Akash Choudhuri

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Research Interests

My primary research interest lies in the intersection of machine learning and deep learning with applications in the domain of healthcare. I have also recently explored the field of uncertainty quantification using Graph Neural **Networks**. My long-term research goal is to develop a scalable and comprehensive framework to predict the risk posed by patients in healthcare settings and propose mitigation strategies. I have a good understanding of **data processing** and analytics, deep learning, natural language processing, and statistics. EDUCATION

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	The University of Iowa	Iowa City, USA
•	Doctoral Degree: Computer Science; GPA: 3.74/4.0	January 2022 - Present
•	Institute of Mathematics and Applications	Bhubaneswar, India
	Master of Science: Mathematics with Data Science; GPA: 8.70/10	July 2019 - July 2021
•	Birla Institute of Technology	Mesra, India
	Bachelor of Science: Mathematics and Computing; GPA: 8.0/10	July 2016 - June 2019
]	Technical Skills	

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•	Languages:	Python, JAVA, R, C, MATLAB

- Frameworks: Scikit, PyTorch, TensorFlow, Keras, Flask, H3, Pyspark, AWS
- Tools: GIT, MySQL

PROFESSIONAL EXPERIENCE

Lawrence Livermore National Laboratory

- Intern, Data Science Summer Institute
 - Uncertainty Quantification of Weighted Link Prediction in Graphs (Summer Project): Researched and Developed a conformal prediction algorithm to compute the uncertainty bounds of link prediction using GCNs at a feature level. I am currently working towards a publication.
 - Cardiac Electrocardiography using Machine Learning (DSSI Challenge Problem): Primarily worked on the multi-class classification problem to classify irregular heartbeats from a time series data of heartbeats. Fine-tuned and created different ML Models like XGBoost and a hybrid MLP+Randomforest Classifier algorithm. Created a hybrid model that gave 12% gain in accuracy in the MIT-arrhythmia dataset.

Data Sutram Data Scientist

July 2021 - December 2021

- Optimized Algorithm for Delivery Management Systems: Created a real-time optimization algorithm to assign orders to delivery executives in last-mile delivery services.
- Dynamic Footfall: Found metrics to compute dynamic footfall of places in India using internet devices ping data.
- Improved geo-coding Wrapper: Created a wrapper method that uses Google APIs to geocode Indian addresses.

Solytics Partners

- Consultant (Data Science)
 - Financial Model Testing: Worked on validating a Credit Risk Model of the World Bank and performed additional stress testing experiments.
 - Technical Recruiter: Was associated with technical recruiting of employees in USA and also conducted campus recruitment process in Indian universities

Solytics Partners

- Intern (Data Science)
 - Auto ML Model: Worked on creating various pipelines for creating an Auto ML and Deep Learning platform for credit risk scoring.
 - Pyspark integration with Keras Models: Worked on creating Pandas UDFs to customize Neural Networks on Spark.

CURRENT PROJECTS

Uncertainty Quantification for Hyperlink Prediction: Development and formulation of uncertainty quantification formulation for hyperlink prediction in hypergraphs. This will not just have applications in healthcare but also can be adapted for other domains.

PUBLICATIONS

- Choudhuri, A et al.: Continually-Adaptive Representation Learning Framework for Time-Sensitive Healthcare Applications, In publication Process, Proceedings of The 32^{nd} ACM International Conference on Information and Knowledge Management, 2023 (https://dl.acm.org/doi/10.1145/3583780.3615464).
- Choudhuri, A.: A Hybrid Machine Learning Model for Estimation of Obesity Levels, In Data Management, Analytics and Innovation: Proceedings of ICDMAI 2022, Springer Nature (https://doi.org/10.1007/978-981-19-2600-622)

May 2021 - July 2021

March 2020 - April 2021

Pune, India

Remote

Kolkata, India

Livermore, USA

May 2023 - August 2023

Important Talks

- CDC MIND Group Meeting 2023: Presented initial motivations about the integration of clinical notes for CDI incidence prediction and CCMI prediction and presented the results of our paper titled "Continually-Adaptive Representation Learning Framework for Time-Sensitive Healthcare Applications".
- Summer Slam 2023: Presented initial approach to computing uncertainty bounds for weighted link prediction in graphs at the Summer Slam at Lawrence Livermore National Laboratory.
- Tutorial Series 49th Annual Conference of the Odisha Mathematical Society, 2020: Presented an introductory tutorial on using ANNs for credit risk estimation.

CURRENT SUBMISSIONS AND POSTERS

- Designing Near-Optimal Spatial Vaccine Allocation Strategies: Poster- MIDAS Annual Meeting Lightning Talk, October 2023.
- Greedy Strikes Back: Circumventing the Hardness of Vaccine Allocation: In submission, IJCAI 2024.
- Empirical gain of Addition of Clinical notes in CDI Incidence Prediction: A Quantitative Study: In submission, ICHE.
- Heterogenous Hypergraph Contrastive Learning for Dynamic Patient Risk Estimation: In submission, KDD 2024.

ACADEMIC SERVICE

- International workshop on Epidemiology meets Data Mining and Knowledge Discovery (epiDAMIK @ KDD): Program Committee Member and reviewer of the conference for 2022 and 2023.
- Informatics in Medicine Unlocked (IMU): Reviewer for the journal in 2022 and 2023.
- IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM): Reviewer for the 2024 edition of the conference.
- **IEEE International Conference on Data Engineering (ICDE)**: External Reviewer for the 2024 edition of the conference.
- ACM Knowledge Discovery in Databases (KDD): Reviewer for the 2024 edition of the conference.

HONORS AND AWARDS

- UIOWA CS Department Travel Grant:: Awarded a sum of \$600 to present works in CIKM 2023.
- UIOWA Graduate Student Senate Travel Grant:: Awarded a sum of \$1000 to present works in CIKM 2023.
- UIOWA Graduate and Professional Student Government Travel Grant:: Awarded a sum of \$400 to present works in CIKM 2023.
- Focus Areas in Science and Technology Summer Fellowship:: From the Indian Academy of Sciences from May-June, 2019.
- Summer Research Fellowship:: From the Indian Academy of Sciences from May-July, 2018.
- Indo-German Spring School on Algorithms and Big Data:: Obtained full scholarship to attend the workshops and discussion sessions in 2020.

Relevant Courses

- CS: 4980: Computational Epidemiology
- DATA: 4750: Probabilistic Statistical Learning
- ECE: 5995: Data Mining
- CS: 5630: Cloud Computing Technology
- CS: 5350: Design and Analysis of Algorithms
- ECE: 5995: Generative AI Tools
- BIOS: 7600: Statistical Analysis of Network Data

References

- Bijaya Adhikari:: Assistant Professor, Department of Computer Science, University of Iowa. bijaya-adhikari@uiowa.edu
- Kishlay Jha:: Assistant Professor, Department of Electrical and Computer Engineering, University of Iowa. kishlay-jha@uiowa.edu