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SHUVENDU ROY

PhD Candidate

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Google Scholar

I'm a Ph.D. Candidate (AI) at Queen's University, Canada. My research focuses on Multi-modal Unsupervised Representation Learning and Downstream Adaptation with a focus on reducing the need for large labelled data. A summary of my profile is as follows: Published in top-tier conferences and journals (e.g. ICLR, AAAI, TMLR); skilled in Python and different machine learning libraries (Pytorch, Tensorflow); Experienced in deep learning methods and model designing, training, and deployment.

Expected graduation: Summer 2025.

RESEARCH & PROFESSIONAL EXPERIENCE

Borealis AI

Machine Learning Research Intern

Jan 2025 -

Toronto, ON, Canada

- Research area: Semi-supervised Learning.

Vector Institute for AI

Applied Machine Learning Intern

Jan 2024 - Dec 2024

Toronto, ON, Canada

- Research area: Multi-modal Self-supervised Learning.
- Working on building a multi-modal health foundation model.
- Research during the internship is published as the following papers:
 - Continual Learning of Foundation Model with Limited Labelled Data, **NeurIPS 2024 Workshop** on Scalable Continual Learning for Lifelong Foundation Models.
 - Benchmarking Vision-Language Contrastive Methods for Medical Representation Learning.
 - Few-shot Tuning of Foundation Models for Class-incremental Learning.

Google Research

Student Researcher

Summer — Fall 2023

Montreal, QC, Canada

- Research area: Self-supervised Learning and Continual Learning.
- Research focused on the quality-quantity tread off in unlabelled data for self-supervised learning. Developed a strategic sampling technique for unlabelled data that reduces training costs by up to 80% and improves performance by up to 2%. The application area focused on activity recognition from IMU.
- Worked on a research stream focused on the few-shot class incremental learning.
- Research during the internship is published as the following papers:
 - A Bag of Tricks for Few-shot Class Incremental Learning, **TMLR 2024**

Queen's University

Teaching Assistant

Jan 2022 — Present

Kinston, ON, Canada

- Artificial Intelligence, Winter 2022, 2023.
- Introduction to Programming, Fall 2022

Robi Axiata Limited

Applied ML Researcher

Nov 2019 — Jul 2021

Dhaka, Bangladesh

- Developed a recommender system of telecom packages based on the user purchase and consumption profile.
- Developed predictive models for custom churn prediction and usage drop prediction.

REVE System Ltd.

Jr. Software Engineer

Mar 2019 — Oct 2019

Dhaka, Bangladesh

- Research focused on the development of Bengali spell and grammar checkers and corrector models.
- Worked on domain-specific ChatBot.
- Research during the internship is published as the following papers:
 - Unsupervised Context-Sensitive Bengali Spelling Correction with Character N-gram, **IEEE ICCIT 2019**.

EDUCATION

Doctor of Philosophy (Ph.D.) in Artificial Intelligence

Queen's University

Jan 2022 — Present

Kinston, ON, Canada

- Research Area: Unsupervised visual representation learning and downstream adaptation.
- Thesis: Unsupervised Visual Representation Learning: Training, Downstream Adaptation and Continual Tuning

Master of Applied Science (MAsc) in Electrical and Computer Engineering

Queen's University

Sep 2020 — Dec 2021

Kinston, ON, Canada

- Thesis: Unsupervised visual representation learning.
- CGPA: 4.13/4.30
- Promoted to Ph.D.

Bachelor of Science (BSc) in Computer Science and Engineering

Khulna University of Engineering & Technology

Apr 2015 — Jan 2019

Khulna, Bangladesh

- Thesis: Facial emotion recognition using transfer learning in the deep CNN.
- CGPA: 3.26/4.00

SKILLS

Libraries and Technologies	PyTorch, Tensorflow, Keras, Scikit-learn, Matlab, Git, UNIX, Android, IOS, ASP.NET, Oracle, MySQL
Programming Language	Python, C, C++, Java, C#, R, JavaScript
Communication	English, Bengali
Problem Solving	500+ solved problem in online judges and 10+ competitions in Kaggle.

