctuations.
- The designed circuit can be integrated into *ASIC*s designed for ML Applications & On-Chip Learning - the results of a practical on-chip implementation have been demonstrated along with its transfer-characteristics and presented in the manuscript.

Electronic Toll Collection System using Barcode Technology

Conference: *Springer Sponsored Conference on Nanoelectronics, Circuits and Communication Systems, 2017*

Authors: E.V.V. Hari Charan, **Indrajit Pal**, Akash Sinha, Raj Kamal Roye Baro, Vijay Nath | DOI: 10.1007/978-981-13-0776-8_51

Published Book Series*: Springer Book Series – Lecture Notes in Electrical Engineering*

- An automated Electronic Toll Collection was developed with the capability of decoding information in barcodes via sophisticated image-processing (*using OpenCV*) techniques & fast retrieval of information from a database using the decoded data

Predicting Bio-Molecular properties from Molecule Structure

GitHub Repository: https://github.com/indropal/GraphDLBioMolecules | [Link]

- Graphs are an efficient way to represent molecular structure and to understand the interactive bonds amongst atoms – which can be further used to decipher a molecule's physical properties.
- This project explores *Graph Neural Networks* to decipher graph representations of bio-molecular structures & predict physical-properties of molecules.

SKILLS

Skill Type	Details
Programming Languages	Python, C/C++, C#, JavaScript
Machine Learning Libraries	scikit-learn, XGBoost, CatBoost, LightGBM, SciPy
Deep Learning Frameworks	TensorFlow, Keras, PyTorch
Big Data Frameworks	Spark/PySpark, Hive
Deployment Frameworks	Docker, Flask

TECHNICAL CERTIFICATIONS

Deep Learning Specialization

DeepLearning.AI, Coursera | [Specialization Certificate Link]

DeepLearning.AI TensorFlow Developer Professional Certificate

DeepLearning.AI, Coursera | [Professional Certificate Link]

Applied Machine Learning in Python

University of Michigan, Coursera | [Certificate Link]

PERSONAL DETAILS

Personal Website: https://indropal.github.io | [Link]

LinkedIn profile: https://linkedin.com/in/pal-indrajit | [Link]

GitHub Profile: https://github.com/indropal | [Link]

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