Rajesh Titung

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Ph.D. candidate specializing in NLP and AI with three years of industry experience as a machine learning engineer. Focused on advancing machine learning for human behavior modeling. Seeking a role to drive innovation in AI and multimodal interaction.

Education

Ph.D. in Computing and Information Sciences 2021 – Present
Rochester Institute of Technology *Rochester, NY, USA*

- **Advisor**: Professor Cecilia O. Alm
- **Research Group**: Computational Linguistics and Speech Processing Lab
- **Select Courses:** NLP I, Statistical Machine Learning, Deep Learning, Bio-inspired Intelligent Systems, Human Factors in AI, Fundamentals of HCI, System Modeling and Optimization, Graduate Speech Processing
- **CGPA**: 3.94

Bachelor in Computer Engineering 2013 – 2017
Pulchowk Campus, Institute of Engineering, Tribhuvan University *Lalitpur, Nepal*

Research Experience

Graduate Research Assistant August 2021 – Present
Computational Linguistics and Speech Processing Lab, RIT *Rochester, NY, USA*

- Exploring federated learning and interactive machine learning to enhance the personalization and generalization of behavioral models representing highly diverse, multimodal human expressive behaviors and perceptions. Developed a **personalized federated learning** strategy for heterogeneous affective data modeling individual and dyadic alignment patterns.
- Investigating resource-efficient interactive learning methods for affective computing, including active learning and machine teaching, and proposed a dual-objective **federated active learning (FAL)** framework balancing personalization and generalization via tunable client-server trade-offs.
- Developing methods for fine-grained **synchrony modeling** in multi-party affective interactions and integrated synchrony metrics into transformer-based temporal affect recognition models to improve personalization within single-model architectures.
- Formulated an **agent-agreement taxonomy** to guide decision-making between personalization and generalization in affect modeling by linking inter- and intra-annotator agreement patterns to modeling principles.
- Investigated the benefits and trade-offs of **interactive machine learning** approaches, including active learning and machine teaching.
- Conducted multimodal data collection experiments using task-based spoken interactions to capture emotion expressions such as surprise, confusion, and frustration, focusing on both monadic and dyadic settings. Developed **FUSE** (FrUstration and Surprise Expressions), a novel multimodal corpus with rich annotations and emotion inference baselines for studying subtle affective behavior.
- Co-mentored multiple undergraduate and master's students in the CLaSP Lab, including mentorship leading to peer-reviewed co-authored publications.

Visiting Ph.D. Student Researcher October 2023 – November 2023
ML-Labs, SFI Center for Research Training in Machine Learning *Dublin, Ireland*

- Conducted research and published a journal article as first co-author with collaborators at University College Dublin (UCD).
- Leveraged LLMs to investigate vulnerabilities in phishing emails motivated by theories of affect.

Graduate Research Assistant May – July 2022
NSF REU Site in Computational Sensing for Human-centered AI *Rochester, NY, US*

- Co-mentored 10 undergraduate students from different universities in team-based research projects
- Held a daily technical office hour
- Organized a Mentor Café event enabling interactions with Ph.D. students
- Provided individual support to students such as academic writing in LaTeX, system setup, human subject data collection, sensor use
- Conducted a sensor demo session on sensors and the iMotions software

Teaching Experience

Graduate Teaching Assistant (Graduate Level) Fall 2025
Computational Geometry CSCI 716, RIT *Rochester, NY, USA*

- Grading reading and programming assignments
- Held office hours to support students

Graduate Teaching Assistant (Graduate Level) Spring 2025, 2026
Capstone Project IDAI 780, RIT *Rochester, NY, USA*

- Conducted a hands-on tutorial on how to use GPU clusters for AI graduate students.
- Supported capstone poster website content management.
- Held TA office hours to assist students with their MS capstone projects.
- Supported the instructor.

Graduate Teaching Assistant (Graduate Level) Fall 2023, 2024
Foundations of Artificial Intelligence IDAI 610, RIT *Rochester, NY, USA*

- Created video tutorials on transfer learning, large multimodal models (LMMs), large language models (LLMs), and fine-tuning techniques for LLMs.
- Graded and supported the development of new technical problem sets and reading assignments (written critiques of published research papers), including class-based shared task competitions.
- Held TA office hours and created quiz questions.

Teaching Assistant (Graduate Level) Fall 2022
Natural Language Processing I, RIT *Rochester, NY, US*

- Developed a shared tasks group assignment/competition with three NLP sub-tasks and data.
- Graded problem sets and reading assignments
- Held TA office hours

Professional Experience

Machine Learning Engineer July 2018 – July 2021
Fusemachines Nepal *Kathmandu, Nepal*

- Led a team on Zendesk-based automated reply system
- Co-led a team on an information retrieval system for a construction project leads and analytic company
- Curated NLP, RL, and CS course materials for Fusemachines Nanodegree

Publications

1. **Rajesh Titung** and Cecilia O. Alm. Competing Objectives: Personalization and Generalization in Human Behavioral Modeling. Manuscript submitted and under review.

2. **Rajesh Titung** and Cecilia O. Alm. 2026. Personalized Federated Learning for Session-based Affective Interaction Modeling. IEEE Transactions on Affective Computing, accepted for publication.

3. Faithful Chiagoziem Onwuegbuche*, **Rajesh Titung***, Esa Rantanen, Anca Delia Jurcut, Cecilia O. Alm and Liliana Pasquale. 2025. Securing the Weakest Link: Exploring Psychological Vulnerabilities in Phishing Emails with LLMs. IEEE Access, vol. 13, 2025, pp. 173460–173486. (* = equal contribution)

4. **Rajesh Titung** and Cecilia O. Alm. 2024. FUSE - FrUstration and Surprise Expressions: A Subtle Emotional Multimodal Language Corpus. In Proceedings of the 2024 Joint International Conference on Computational Linguistics, Language Resources and Evaluation (LREC-COLING 2024), pages 7544–7555, Torino, Italia. ELRA and ICCL.

