

Subhankar Roy, PhD.

Post-doctoral researcher

Department of Information Engineering and Computer
Science
University of Trento, Italy
Via Sommarive 9, Povo, TN, Italy

Email: subhankar.roy@unitn.it
Phone: + 39 3288778930
[Personal webpage](#)
[Google scholar](#)

EDUCATION

PhD.	University of Trento, Italy <i>Discipline:</i> Information and Communication Technology <i>Thesis:</i> "Learning to Adapt Neural Networks Across Visual Domains" <i>Grade:</i> with distinction <i>Advisors:</i> Prof. Elisa Ricci and Prof. Nicu Sebe	Nov 2018 - Sept 2022
M.Sc	University of Trento, Italy <i>Discipline:</i> Telecommunications Engineering <i>Thesis:</i> "Image Classification and Retrieval in Scarcely Annotated Remote Sensing Archives using Deep Learning" <i>Grade:</i> 110/110 <i>Advisors:</i> Prof. Begum Demir and Prof. Nicu Sebe	Sept 2015 - Mar 2018
B.Tech	West Bengal University of Technology, Kolkata, India <i>Discipline:</i> Electrical Engineering <i>Thesis:</i> Energy saving light dimmer circuits <i>Grade:</i> 8.79/10	Aug 2009 - May 2013

RESEARCH INTERESTS

The primary goal of my research is to investigate the safety of foundation models and design Safe AI algorithms that make foundation models robust, privacy preserving, aligned with human values, and not rely on expensive human annotations or interventions. In particular, I am interested in the following topics:

- Robustness of neural networks
- Continual learning
- Multimodal learning
- Open-world recognition
- Novel class discovery
- Machine unlearning

RESEARCH EXPERIENCE

Post-doctoral researcher

May 2024 - Present

Department of Information Engineering and Computer Science, University of Trento, Italy

Advisor: Prof. Elisa Ricci

- Have contributed to two projects that deal with how to efficiently fine-tune foundation models in a continual manner and that are distributed across client devices
- Have contributed to two machine unlearning projects that investigate their effectiveness when training data is absent and how machine unlearning impacts group fairness
- Have contributed to a project that investigates the potential of black-box open-vocabulary models, available as API, for the task of semantic segmentation
- Prepared and submitted five conference manuscripts and one journal manuscript

Lecturer

Sept 2023 - Mar 2024

School of Computing Science, University of Aberdeen, UK

- Have supervised a project on the use of synthetic data from generative models for improving the generalization of segmentation models to unseen domains
- Have supervised a project on the effectiveness of weight-averaging in continual learning
- Have supervised a project on eliminating expert annotations that is commonly needed for fine-grained visual classification through the interaction of vision-language and large language models
- Prepared and submitted four conference manuscripts

Post-doctoral researcher

Feb 2023 - Aug 2023

Department of Image Data and Signal, Telecom Paris, France

Advisor: Dr. Stephane Lathuiliere

- Have contributed to two projects on domain adaptation for semantic segmentation, both dealing with the use of augmented and synthetic data
- Have contributed to a project on parameter efficient fine-tuning of pre-trained foundation models for addressing domain shift in action recognition
- Prepared and submitted two conference and two workshop manuscripts

Graduate researcher

Nov 2022 - Jan 2023

Fondazione Bruno Kessler, Italy

- Have contributed to a research project, where the goal was to build a system, as a proof of concept for the EU project PROTector, that can not only classify known actions in videos but also actions that are out-of-distribution
- Prepared and submitted one conference manuscript

Research intern

Mar 2022 - Sept 2022

Naver Labs Europe, Grenoble, France

Advisor: Dr. Riccardo Volpi

- Have led a project on weakly supervised incremental semantic segmentation by exploiting semantic relationships between classes of the past and current tasks
- Prepared and submitted one conference manuscript and one patent

Research intern

Sept 2021 - Nov 2021

Department of Computer Science, Aalto University, Finland

Advisor: Dr. Arno Solin

- Have led a research project on uncertainty quantification of neural networks for unsupervised domain adaptation setting. I employed Laplace approximation to estimate the uncertainty of a pre-trained source model on the unlabelled target data, which was used for downweighting the influence of target data points during target adaptation
- Prepared and submitted one conference manuscript

PhD candidate

Oct 2018 - Sept 2022

Department of Information Engineering and Computer Science, University of Trento, Italy