AWARDS AND SCHOLARSHIPS

1st price at IEEE Research Excellence Award (PhD)	Nov, 2024
Graduate Student Conference Award, Queens's University, Canada	July, 2023
Runners Up in 'System Development Project Competition', at Khulna University of Engineering & Technology	Feb, 2018
Vocational Scholarship from Khulna University of Engineering & Technology for Academic year 2014/15 and 2017/18	2015, 2018

PUBLICATIONS

1. Barys Liskavets, Maxim Ushakov, **Shuvendu Roy**, Mark Klibanov, Ali Etemad, Shane K. Luke, 'Prompt Compression with Context-Aware Sentence Encoding for Fast and Improved LLM Inference', AAAI Conference on Artificial Intelligence (AAAI 2025).
2. **Shuvendu Roy**, Ali Etemad, 'Consistency-guided Prompt Learning for Vision-Language Models', International Conference on Learning Representations (ICLR 2024).
3. **Shuvendu Roy**, Ali Etemad, 'Scaling Up Semi-supervised Learning with Unconstrained Unlabelled Data', AAAI Conference on Artificial Intelligence (AAAI 2024).
4. **Shuvendu Roy**, Chunjong Park, Aldi Fahrezi, Ali Etemad, 'A Bag of Tricks for Few-Shot Class-Incremental Learning', Transactions on Machine Learning Research (TMLR), 2024.
5. **Shuvendu Roy**, Ali Etemad, 'Exploring the Boundaries of Semi-Supervised Facial Expression Recognition: Learning from In-Distribution, Out-of-Distribution, and Unconstrained Data', IEEE Transactions on Affective Computing (IEEE TAFFC), 2024. (Invited paper/ ACII'22).
6. **Shuvendu Roy**, Ali Etemad, 'Leveraging Self Weak-supervision for Improved VLM Performance', **NeurIPS Workshop** on Adaptive Foundation Models, 2024.
7. **Shuvendu Roy**, Elham Dolatabadi, Arash Afkanpour, Ali Etemad, 'Continual Learning of Foundation Models with Limited Labelled Data', **NeurIPS Workshop** on Scalable Continual Learning for Lifelong Foundation, 2024.
8. **Shuvendu Roy**, Ali Etemad, 'Impact of Labelled Set Selection and Supervision Policies on Semi-supervised Learning', IEEE Transactions on Emerging Topics in Computational Intelligence (IEEE TETCI), 2024.
9. **Shuvendu Roy**, Elham Dolatabadi, Arash Afkanpour, Ali Etemad, 'Few-shot Tuning of Foundation Models for Class-incremental Learning', arXiv preprint arXiv:2405.16625.
10. **Shuvendu Roy**, Yasaman Parhizkar, Franklin Ogidi, Vahid Reza Khazaie, Michael Colacci, Ali Etemad, Elham Dolatabadi, Arash Afkanpour, 'Benchmarking Vision-Language Contrastive Methods for Medical Representation Learning', arXiv preprint arXiv:2406.07450.
11. **Shuvendu Roy**, Ali Etemad, 'Learning Through Consistency for Prompt Tuning', **NeurIPS Workshop** on Robustness of Zero/Few-shot Learning in Foundation Models (R0-FoMo), 2023. (Spotlight)
12. **Shuvendu Roy**, Ali Etemad, 'Does Unconstrained Unlabeled Data Help Semi-Supervised Learning?', **NeurIPS Workshop** on Self-Supervised Learning - Theory and Practice, 2023.
13. **Shuvendu Roy**, Ali Etemad, 'Contrastive Learning of View-Invariant Representations for Facial Expressions Recognition', **ACM Transactions** on Multimedia Computing, Communications, and Applications, 2023.
14. **Shuvendu Roy**, Ali Etemad, 'Temporal Contrastive Learning with Curriculum', IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2023).
15. **Shuvendu Roy**, Ali Etemad, 'Active Learning with Contrastive Pre-training for Facial Expression Recognition', 11th International Conference on Affective Computing and Intelligent Interaction (ACII 2023).
16. **Shuvendu Roy**, Ali Etemad, 'Analysis of Semi-Supervised Methods for Facial Expression Recognition', 10th International Conference on Affective Computing and Intelligent Interaction (ACII 2022).
17. **Shuvendu Roy**, Ali Etemad, 'View-Invariant Compact Contrastive Learning for Facial Expression Recognition', **AAAI'22 Workshop** on Human-Centric Self-Supervised Learning, 2022.
18. **Shuvendu Roy**, Ali Etemad, 'Self-supervised Contrastive Learning of Multi-view Facial Expressions', 23rd ACM International Conference on Multimodal Interaction (ICMI 2021).
19. **Shuvendu Roy**, Ali Etemad, 'Spatiotemporal Contrastive Learning of Facial Expressions in Videos', 9th International Conference on Affective Computing and Intelligent Interaction (ACII 2021).

