Abhishek Kumar Mishra

Contact

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Research Area

AI in Healthcare, Spiking Neural Network, Machine Learning, Fault tolerance, Semiconductor Wafer Defect, Natural Language Processing

Education

Aug 2020 – Dec 2024 **Ph.D. in Electrical Engineering**, *Drexel University*, Philadelphia, PA, *GPA – 4.0/4.0*
Advisors: Dr. Nagarajan Kandasamy, Dr. Anup Das

Aug 2018 – Jul 2020 **MS in Computer Science**, *University at Buffalo*, Buffalo, NY, *GPA – 3.51/4.0*
Advisor: Dr. David Doermann

Aug 2011 – Jul 2015 **B.Tech in Electronics & Communication Engineering**, *RCCIIT*, Kolkata, India

Work Experience

Oct 2023 – Present **Machine Learning Engineer**, *AltruMed*, Philadelphia, PA, USA

- Developed a novel architecture: OxyCaps to accurately detect opioid overdose events non-invasively, achieving accuracy of 92% modeled using sleep apnea data.
- Robust and optimized time-series classification models are designed to efficiently process complex data patterns while being adapted for low-power embedded systems.
- Designed and implemented predictive models to anticipate opioid use events, significantly reducing alert response times for emergency intervention.
- Our work was published in IJCAI 2024.

Feb 2022 – Jul 2022 **Graduate Data Science Intern**, *Intel Corporation, MPE MDNA Team*, Austin, TX, USA

- Built machine learning models using semiconductor test parametric data to reduce yield loss.
- Created an end-to-end pipeline for pulling the data, pre-processing, training, and predicting.
- Our work was published in VTS 2023.

May 2019 – Dec 2019 **Research Intern**, *North Park Innovation Ltd*, Buffalo, NY, USA

- Designed a pipeline for the multi-class classifier to find the cause of the malfunction of the HVAC system.
- Developed an ANN model that surpassed malfunction detection, achieving a score of 81.35% macro precision & 80.21% macro recall.

Sep 2015 – Aug 2017 **Junior Data Scientist**, *Ericsson India Global Pvt. Ltd.*, Mumbai, MH, India

- Predicted the network key performance indicator (KPI) for the client by developing a classification model based on the historical data for improvement and degradation of the network.
- Implemented a supervised learning model for anomaly detection based on alarms, capturing unusual base station behavior. This reduced alarms by 30% and enabled early fault prediction and proactive decision-making.
- Implemented a logistic regression model to diagnose weak network connections, identifying key features. This approach improved prediction accuracy by 10% compared to the previous year.
- Created interactive Dashboards and visualizations for descriptive analysis.

Teaching

Sep 2020 – Dec 2024 **Teaching Assistant**, *Drexel University*, Philadelphia, PA
- Held office hours and graded homework, tests, and quizzes for courses:
  - ECE 613: Neuromorphic computing (Summer 2024)
  - ECE 350: Introduction to Computer Organization (Fall 2020, Summer 2021, Fall 2022)
  - ECE 200: Digital Logic Design (Summer 2021)

Jan 2020 – Apr 2020 **Teaching Assistant**, *University at Buffalo*, Buffalo, NY
- Held weekly recitations and office hours and graded homework, tests, and quizzes for the course:
  - EAS 595LEC: Fundamentals of Artificial Intelligence (Spring 2020)

Publications

See my Google Scholar page for recent updates and citation information.

Web Conference 2025 **Efficient Aspect Term Extraction using Spiking Neural Network. Abhishek Kumar Mishra**, Arya Somasundaram, Anup Das, Nagarajan Kandasamy (Recently submitted)

AAAI 2025 **GLUmos: Noninvasive Glucose Monitoring Using a Wearable Spectroscopy Device.** Anush Lingamoorthy, **Abhishek Kumar Mishra**, Tarek Hamid, Claire Kendell, Junpeng Zhao, Jacob Brenner, Nagarajan Kandasamy, Amanda Watson (Recently submitted and advanced to Phase 2)

PRDC 2024 **Model-Based Approach Towards Correctness Checking of Neuromorphic Computing Systems. Abhishek Kumar Mishra**, Anup Das, Nagarajan Kandasamy (Recently accepted)

ITC 2024 **Wafer2Spike: Spiking Neural Network for Wafer Map Pattern Classification. Abhishek Kumar Mishra**, Suman Kumar, Anush Lingamoorthy, Anup Das, Nagarajan Kandasamy (Recently accepted)

ICONS 2024 **Neuromorphic Computing for the Masses**. Shadi Matinizadeh, Arghavan Mohammadhassani, Noah Pacik-Nelson, Ioannis Polykretis, Krupa Tishbi, Suman Kumar, M. L Varshika, **Abhishek Kumar Mishra**, Nagarajan Kandasamy, James Shackleford, Eric Gallo, Anup Das (Recently accepted)

