

Nilanjana Debnath

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Skills

Programming Languages Python
Machine Learning & Deep Learning PyTorch, TensorFlow, Scikit-learn, Hugging Face Transformers
Graph Neural Networks (GNNs) PyTorch-Geometric(PyG), PyGT, DGL, GraphSAGE, GCN, GAT, TGN
Natural Language Processing BERT, GPT, T5, RoBERTa, NLTK, SpaCy, Gemini API
Computer Vision OpenCV, YOLO, Detectron2
Model Deployment & MLOps ONNX, MLflow, Docker, CI/CD pipelines
Cloud Platforms AWS (S3, SageMaker, Lambda)
Data Engineering & Visualization Pandas, NumPy, Matplotlib, Seaborn, Plotly, SQL

Education

| Degree | Institute/School | CPI/% | Year |
|--|---|-----------|-------------|
| M.S. (Research) (Computer Science and Engineering) | Indian Institute of Technology (IIT) Palakkad | 9.25/10.0 | 2021 – 2025 |
| B.Tech (Information Technology) | Kalyani Government Engineering College | 8.49/10.0 | 2015 – 2019 |

MS Thesis: Heterogeneous Continuous-Time Dynamic Graph Representation Learning

- MS-Thesis : Heterogeneous Continuous-Time Dynamic Graph Representation Learning (HT-Graph)** **2022 – 2024**
- Developed a model to address challenges in large, dynamic, heterogeneous graphs by improving prediction performance and computational efficiency.
 - Implemented **HT-Graph** using neighbor-aware learning, **neighbor-store**, and **restarter** modules to enable parallel training and faster computations.
 - Achieved **46.3% speedup** over baseline models on a 2-GPU machine and improved average precision (AP) and AUC scores.
 - Skills:** Python, PyTorch, PyTorch-Geometric, Deep Graph Library (DGL), Graph Neural Networks, Dynamic Graph Neural Networks.

Projects

- Human Activity Recognition on UCF-50 Dataset using PyTorch** **Activity-Recognition**
- Developed a human activity recognition system for video data using a combination of Convolutional Neural Networks (CNNs) and Long Short-Term Memory (LSTM) networks.
 - convLSTM and LRCN models were used to extract spatial features from video frames and model temporal dependencies.
 - Evaluated model performance using accuracy and loss metrics; found that LRCN outperformed convLSTM models in terms of classification accuracy (i.e. 92 % and 89 % respectively).
 - Deployed the trained model for real-time human activity recognition using live webcam feed.
 - Skills:** PyTorch, CNN, LSTM, Human Activity Recognition, Computer Vision, Deep Learning.
- Traffic Forecasting on Metropolitan LA Dataset using PyGT** **Traffic-Forecasting**
- Built a traffic forecasting model using Temporal Graph Neural Networks (TGNNs) to predict traffic speed in real-time based on spatial and temporal data.
 - Implemented an Attention Temporal Graph Convolutional Network (A3TGCN) to capture both spatial and temporal patterns.
 - Conducted data preprocessing, model training, and evaluation, achieving accurate traffic speed predictions.
 - Implemented both single-shot and autoregressive prediction methods for traffic forecasting.
 - Skills:** PyTorch, PyTorch-Geometric-Temporal (PyGT), Temporal Graph Neural Networks, Traffic Forecasting, Deep Learning.

Professional Experience

- Systems Engineer @ Tata Consultancy Services** **June 2019 - July 2021**
- Analyzed user interaction data** using Azure Log Analytics to uncover usage trends and identify performance bottlenecks.
 - Built interactive Azure dashboards for real-time KPI monitoring (e.g. session duration, click-through rates, crash analytics etc)
 - Collaborated with the product team to implement changes based on insights, such as improving navigation flows, which increased feature engagement by 20%.
 - Analyzed the effectiveness of UI changes, resulting in a 15% improvement in retention and a 10% reduction in drop-off rates.
 - Automated Azure VM management** using PowerShell scripts and Azure Automation, reducing manual intervention by 90%.
 - Consolidated and standardized VM metadata from multiple CSV sources into a master list for efficient tracking and reporting.
 - Automated VM running status, software updates, installations, and configurations for thousands of Azure VMs.
 - Skills Used:** Azure Log Analytics, KQL, Azure Dashboards, Data Analysis, User Experience Optimization, PowerShell, Azure Automation, Scripting, Software Management.