Nikhil Thapa

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Research Interests

Music Information Retrieval, Contrastive Learning, Deep Metric Learning, Computer Vision, Generative AI

Education

- **Jeonbuk National University**, M.S. in Computer Science and Engineering (2023 – Ongoing)
- **Kathmandu University**, B.E. in Mechanical Engineering (2016 – 2021)

Research Experience

Graduate Research Assistant, Jeonbuk National University – Jeonju, South Korea (March 2023 – Ongoing)

- Developed a method for Pine Wilt Disease detection using drone images by integrating Deep Metric Learning with YOLOv8 and Segformer models. This work resulted in a published journal paper and a national conference paper, improving detection accuracy and species classification.
- Conducted research on beat tracking, developing a Dual-Path model combining Temporal Convolutional Networks and Transformers, achieving state-of-the-art performance with fewer parameters. Defended a master's thesis on beat tracking using a TCN-Transformer hybrid architecture, leading to a journal publication. Incorporated downbeat tracking in Korean Pansori music as part of the thesis. Currently researching automatic drum transcription in Korean Pansori music.

Research Assistant, Nepal Academy of Science and Technology (NAST) – Lalitpur, Nepal (Nov 2021 – Nov 2022)

- Designed mathematical models and 3D prototypes for an indirect evaporative cooling system utilizing biochar and performed techno-economic assessment of waste-to-energy technologies, focusing on municipal solid waste analysis in Kathmandu.
- Contributed to energy-exergy analysis of biodiesel from waste cooking oil, presented at the 9th National Conference on Science and Technology, Nepal (2022).

Research Intern, Ministry of Education, Science and Technology, Singhadurbar, Kathmandu, Nepal (Aug. 2020 – Nov 2020)

- Designed, programmed and tested, a prototype level gauge using ultrasonic sensors and Arduino.
- Maintained comprehensive project documentation and provided regular progress reports.

Technical Skills

Languages	Python, C/C++
Frameworks & Libraries	PyTorch, TensorFlow, Librosa, fastai, madmom, NumPy, SciPy, scikit-learn, Matplotlib
Tools	LaTeX, Linux, Docker, Git
Digital Music Production	FL Studio, Ableton, Studio One, Producing, Mixing & Mastering
Languages	English (Fluent), Nepali (Native), Hindi (Fluent), Korean (Basic – spoken and listening)
Musical Instruments	Indian Flute (Bansuri), Cajon

Publications

- **Thapa, N.**, Khanal, R., Bhattarai, B., & Lee, J. (2024). Pine Wilt Disease Segmentation with Deep Metric Learning for Early-Stage Disease Identification. *Electronics*, 13(10), 1951. [link]
- Dual-Path Beat Tracking: Combining Temporal Convolutional Networks and Transformers in Parallel," *International Journal of Audio Engineering Research*, Under Review.

- **Thapa, N.**, & Lee, J. (2023). Deep Metric Learning-Based Classification of Tree Species and Disease Stages Affected by Pine Wilt Disease. In *Proceedings of the Korean Institute of Communications and Information Sciences*, 357–358. [link]

Awards

- Nijamati Karmachari Santati Scholarship, 2016 by the Government of Nepal to pursue Undergraduate Sttudies
- Jeonbuk National University Academic Scholarship (2023-2025)

References

Dr. Kyung Sung Lee (Thesis Advisor)
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Professor Emeritus, Dr. Joon Whoan Lee (Thesis Co-Advisor)
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