

Bipesh Raj Subedi

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RESEARCH INTERESTS

Machine Learning, Natural Language Processing, Deep Learning, Large Language Models, Computer Vision, Data Science

EDUCATION

12/2020 - 04/2023	Master of Engineering in Computer Engineering at Kathmandu University, Dhulikhel, Nepal
08/2016 - 11/2020	Bachelor's in Computer Engineering at Kathmandu University, Dhulikhel, Nepal
2014 - 2016	Higher Secondary Education (+2 Science) at St. Xavier's College, Kathmandu, Nepal
2014	Secondary Level Education (SLC) at Aadarsha Secondary English School, Saptari, Nepal

EXPERIENCE

Kathmandu University, Dhulikhel, Nepal

Research Assistant: Contributing to the Google Society-Centered AI Project on trilingual machine translation for English-Nepali-Tamang at ILPRL, present

Visiting Lecturer:

- Instructor for COMP 102 (Computer Programming) course, present
- Instructor for COMP 116 (Object-Oriented Programming) course, 05/2024 - 07/2024

Research Assistant: Contributed to Information and Language Processing Research Lab (ILPRL) during my masters, 03/2022 - 03/2023

Teaching Assistantship: C Programming Lab, 02/2022 - 07/2022

Real Time Solutions Pvt. Ltd, Lalitpur, Nepal

Android Developer - Internship, 08/2020 - 12/2020

ComplianceQuest, Kathmandu, Nepal

Software Developer - Internship, 07/2020 - 11/2020

PROJECTS

CNN-Transformer Based Encoder-Decoder Model for Nepali Image Captioning (Thesis)

Supervisor: Dr. Bal Krishna Bal

Conference: ICON 2022, New Delhi, India

Description: Developed a deep learning model combining CNN and Transformer to generate image captions in Nepali. Created a dataset with Nepali captions using the Flickr8k dataset. Employed ResNet-101 and EfficientNetB0 as pre-trained CNN models, achieving promising results for future improvement.

Exploring the Potential of Large Language Models (LLMs) for Low-resource Languages

Conference: LREC-COLING 2024, Torino, Italy

Description: Evaluated LLMs for NER and POS tagging for Nepali, a low-resource language. Conducted experiments with multiple LLMs especially BERT variants, achieving high F1-scores with NepBERTa, demonstrating significant potential for LLMs in low-resource language tasks.

Nepali Video Captioning using CNN-RNN Architecture

Conference: ICT-CEEL 2023, Bhaktapur, Nepal

Description: Studied deep neural networks for generating captions for Nepali videos. Utilized various CNN-RNN architectures, with EfficientNetB0 + BiLSTM achieving notable BLEU-4 and METEOR scores. Addressed challenges and future research directions in Nepali video captioning.

Word Embedding in Nepali Language using Word2Vec

Conference: NLPPIR 2022, Bangkok, Thailand

Description: Implemented Word2Vec for Nepali news data to develop word embeddings. Used Gensim package to model word relationships, focusing on the health section of Nepali news portals, showing promising results in word similarity analysis.

Stress Classification on WorkStress 3D dataset

Description: This study focuses on experimenting with machine learning and deep learning models for classification tasks on WorkStress 3D dataset. Implemented LSTM and SVM for physiological signals data and VGG16 / CNN for facial expression data to classify emotions (stressed and not stressed). The results were promising and further improvements can be done.

PUBLICATIONS

1. Subedi, B., Regmi, S., Bal, B. K., & Acharya, P. (2024). Exploring the potential of large language models (LLMs) for low-resource languages: A study on named-entity recognition (NER) and part-of-speech (POS) tagging for Nepali language. In *Proceedings of the 2024 Joint International Conference on Computational Linguistics, Language Resources and Evaluation (LREC-COLING 2024)* (pp. 6974–6979). ELRA and ICCL. <https://aclanthology.org/2024.lrec-main.611>
2. Subedi, B., Singh, S., & Bal, B. K. (2023). Nepali video captioning using CNN-RNN architecture. In *Proceedings of the International Conference on Technologies for Computer, Electrical, Electronics & Communication (ICT-CEEL 2023)* (pp. 94–99). <https://arxiv.org/abs/2311.02699>
3. Poudel, S., Ghimire, N., Subedi, B., & Singh, S. (2023). Retrieval and generative approaches for a pregnancy chatbot in Nepali with stemmed and non-stemmed data: A comparative study. In *Proceedings of the International Conference on Technologies for Computer, Electrical, Electronics & Communication (ICT-CEEL 2023)* (pp. 209–215).
4. Subedi, B., & Sharma, G. (2023). Smart agriculture: Components, processes, challenges, and future perspectives. *Journal of Data Mining and Management*, 8 (2), 28–40. <http://matjournals.co.in/index.php/JoDMM/article/view/4088>
5. Subedi, B., & Bal, B. K. (2022). CNN-Transformer based encoder-decoder model for Nepali image captioning. In *Proceedings of the 19th International Conference on Natural Language Processing (ICON)* (pp. 86–91). Association for Computational Linguistics. <https://aclanthology.org/2022.icon-main.12>
6. Subedi, B., & Poudyal, P. (2022). Word embedding in Nepali language using Word2Vec. In *Proceedings of the 2022 6th International Conference on Natural Language Processing and Information Retrieval (NLPIR 2022)*. Association for Computing Machinery. <https://doi.org/10.1145/3582768.3582799>
7. Subedi, R., Sharma, G., & Pandey, T. R. (2022). A comprehensive study on online teaching–learning (OTL) system and platforms. *BOHR International Journal of Computer Science*, 1, 110–123. <https://doi.org/10.54646/bijcs.016>
8. Subedi, B., & Sharma, G. (2022). A state-of-the-art review on fog computing architecture, applications, and security issues. *International Journal of Advanced Networking and Applications*, 13, 5188–5196. <https://www.ijana.in/V13-6.php#>