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# SHUVENDU ROY

## PhD Candidate

shuvenduroy.github.io  
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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

### Vector Institute for AI

*Applied Machine Learning Intern*

**Jan 2024 - Present**

*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:
  - 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

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

## AWARDS AND SCHOLARSHIPS

Graduate Student Conference Travel 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. **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.
2. **Shuvendu Roy**, Ali Etemad, 'Leveraging Self Weak-supervision for Improved VLM Performance', **NeurIPS Workshop** on Adaptive Foundation Models, 2024.
3. **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.
4. **Shuvendu Roy**, Ali Etemad, 'Consistency-guided Prompt Learning for Vision-Language Models', International Conference on Learning Representations (**ICLR-24**).
5. **Shuvendu Roy**, Ali Etemad, 'Scaling Up Semi-supervised Learning with Unconstrained Unlabelled Data', AAAI Conference on Artificial Intelligence (**AAAI-24**).
6. **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.
7. **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 TAFCC**), 2024. (**Invited paper/ ACII'22**).
8. **Shuvendu Roy**, Elham Dolatabadi, Arash Afkanpour, Ali Etemad, 'Few-shot Tuning of Foundation Models for Class-incremental Learning', arXiv preprint arXiv:2405.16625.
9. 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', arXiv preprint arXiv: 2409.01227.
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.

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## 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)

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## 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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