Prashant Shrestha

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Github | Scholar | Linkedin

Education

Bachelors in Electronics, Communication and Information Engineering 2018-2023

Pulchowk Campus, Institute of Engineering *Lalitpur, Nepal*

Courses: Artificial Intelligence, Data Science, Data Mining, Database Management Systems, Big Data, Data Structures and Algorithms

- Ranked 82 in entrance exam out of nearly 18000 applicants (***top 0.5%***)
- Graduated with **Distinction**, scoring 82.05%

Preprints and Publications

- **CAR-MFL: Cross-Modal Augmentation by Retrieval for Multimodal Federated Learning with Missing Modalities.** [Paper]
  Poudel, P, **Shrestha, P***., Amgain, S.*, Shrestha Y. R., Gyawali P. K. & Bhattarai. B. (*MICCAI*), 2024
- **Investigating the Robustness of Vision Transformers against Label Noise in Medical Image Classification.** [Paper]
  Khanal, B., **Shrestha, P.***, Amgain, S.*, Khanal, B., Bhattarai, B., & Linte, C. A. (*EMBC*), 2024
- **Investigation of Federated Learning Algorithms for Retinal Optical Coherence Tomography Image Classification with Statistical Heterogeneity.** [Paper]
  Amgain, S.*, **Shrestha, P.***, Bano, S., Torres, I. D. V., ... & Bhattarai, B. In (*IPCAI Long Abstract*), 2024
- **Cross-modal Contrastive Learning with Asymmetric Co-attention Network for Video Moment Retrieval.** [Paper]
  Panta, L.*, **Shrestha, P.***, Sapkota, B., Bhattarai, A., Manandhar, S., & Sah, A. K. (*WACV Workshop on Pretraining*), 2024
- **Medical vision language pretraining: A survey.** [Paper]
  Shrestha, P.*, Amgain, S.*, Khanal, B., Linte, C. A., & Bhattarai, B. *arXiv preprint*, 2023

Research Experience

Research Assistant June 2023 - Present

Multimodal Learning Lab — Advisor: Dr. Binod Bhattarai *University of Aberdeen, UK & NAAMII*

- Actively contributing to research projects on **Federated Learning**, **Medical Imaging**, and **Multi-modal Learning**
- Developed a novel regularization method to improve robustness to **label noise in federated learning**, utilizing local neighbourhood of representations from pretrained SSL encoders (*Under Review*).
- Assisted team on developing a novel method for handling **missing modality in multimodal federated setting** with medical datasets using intra-modal retrieval.
- Assisted team on investigating the robustness of transformer-based architecture with different self-supervised pretraining approaches on **medical image classification with label noise**.
- Conducted an extensive **survey on medical vision language pretraining** approaches identifying current trends, available datasets, and challenges.
- Investigated the effectiveness of different federated learning approaches for OCT image classification.

NLP Research Intern Oct 2022 - April 2023

NAAMII — Advisor: Dr. Bishesh Khanal *Lalitpur, Nepal*

- Reviewed state of Nepali NLP literature in the domain of neural machine translation and anaphora resolution tasks
- Performed in-depth exploratory data analysis on publicly available datasets for Nepali machine translation, studying their features and limitations

Teaching Experience

Teaching Assistant Jan 2024

AI4Growth, Nepal

- Designed and conducted lab sessions on supervised learning and natural language processing.
- Guided students through capstone project on *Sentiment Analysis using BERT.*

Teaching Assistant May 2023

4th Annual AI School, Nepal

- Provided hands-on guidance and technical assistance in lab session on supervised learning.

Instructor December 2022

Software Fellowship, LOCUS 2023

- Prepared and delivered lecture on basics of Python programming.

Professional Service

Reviewer, Workshop on Data Engineering in Medical Imaging, MICCAI, 2024

Industry Experience

Machine Learning Engineer June 2023 - Present

BaseGTX, UK *part-time, Remote*

- Involved in the development of algorithms for retinal disease diagnosis.
- Working on analyzing and predicting disease-causing genetic variants using AI.

Awards and Achievements

Fellowship, NAAMII 4th Annual AI School Scholarship *2023*

Fellowship, Fusemachines AI Fellowship *2023*

Grant, RARA Labs *2023*

Financial assistance for Graduating Capstone Project research

Award, Second Runner up at SmartBots Coding Challenge *2023*

Involved development of an efficient game playing bot for a card game, competition involved 94 teams nationwide

Award, First Runner up at Global Coding Challenge(Rest Of the World Division) by Credit Suisse *2022*

Global Rank 26 out of 2000+ participants globally, involved providing efficient solutions to programming challenges

Award, First Runner up at OpenIMIS-DRG Datathon organized by CARD, IOE *2022*

Involved mapping Thai DRG and OpenIMIS database fields

Award and Scholarship, Ncell Academic Excellence Award by Ncell *2020*

Awarded for achieving highest scores for the freshmen year in the department

Scholarship, Received stipend each semester for securing top 24 position in class *2018-2023*

Scholarship, Golden Jubilee Scholarship by Indian Embassy for undergraduate studies *2018-2023*

Scholarship, Merit-based full tuition waiver in undergrad based on entrance exam ranking *2018-2023*

Selected Academic Projects

Natural Language Query Grounding in Video, — *Graduating Capstone Project* [PDF] *March 2023*

- Involved experimenting with different multi-modal transformer architectures to perform temporal localization in a video using a text query
- Built a web UI for visualization and inference using Flask.
- Improved results over baseline, published at WACV workshop on pretraining, 2024

Capture The Flag game using Multi-agent RL, — *Minor Capstone Project* [PDF] *March 2022*

- Involved developing multi-agent reinforcement learning algorithms to solve Capture the Flag game inside Unity's dodgeball environment
- Utilized a self-play variation of MADDPG for multi-agent training
- Designed curriculum to perform training in multiple stages.

Skills summary

Languages: C++, Python, C, SQL

Machine Learning: Multimodal Learning, Federated Learning, Computer Vision

Frameworks: Pytorch, Pandas, Numpy, Matplotlib, Scikit-Learn, Django

Tools: Git, Github, LaTex, WandB, NeptuneAI, Slurm