Kisan Thapa

PhD Candidate, Computer Science

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Google Scholar Profile

Summary

PhD candidate in Computer Science specializing in computational biology, machine learning, and graph neural networks. Experienced in building scalable software, from Android applications to deep learning models that analyze complex biological datasets. Published researcher with expertise in computational methods, interactive visualization tools, and machine learning pipelines. Strong track record of collaborating across disciplines to translate data into actionable insights.

Education

Sep 2021 - Present — **University of Massachusetts Boston** — Boston, MA
PhD in Computer Science

- Research Interests: Computational Biology, Deep Learning, Graph Neural Networks

Advisor: Prof. Ozgun Babur

Sep 2021 - May 2025 — **University of Massachusetts Boston** — Boston, MA
Master of Science in Computer Science (en-route)
Awarded upon successful completion of doctoral coursework and qualifying examinations.

Aug 2013 - Sep 2017 — **Pokhara University** — Pokhara, Nepal
Bachelor of Computer Engineering
Honors: Dean's List 2017
Relevant Coursework: Data Structures and Algorithms, Object-Oriented Programming (Java, C++), Database Management Systems, Computer Networks, Operating Systems, Software Engineering Principles, Digital Logic Design

Research Experience

Sep 2021 - Present — **Graduate Research Assistant** — **Network Biology Lab, UMass Boston**

- Developed and implemented a large-scale, web-based visualization tool (JavaScript, HTML, CSS) for causal interaction networks, optimizing for responsiveness and efficient rendering of complex biological networks.
- Published a first-author article in Patterns that proposed methods to integrate pathways, protein interactions, and regulatory networks into deep neural networks, improving model interpretability and predictive accuracy in large-scale omics datasets.
- Created a computational framework to infer transcription factor activity from gene expression data, identifying dysregulated TFs in cancer and uncovering actionable targets that support drug development and personalized therapies.
- Contributed to multiple high-impact studies in cancer genomics, including the identification of protein kinase signaling networks in uveal melanoma and prognostic gene signatures in glioblastoma.
- Built and deployed deep learning pipelines in Python and R, and interactive web applications with Flask, streamlining analysis workflows for multi-omics data used by collaborators across disciplines.

Employment

Aug 2020 - Aug 2021 **Software Developer** **EB Pearls Pvt. Ltd., Nepal**

- Built a high-impact crowdfunding Android application enabling secure mobile-to-mobile payments for 5,000+ beneficiaries.
- Refactored legacy Android codebases with MVVM and DI patterns, cutting technical debt and improving maintainability.
- Optimized Google Map SDK heatmap rendering performance for a large-scale local dating application.

Nov 2017 - Jun 2020 **Software Developer** **Rooster Logic Pvt. Ltd., Nepal**

- Identified and resolved over 20 critical bugs in an Android survey application (Java), resulting in a 3x improvement in average survey completion time.
- Architected and built a full-stack issue-tracking system (Android/Java client, Node.js backend) for rainwater harvesting projects, decreasing issue resolution time by 80%.

Teaching Experience

Sep 2021 - Present **Graduate Teaching Assistant** **UMass Boston**

- Assisted in teaching Applied Machine Learning and Applied Discrete Mathematics to 50+ undergraduate and graduate students every semester.
- Held weekly office hours and mentoring sessions, providing one-on-one support with coding, proofs, and Machine Learning assignments (octave, scikit-learn, PyTorch).

- Developed supplementary materials to aid student understanding of key mathematical and machine learning principles.

Publications

Peer-Reviewed Journal Articles

1. **Thapa, K.**, Kinali, M., Pei, S., Luna, A., & Babur, O. (2025). Strategies to include prior knowledge in omics analysis with deep neural networks. *Patterns (Cell Press).*
2. Somers, J., **Thapa, K.**, Demir, E., et al. (2023). A framework for considering prior information in network-based approaches to omics data analysis. *Proteomics.*
3. Onken, M. D., **Thapa, K.**, Blumer, K. J., et al. (2023). Protein kinase signaling networks driven by oncogenic Gq/11 in uveal melanoma. *Molecular & Cellular Proteomics.*

Peer-Reviewed Conference Proceedings

4. Sharma, P., **Thapa, K.**, et al. (2024). Unlocking the Potential of Large Language Models for AI-Assisted Medical Education: A Case Study with ChatGPT. *International Conference on Technology and Innovation in Learning, Teaching and Education.*
5. Khanal, S. R., Sharma, P., **Thapa, K.**, et al. (2024). Performance analysis and evaluation of cloud vision emotion Apis. *International Conference on Technology and Innovation in Learning, Teaching and Education.*

Preprints

6. Vishnoi, M., **Thapa, K.**, Korkut, A., et al. (2024). A prognostic matrix gene expression signature defines functional glioblastoma phenotypes and niches. *Research Square.*
7. Gautam, S., Sharma, P., **Thapa, K.**, et al. (2023). Screening autism spectrum disorder in children using a deep learning approach. *arXiv preprint arXiv:2306.14300.*

Key Research Projects & Software

- **CausalPath WebServer**: An open-source bioinformatics platform developed to infer causal biological mechanisms from complex molecular data (e.g., phosphoproteomics). CausalPath makes advanced network analysis accessible to the broader biomedical research community, helping to explain experimental observations in the context of known biology.
  Tech: Java, JavaScript, HTML/CSS, Cytoscape.js
  Links: https://causalpath.cs.umb.edu/ | GitHub
- **Cell Activity Inference Landscape (KALE)**: A computational tool to infer transcription factor (TF) activity from gene expression data and TF target information, supporting biological discovery in disease contexts.
  Tech: Python, Flask, Pandas, NumPy
  Link: https://kale.cs.umb.edu/

Awards & Honors

- Dean's List, Pokhara University (2017)

Skills

- **Programming:** Python, Java, R, Kotlin, JavaScript, C, C++, SQL, HTML, CSS
- **Frameworks & Libraries:** PyTorch, TensorFlow, scikit-learn, Pandas, Flask, Django, React.js, Node.js
- **Tools:** Git, AWS, Firebase, Docker, Android SDK
- **Core Competencies:** Software Development, Machine Learning, Deep Learning, Scientific Research, Graph Neural Networks, Data Analysis & Visualization, Android App Development, Algorithm Development, Data Structures