Advisor: Prof. Elisa Ricci and Prof. Nicu Sebe

- I have led several projects on mainly two main research directions - unsupervised domain adaptation and novel class discovery
- I have designed and developed domain adaptation methods that were based on distribution alignment, synthetic data generation, and co-teaching techniques
- I have designed and developed novel class discovery methods using self-supervised techniques and those that learn continually over time
- I have worked on an interdisciplinary and collaborative project on using weakly-supervised localization technique for scoring lung ultrasound imagery
- Prepared and submitted more than 10 conference manuscripts and journals

TEACHING EXPERIENCE

Lecturer

Sept 2023 - Mar 2024

School of Computing Science, University of Aberdeen, UK

Courses: Modelling and Problem Solving for Computing; and Advanced Programming

- Shared teaching responsibilities with another instructor, together we developed the course content, and graded assessments for a class of 100+ and 40+ students (Lectured for 50% of the classroom lessons (20 contact hours for each course))
- Developed contents for practical sessions from scratch
- Interacted with students during office hours and supervised course projects

Teaching assistant

2019/2020 A.Y.

Department of Information Engineering and Computer Science, University of Trento, Italy

Course: Deep Learning

- Developed hands-on programming assignments in Pytorch and led practical sessions in a class of 100+ students
- Supervised final course projects; and graded assessments and course projects

GRANT WRITING EXPERIENCE

EUREGIO Mobility Fund

June 2024

Role: Principal investigator (PI). *Amount awarded:* 7200 EUR

- Main contributor to the proposal that promotes exchange of researchers in the Euregio institutions (University of Trento, University of Bolzano and University of Innsbruck)

- A part of the funds will also help organizing VISMAL, an ELLIS Winter School on Foundation models in January 2025

India-Italy Bilateral Call 2025-2027

July 2024

Role: Co-investigator (Co-I). *Status*: under review

- Main contributor to the proposal that will facilitate exchange of researchers between University of Trento, Italy and Indian Institute of Technology, Bombay, India
- Main focus of the research exchange is to design and develop data and compute efficient and lifelong personalization techniques for large-scale foundation models, and thus driving the deployment of foundation models

Horizon Europe 2024

Sept 2024

Role: Co-investigator (Co-I). *Status*: unsuccessful

- Have contributed to a HORIZON Europe proposal on AI-assisted cooperative perception for safe autonomous driving, which involved a consortium of 13 partner institutions
- Have contributed in the proposal by writing three sub-tasks in a work package that was related to using deep learning techniques for robust and data efficient perception

PUBLICATIONS: Peer reviewed conferences and journals

[1] Liu, Mingxuan, Subhankar Roy, Zhun Zhong, Nicu Sebe, and Elisa Ricci. "Large-scale pre-trained models are surprisingly strong in incremental novel class discovery." In *International Conference on Pattern Recognition (ICPR)*, pp. 126-142. Cham: Springer Nature Switzerland, 2024.

[2] De Min, Thomas, Massimiliano Mancini, Stéphane Lathuilière, Subhankar Roy, and Elisa Ricci. "Less is more: Summarizing Patch Tokens for efficient Multi-Label Class-Incremental Learning." In *Conference on Lifelong Learning Agents (CoLLAs)*, 2024.

[3] Zara, Giacomo, Victor Guilherme Turrise da Costa, Subhankar Roy, Paolo Rota, and Elisa Ricci. "Simplifying open-set video domain adaptation with contrastive learning." In *Computer Vision and Image Understanding (CVIU)* 241 (2024): 103953.

[4] Liu, Mingxuan, Subhankar Roy, Wenjing Li, Zhun Zhong, Nicu Sebe, and Elisa Ricci. "Democratizing fine-grained visual recognition with large language models." In *International Conference on Learning Representations (ICLR)*, 2024.

[5] Benigmim, Yasser, Subhankar Roy, Slim Essid, Vicky Kalogeiton, and Stéphane Lathuilière. "Collaborating Foundation models for Domain Generalized Semantic Segmentation." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 3108-3119. 2024.

[6] Marouf, Imad Eddine, Subhankar Roy, Enzo Tartaglione, and Stéphane Lathuilière. "Weighted ensemble models are strong continual learners." In *European Conference on Computer Vision (ECCV)*, pp. 306-324. Springer, Cham, 2024.

