REZA ABBASI

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RESEARCH INTERESTS

• Vision-Language Models • Out Of Distribution Generalization • Self-Supervised Learning

EDUCATION

Master of Science in Computer Engineering *Sep 2021 - Sep 2024*
Department of Computer Engineering, Sharif University of Technology (SUT), Tehran, Iran
GPA: 4.00/4.00
Thesis: Medical Image Retrieval with Self-Supervised Models
Supervisor: Dr. Mohammad Hossein Rohban

Bachelor of Science in Computer Engineering *Sep 2016 - Dec 2020*
Department of Computer Engineering, Isfahan University of Technology (IUT), Isfahan, Iran
GPA: 3.61/4.00
Thesis: Implementation of Meta-Heuristic Methods for Robot Path Planning
Supervisor: Dr. Hossein Falsafain

PUBLICATIONS

- **Conference:**
  - **Abbasi R.**, Nzari A., Sefid A., Banayeeanzade A., Rohban M., Soleymani Baghshah M. *CLIP Under the Microscope: A Fine-Grained Analysis of Multi-Object Representation*. **Accepted** to CVPR 2025.
  - **Abbasi R.**, A., Rohban M., Soleymani M. *Deciphering the Role of Representation Disentanglement: Investigating Compositional Generalization in CLIP Models*. **Accepted** at ECCV 2024. View Paper.
  - Abdollahi A., Ghaznavi M., Karimi M., Oriyad A., **Abbasi R.**, Salesi A., Behjati M., Rohban M., Soleymani M. *GABInsight: Exploring Gender-Activity Binding Bias in Vision-Language Models*. **Accepted** at ECAI 2024 .View Paper.
- **Workshop:**
  - **Abbasi R.**, Nzari A., Sefid A., Banayeeanzade A., Rohban M., Soleymani Baghshah M. *Analyzing CLIP's Performance Limitations in Multi-Object Scenarios: A Controlled High-Resolution Study*. **Accepted** at EVAL-FoMo 2024, ECCV Workshop.
  - **Abbasi R.**, Sameie M., Rohban M., Soleymani Baghshah M. *The Critical Role of Language in the Compositional Generalization of CLIP*. **Accepted** at OOD-CV, ICCV Workshop. View Paper
  - Azizmalayeri M.*, **Abbasi R.***, Haji Mohammad rezaie A.*, Zohrabi R.*, Amiri M., Taghi Manzuri M., Rohban M. *Spuriosity Rankings for Free: A Simple Framework for Last Layer Retraining Based on Object Detection*. **Accepted** at SCIS, ICML Workshop. View Paper
- **Journal:**
  - Marioriyad A., Banayeeanzade A., **Abbasi R.**, Rohban M., Soleymani Baghshah M. *Attention Overlap Is Responsible for The Entity Missing Problem in Text-to-image Diffusion Models!*. **Accepted** at TMLR.
  - Pirayesh Z., Rahimi H., Motamedian R., Afshar S., **Abbasi R.**, Rohban M., Mahdian M., Ahsaie M., Alamdari M. *A Hierarchical Deep Learning Approach for Diagnosing Impacted Canine-Induced Root Resorption via CBCT*. **Accepted** at Journal of Endodontics. View Paper
  - Rahimi H., Dianat O., **Abbasi R.**, Zahedrozegar S., Ashkan A., Motamedian S., Rohban M., and Nosrat A. *Artificial Intelligence for Detection of External Cervical Resorption Using Label-Efficient Self-Supervised Learning Method*. **Accepted** at BMC Oral Health. View Paper
  - Nazari A., Najafi S., **Abbasi R.**, Rahimi H., Motie P., Alamdari M., Hosseinzadeh M., Pauwels R., Schwendicke F *High-Resolution Dentomaxillofacial Cone-Beam Computed Tomography using Deep Learning-based Super-Resolution: A Pilot Study*. **Submitted** to Journal of Dentistry.

RESEARCH EXPERIENCE

Research Assistant *Jan 2022 - Sep 2024*
Robust and Interpretable Machine Learning Lab, Sharif University of Technology, Tehran, Iran
Supervisor: Dr. Mohammad Hossein Rohban
Engaged in researching and developing advanced computer vision models. Responsibilities include data analysis, algorithm implementation, and mentoring over 8 undergraduate students, guiding them through project design and execution for successful outcomes.

Research Assistant *Sep 2022 - Sep 2024*
Machine Learning Lab, Sharif University of Technology, Tehran, Iran
Supervisor: Dr. Mahdieh Soleymani Baghshah
Involved in the evaluation and analysis of vision-language models like OpenAI's CLIP. Conducted extensive experiments, offering critical insights into the models' performance and capabilities.

Research Assistant *Mar 2022 - Apr 2024*
Shahid Beheshti University, Tehran, Iran
Supervisor: Dr. Hossein Mohammad-Rahimi
Collaborated on a multidisciplinary research project with the medical department at Shahid Beheshti University, focusing on self-supervised learning models for medical imaging. Specialized in classification and segmentation techniques for dental images.

TEACHING EXPERIENCE

Teaching Assistant *Sep 2022 - June 2023*
Course: Artificial Intelligence, Sharif University of Technology
Supervisor: Dr. Mahdieh Soleymani Baghshah

Teaching Assistant *Sep 2022 - June 2023*
Course: Machine Learning, Sharif University of Technology
Supervisor: Dr. Ali Sharifi-Zarchi

Teaching Assistant *Aug 2020 - Dec 2020*
Courses: Data Warehouse & Database Lab, Isfahan University of Technology
Supervisor: Dr. Alireza Basiri

SELECTED PROJECTS

Histopathology Retrieval using CLIP
GitHub Link
Trained a CLIP model histopathology image Retrieval. Utilized ChatGPT to condense medical reports into concise descriptions, paired with images for model training.

Composed Image Retrieval with CLIP
GitHub Link
This project utilizes CLIP's Image Encoder and Text Encoder as backbones to train a model using contrastive learning for composed image retrieval.

CLIP Evaluation on Compositional OoD
GitHub Link
Conducted comprehensive evaluations on compositional benchmarks to assess the strengths and weaknesses of large vision-language models.

Image Retrieval
GitHub Link
Developing and evaluating various supervised and self-supervised deep learning models for image retrieval in histopathology images.

Object Detection
GitHub Link
Explored advanced object detection techniques using YOLO and OWL-ViT across various datasets, enabling precise object localization and classification for a range of applications.