20. M. A. H. Akhand, **Shuvendu Roy**, N. Siddique and T. Shimamura, 'Facial Emotion Recognition Using Transfer Learning in the Deep CNN', **Electronics** 10 (9), 2021.
21. M. A. H. Akhand, Md. Iraj Sayim, **Shuvendu Roy** and N. Siddique, 'Human Age Prediction from Facial Image using Transfer Learning in Deep Convolutional Neural Network', in International Joint Conference on Computational Intelligence (IJCCI), pp.217-229, **Springer**, 2020.
22. **Shuvendu Roy**, 'Island Loss for Improving the Classification of Facial Attributes with Transfer Learning on Deep Convolutional Neural Network', International Journal of Image, Graphics and Signal Processing (**IJIGSP**), Vol.12, No.1, pp. 18-29, 2020.
23. Sneha Paul and **Shuvendu Roy**, 'Forecasting The Average Temperature Rise In Bangladesh: A Time Series Analysis', **Journal of Engineering Science** 11(1), 83-91, 2020.
24. **Shuvendu Roy** and Ferdous Bin Ali, 'Unsupervised Context-Sensitive Bengali Spelling Correction with Character N-gram' in 22nd International Conference on Computer and Information Technology (ICCIT-2019), **IEEE**, 2019.
25. **Shuvendu Roy** and Md. Sakif Rahman, 'Emergency Vehicle Detection on Heavy Traffic Road from CCTV Footage Using Deep Neural Network', 2nd International Conference on Electrical, Computer and Communication Engineering (ECCE), **IEEE**, 2019.
26. **Shuvendu Roy**, 'Generating Anime from Real Human Image with Adversarial Training', International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT-2019), **IEEE**, 2019.
27. **Shuvendu Roy**, 'Improved Bangla Language Modeling with Convolution', International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT-2019), **IEEE**, 2019.
28. **Shuvendu Roy**, 'Denoising Sequence-to-Sequence modeling for removing spelling mistakes', International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT-2019), **IEEE**, 2019.
29. **Shuvendu Roy** and Sneha Paul, 'Land-Use Detection Using Residual Convolutional Neural Network', International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT-2019), **IEEE**, 2019.
30. **Shuvendu Roy**, Md. Iraj Sayim and M. A. H. Akhand 'Pathological Voice Classification Using Deep Learning', International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT-2019), **IEEE**, 2019.
31. **Shuvendu Roy**, M. A. H. Akhand and N. Siddique, 'Synthesis of Facial Image using Conditional Generative Adversarial Network', in 5th International Conference on Computer, Communication, Chemical, Materials and Electronic Engineering, **IEEE**, 2019.
32. **Shuvendu Roy**, 'Applying Aging Effect on Facial Image with Multi-domain Generative Adversarial Network', International Journal of Image, Graphics and Signal Processing (**IJIGSP**), Vol.11, No.12, pp. 14-22, 2019.
33. **Shuvendu Roy**, Sk. Imran Hossain, M. A. H. Akhand and N. Siddique, 'Sequence Modeling for Intelligent Typing Assistant with Bangla and English Keyboard', International Conference on Innovation in Engineering and Technology (ICIET), **IEEE**, 2018.

ACADEMIC SERVICES

Reviewer

- International Conference on Learning Representations (ICLR-2025)
- Neural Information Processing Systems (NeurIPS-24)
- AAAI Conference on Artificial Intelligence (AAAI-23, AAAI-24)
- Conference on Computer Vision and Pattern Recognition (CVPR-23, CVPR-24)
- European Conference on Computer Vision (ECCV-22, ECCV-24)
- International Conference on Computer Vision (ICCV-23)
- IEEE Transactions on Affective Computing (TAFFC)
- IEEE Transactions on Artificial Intelligence (TAI)

ENGINEERING PROJECTS

- **Intelligent Bengali Typing Assistant** - [GitHub](#)
A language model base intelligent typing assistant system for Bengali. It suggests words and sentences while typing.
 - **Blood-Bank (Android)** - [GitHub](#)
An android application that helps to find the nearest blood donor.
 - **Bangla Programming language (B)** - [GitHub](#)
Interpreted Bengali programming language (B). C-like syntax. The language and the editor are built with python.
 - **Self Driving Car** - [GitHub](#)
Small-scale simulated training of a self-driving car.
 - **Coin-Collector (Game)** - [GitHub](#)
A game project developed with Unity. Finite time runner game to maximize points with speed busters and obstacles.
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