5. Isabelle Arthur#, Jordan Quinn#, **Rajesh Titung**, Cecilia O. Alm, and Reynold Bailey. 2023. MDE - Multimodal Data Explorer for Flexible Visualization of Multiple Data Streams. (Demo). ACII 2023: 11^{th} International Conference on Affective Computing and Intelligent Interaction Workshops and Demos (ACIIW). (#=undergradaute student mentee)

6. Cecilia O. Alm, **Rajesh Titung**, and Reynold Bailey. 2023. Pandemic Impacts on Assessment of Undergraduate Research. (poster). SIGCSE 2023: Proceedings of the 54^{th} ACM Technical Symposium on Computer Science Education.

7. **Rajesh Titung**. 2022. Interactive Machine Learning for Multimodal Affective Computing. In Proceedings of the Doctoral Consortium of 10^{th} International Conference on Affective Computing and Intelligent Interaction (ACII 2022).

8. **Rajesh Titung** and Cecilia O. Alm. 2022. Teaching interactively to learn emotions in natural language. In Proceedings of the Second Workshop on Bridging Human–Computer Interaction and Natural Language Processing, pages 40–46, Seattle, Washington. Association for Computational Linguistics.

Extended Abstract without Proceedings

1. Cecilia O. Alm and **Rajesh Titung**. 2022. Engaging human interactions to learn emotions. EmoCHI'22.

Other Poster Presentation

1. "Teaching Interactively to Learn Emotions in Natural Language", AI@RIT Summit. Rochester Institute of Technology, Rochester, NY, October 2022.

Mentorship and Supervision

Mentored BS and MS students, providing guidance on research design, experimentation, and academic writing.

- Ajay Gopi, Parth Kapur, and Shubh Sehgal, RIT MS in Artificial Intelligence: Coordinating scope and functionality of the team's development of collaborative interpretability software development.
- Pavan Kumar Bellam, RIT MS in Artificial Intelligence: Co-supervised on task design, documentation, and research documentation.
- Ketaki Tilak, RIT MS in Computer Science: Co-supervised her final year capstone project on study of detecting linguistic signals of surprise and frustration in speech data.
- Isabelle Arthur and Jordan Quinn, RIT BS in Computer Science: Co-supervised development of multimodal visualization platform.
- Co-mentored 10 undergraduate students during the NSF REU Site program, supporting project development, LaTeX writing, system setup, data collection, and sensor use.

Recognitions/Awards

AWARE-AI NSF Research Traineeship (NRT) program Spring 2022 - present
- Trainee in the AWARE-AI NSF Research Traineeship (NRT) program.
- Participating in the Human sensing-AI Software Research Track led by Dr. Reynold Bailey

Fusemachines AI Fellowship 2017
- Selected into a competitive fellowship program by Fusemachines Nepal (an AI-based company in Nepal).

Pulchowk Campus Achievements 2013–2017
- College Fellowship Scholarship in each semester
- Selected for an internship at E&T Nepal Pvt. Ltd. for a program of the company in collaboration with TU

St. Xavier's Partial Scholarship 2013
- Provided to around 18 students annually

Invited Talks

- Advanced PhD Student Talk, Center for Human-aware AI Seminar Series (Spring 2025)
- Speaker, RIT AI Club (Spring 2025)

Service

- Assistant co-manager, Computational Linguistics and Speech Processing Lab (2025)
- Technical Program Committee, IEEE EmotionSense 2026 Workshop - PerCom 2026
- Reviewer, Association for the Advancement of Artificial Intelligence, AAAI 2026
- Publicity Chair, HCCS Workshop at IEEE PerCom (2024, 2025)
- Reviewer, International Symposium on Mixed and Augmented Reality, ISMAR 2024
- Exhibitor, Imagine RIT (2022, 2023), Rochester Institute of Technology, USA
- Organizer at ML Workshop, IT Meet 2020, Kathmandu University, Nepal
- Organizer at Yomari Code Camp, Locus 2017, Pulchowk Campus, Nepal

Technical Skills

Programming Languages: Python, Matlab, Java, C/C++, SQL (Postgres), MongoDB
Libraries: PyTorch, Transformers, PEFT, Tensorflow, Keras, OpenAI Gym, NLTK, spaCy, Scikit-learn, Flower
Tools: Jupyter Notebook, conda, pipenv, cookiecutter, Flask
Developer Tools: Git, Docker, Atom, AWS, Jira
Hardware/Sensory Equipment: Pupil Labs Pupil Core Eye tracker, SMI screen-based eye tracker, Tascam audio/speech recorders, GSR Shimmer3 wearable sensors
Other Software: iMotions, Praat, DaVinci Resolve
Languages: English, Nepali, Tamang, Hindi

Additional Online Courses and Certifications

Deep Reinforcement Learning Nanodegree July 2020
- Basics of reinforcement along with value-based and policy-based methods and intro to multi-agent RL.

Reinforcement Learning Specialization August 2020
- A four-course degree focusing on RL fundamentals, various RL algorithms, and formalizing a task as an RL problem.

Deep Learning Specialization June 2019
- A five courses degree focusing on neural network, optimization, management, NLP, and computer vision.

Micromasters in Artificial Intelligence May 2019
- A four-course degree consisting of AI, ML, Robotics, and CGI.