[7] Roy, Subhankar, Riccardo Volpi, Gabriela Csurka, and Diane Larlus. "Rasp: Relation-aware semantic prior for weakly supervised incremental segmentation." In *Conference on Lifelong Learning Agents (CoLLAs)*, 2023

- [8] Zara, Giacomo, Subhankar Roy, Paolo Rota, and Elisa Ricci. "AutoLabel: CLIP-based framework for open-set video domain adaptation." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 11504-11513. 2023.
- [9] Zara, Giacomo, Alessandro Conti, Subhankar Roy, Stéphane Lathuilière, Paolo Rota, and Elisa Ricci. "The unreasonable effectiveness of large language-vision models for source-free video domain adaptation." In *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, pp. 10307-10317. 2023.
- [10] Benigmim, Yasser, Subhankar Roy, Slim Essid, Vicky Kalogeiton, and Stéphane Lathuilière. "One-shot unsupervised domain adaptation with personalized diffusion models." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (CVPRW)*, pp. 698-708. 2023.
- [11] Li, Tianyu, Subhankar Roy, Huayi Zhou, Hongtao Lu, and Stéphane Lathuilière. "Contrast, stylize and adapt: Unsupervised contrastive learning framework for domain adaptive semantic segmentation." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (CVPRW)*, pp. 4869-4879. 2023.
- [12] Zhang, Yangsong, Subhankar Roy, Hongtao Lu, Elisa Ricci, and Stéphane Lathuilière. "Cooperative self-training for multi-target adaptive semantic segmentation." In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, pp. 5604-5613. 2023.
- [13] Roy, Subhankar, Martin Trapp, Andrea Pilzer, Juho Kannala, Nicu Sebe, Elisa Ricci, and Arno Solin. "Uncertainty-guided source-free domain adaptation." In *European Conference on Computer Vision (ECCV)*, pp. 537-555. Cham: Springer Nature Switzerland, 2022.
- [14] Roy, Subhankar, Mingxuan Liu, Zhun Zhong, Nicu Sebe, and Elisa Ricci. "Class-incremental novel class discovery." In *European Conference on Computer Vision (ECCV)*, pp. 317-333. Cham: Springer Nature Switzerland, 2022.
- [15] Roy, Subhankar, Evgeny Krivosheev, Zhun Zhong, Nicu Sebe, and Elisa Ricci. "Curriculum graph co-teaching for multi-target domain adaptation." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 5351-5360. 2021.
- [16] Zhong, Zhun, Enrico Fini, Subhankar Roy, Zhiming Luo, Elisa Ricci, and Nicu Sebe. "Neighborhood contrastive learning for novel class discovery." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 10867-10875. 2021.
- [17] Roy, Subhankar, Aliaksandr Siarohin, Enver Sangineto, Nicu Sebe, and Elisa Ricci. "Trigan: Image-to-image translation for multi-source domain adaptation." In *Machine vision and applications (MVA)* 32 (2021): 1-12.
- [18] Roy, Subhankar, Willi Menapace, Sebastiaan Oei, Ben Luijten, Enrico Fini, Cristiano Saltori, Iris Huijben et al. "Deep learning for classification and localization of COVID-19 markers in point-of-care lung ultrasound." *IEEE Transactions on Medical Imaging (TMI)* 39, no. 8 (2020): 2676-2687.

- [19] Siarohin, Aliaksandr, Subhankar Roy, Stéphane Lathuilière, Sergey Tulyakov, Elisa Ricci, and Nicu Sebe. "Motion-supervised co-part segmentation." In 2020 25th *International Conference on Pattern Recognition (ICPR)*, pp. 9650-9657. IEEE, 2021.
- [20] Roy, Subhankar, Aliaksandr Siarohin, and Nicu Sebe. "Unsupervised domain adaptation using full-feature whitening and colouring." In the *International Conference on Image Analysis and Processing (ICIAP)*. Springer International Publishing, 2019.
- [21] Saltori, Cristiano, Subhankar Roy, Nicu Sebe, and Giovanni Iacca. "Regularized evolutionary algorithm for dynamic neural topology search." In the *International Conference on Image Analysis and Processing (ICIAP)*. Springer International Publishing, 2019.
- [22] Roy, Subhankar, Enver Sangineto, Begüm Demir, and Nicu Sebe. "Metric-learning-based deep hashing network for content-based retrieval of remote sensing images." *IEEE Geoscience and Remote Sensing Letters (GRSL)* 18, no. 2 (2020): 226-230.
- [23] Roy, Subhankar, Aliaksandr Siarohin, Enver Sangineto, Samuel Rota Bulo, Nicu Sebe, and Elisa Ricci. "Unsupervised domain adaptation using feature-whitening and consensus loss." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 9471-9480. 2019.
- [24] Roy, Subhankar, Enver Sangineto, Nicu Sebe, and Begüm Demir. "Semantic-fusion gans for semi-supervised satellite image classification." In 2018 25th *IEEE International Conference on Image Processing (ICIP)*, pp. 684-688. IEEE, 2018.
- [25] Roy, Subhankar, Enver Sangineto, Begüm Demir, and Nicu Sebe. "Deep metric and hash-code learning for content-based retrieval of remote sensing images." In *IGARSS 2018-2018 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 4539-4542. IEEE, 2018.