IJCAI 2024 **Drug Overdose Vital-Signs Evaluator using Machine Learning**. Anush Lingamoorthy, **Abhishek Kumar Mishra**, Suman Kumar, David Gordon, Jacob Brenner, Nagarajan Kandasamy, Amanda Watson

MWSCAS 2024 **A Fully-Configurable Digital Spiking Neuromorphic Hardware Design with Variable Quantization and Mixed Precision**. Shadi Matinizadeh, Arghavan Mohammadhassani, Noah Pacik-Nelson, Ioannis Polykretis, **Abhishek Mishra**, James Shackleford, Nagarajan Kandasamy, Eric Gallo, Anup Das

VTS 2024 **WaferCap: Open Classification of Wafer Map Patterns using Deep Capsule Network**. **Abhishek Mishra**, Mohammad Ershad Shaik, Anush Lingamoorthy, Suman Kumar, Anup Das, Nagarajan Kandasamy, Nur A. Touba

VTS 2023 **Predicting the Silent Data Error Prone Devices Using Machine Learning**. Mohammad Ershad Shaik, Abhishek Kumar Mishra, Yonghyun Kim

ETS 2023 **Online Performance Monitoring of Neuromorphic Computing Systems**. Abhishek Kumar Mishra, Anup Das, Nagarajan Kandasamy

ASPDAC 2023 **Hardware-Software Co-Design for On-chip Learning in AI Systems.** M.L.Varshika, Abhishek Kumar Mishra, Nagarajan Kandasamy, Anup Das

Electronics 2022 **Built-In Functional Testing of Analog In-Memory Accelerators for Deep Neural Networks**. Abhishek Kumar Mishra, Anup Das, Nagarajan Kandasamy

RANLP 2021 **Does local pruning offer task-specific models to learn effectively?** Abhishek Kumar Mishra, Mohna Chakraborty

Academic Service

Reviewer

- The Web Conference 2025
- AISTATS 2025
- NeurIPS 2024
- IJCAI 2024
- IEEE J. Biomedical and Health Informatics 2024
- IEEE Transactions on Computers 2024
- IJCNN 2024
- ACM TECS 2022, 2024
- Procedia Computer Science Journal 2023
- DAC 2022, 2023
- ICCAD 2021, 2022, 2023
- ASPDAC 2022
- DATE 2021, 2022, 2025
- Cases Journal 2021
- Computing Frontiers 2021
- NEUNET Journal 2020
- IEEE CONECCT 2020

Membership

- IEEE, IJCAI, ACM, AAAI, Frontiers

Awards & Achievements

Poster Presentation **IBM IEEE CAS/EDS – AI Compute Symposium, Oct 2022**. Selected to present the "IBM IEEE CAS/EDS – AI Compute Symposium 2022" poster.

Certificate of Completion **VentureWell E-Team Propel Workshop, May 2-3, 2024**. Attended the workshop at The Keenan Center for Entrepreneurship at Ohio State University to learn topics like business model development, customer discovery, team dynamics, value chains, and intellectual property.

Machine Learning Engineer I am also associated with a startup company: **AltruMed**, a medical device company dedicated to addressing the opioid epidemic through the development of innovative solutions such as DOVE. As a Machine Learning Engineer, I contributed to the development of DOVE, a non-invasive medical device designed to detect opioid overdoses and alert bystanders and EMS. This device serves as a critical safety net for individuals with opioid use disorder, particularly in light of potent synthetic opioids. With a focus on harm reduction and human-centric design, DOVE addresses the needs of vulnerable populations, significantly helping to reduce accidental overdose deaths.

Skills

Languages	Python, C++, SQL, R, Matlab
Tools/IDE	Jupyter, Visual Studio, Sublime, Tableau, Anaconda, AWS, Google Cloud Platform
Libraries & Frameworks	NumPy, Pandas, scikit-learn, Matplotlib, Tensorflow, Keras, Pytorch, snnTorch, Dash, Scipy, Plotly, SpaCy, NLTK, VADER, TextBlob, Gensim, Beautiful Soup, Regex, Bokeh, Folium, Hadoop, MapReduce, Spark

Current Research Projects

- Running a massive study over 1k patients to gather physiological data to detect blood glucose concentrations noninvasively and manage diabetes using machine learning. The study aims to enhance continuous glucose monitoring and explore new opportunities for noninvasive health monitoring.
- Conducting a study, approved by IRB to collect opioid overdose data from different subjects for the early detection of opioid overdose using machine learning.
- Developing a Machine Learning framework for real-time monitoring of neuromorphic program execution using model-based redundancy. This software-based monitor detects discrepancies between hardware neuron behavior and predictions, reducing hardware overhead and minimizing intrusion on applications.

References

- **Dr. Nagarajan Kandasamy** – Professor (Advisor), Drexel University. Email: nk78@drexel.edu
- **Dr. Anup Das** – Associate Professor (Co-advisor), Drexel University. Email: ad3639@drexel.edu
- More references will be available upon request.