OTHER PUBLICATIONS: Manuscripts in progress and under review

- [1] De Min, Thomas, Subhankar Roy, Massimiliano Mancini, Stéphane Lathuilière, and Elisa Ricci. "One-Shot Unlearning of Personal Identities." arXiv preprint arXiv:2407.12069 (2024).
- [2] Liu, Mingxuan, Zhun Zhong, Jun Li, Gianni Franchi, Subhankar Roy, and Elisa Ricci. "Organizing Unstructured Image Collections using Natural Language." arXiv preprint arXiv:2410.05217 (2024).
- [3] Yasser Benigmim, Imad Eddine MAROUF, Subhankar Roy, Slim Essid, Vicky Kalogeiton, Stéphane Lathuilière. "Make me an Expert: Distilling from Generalist Black-Box Models for Semantic Segmentation", 2024.
- [4] Thomas De Min, Subhankar Roy, Stéphane Lathuilière, Elisa Ricci, Massimiliano Mancini. "Group-robust Machine Unlearning", 2024.
- [5] Mainak Singha, Subhankar Roy, Sarthak Mehrotra, Ankit Jha, Moloud Abdar, Biplab Banerjee, Elisa Ricci. "FedMVP: Federated Multi-modal Visual Prompt Tuning of Vision-Language Models", 2024.

[6] Marouf, Imad Eddine, Subhankar Roy, Enzo Tartaglione, and Stéphane Lathuilière. "Rethinking Class-incremental Learning in the Era of Large Pre-trained Models via Test-Time Adaptation." arXiv preprint arXiv:2310.11482 (2023).

INVITED TALKS

- *Venue*: University of Trieste. *Title*: "Continual Transfer Learning in the era of Large Pre-trained Models." May, 2024

PRESENTATIONS AT CONFERENCES AND WORKSHOPS

Oral presentations

- ICPR 2024

Poster presentations

- IGARSS 2018, CVPR 2019, ICIAP 2019, ECCV 2022, CVPR 2023, ICCV 2023, ICLR 2024, ECCV 2024

Virtual presentations

- ICPR 2020, CVPR 2021

PROFESSIONAL SERVICES

Conferences

- Area Chair of CVPR 2025, BMVC 2024, ECCV 2024
- Reviewer of WACV 2025, ICPR 2024, CVPR 2024, ICCV 2023, WACV 2023, ECML 2023

Journals

- Reviewer of International Journal of Computer Vision (IJCV), IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), IEEE Transactions on Multimedia (TMM), Computer Vision and Image Understanding (CVIU)

Editor

- Guest editor of CVIU special issue on Trustworthy Cross-Modal Reasoning for Video-Language Understanding

Workshop organization

- Organizer of Green Foundation Models Workshop at ECCV 2024

AWARDS AND SCHOLARSHIPS

Conference awards

- *Best student paper honourable mention* (2019) at International Conference on Image Analysis and Processing for the paper "Regularized evolutionary algorithm for dynamic neural topology search."

Merit awards

- *Ph.D. Scholarship* (2018) from University of Trento, Italy
- *Annual Merit Award* (2018) from University of Trento, Italy for being one of the top performers of the Master's degree
- *Opera Universitaria Scholarship* (2015) for topping the merit list for admission to the Masters program

SKILLS

Programming languages

- Python (Excellent), Matlab (Proficient), Java (Familiar), C++ (Familiar), C (Familiar)

Libraries

- PyTorch (Excellent), Lightning (Proficient), Tensorflow (Familiar)

LANGUAGES

- English (Professional proficiency)
- Bengali (Native proficiency)
- Hindi (Native proficiency)
- Italian (Basic proficiency)

REFERENCES

Prof. Elisa Ricci

Professor at Department of Information Engineering and Computer Science
University of Trento, Italy
Via Sommarive 9, Povo, TN, Italy
Contact email: e.ricci@unitn.it

Prof. Nicu Sebe

Professor at Department of Information Engineering and Computer Science
University of Trento, Italy
Via Sommarive 9, Povo, TN, Italy
Contact email: niculae.sebe@unitn.it

Dr. Stéphane Lathuilière

Research Scientist at Inria, Grenoble.
655 Av. de l'Europe, 38330 Montbonnot-Saint-Martin
Contact email: stephane.lathuiliere@inria.fr