

Hani Alomari

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Research Statement

My work lies at the intersection of computer vision and natural language processing, with primary focus on multimodal learning and vision–language models. I develop diverse, semantically aligned representations for cross-modal retrieval across image, text, video, and audio, using multi-embedding strategies to capture non-literal and abstract relationships. I work on structured knowledge and grounded reasoning for interpretable vision–language models, supported by new benchmarks and evaluation pipelines. This research has led to publications at top-tier venues such as ACL 2025.

Education

Virginia Tech

Jan 2023 — Jan 2028 (expected)

Ph.D., Computer Science | Advisor: Dr. Chris Thomas | GPA: 4.00/4.00

Jordan University of Science and Technology

Feb 2020 — Jun 2022

M.S., Data Science | Advisor: Prof. Rehab Duwairi | GPA: 4.26/4.30

Jordan University of Science and Technology

Feb 2016 — Jan 2020

B.S., Computer Science | Advisor: Dr. Malak Abdullah | GPA: 4.04/4.20

Publications

- **ENTER (v2): Event-Based Interpretable Reasoning for VideoQA.** Hammad Ayyubi, Junzhang Liu, 2026 Ali Asgarov, Zaber Ibn Abdul Hakim, Najibul Haque Sarker, Zhecan Wang, Chia-Wei Tang, Hani Alomari, et al. *Under review, AAAI 2026*.
- **Maximal Matching Matters: Preventing Representation Collapse for Robust Cross-Modal Retrieval.** Hani Alomari, Anushka Sivakumar, Andrew Zhang, Chris Thomas. *ACL 2025 (Main)*. [paper](#) 2025
- **Real-Time Ultra-Fine-Grained Surgical Instrument Classification.** Md Atabuzzaman, Gino DiMatteo, Hani Alomari, et al. *FGVC, CVPR 2025*. 2025
- **JourneyBench: A Challenging One-Stop Vision–Language Understanding Benchmark of Generated Images.** Zhecan Wang, Junzhang Liu, Chia-Wei Tang, Hani Alomari, et al. *NeurIPS 2024*. [paper](#) 2024
- **ENTER: Event-Based Interpretable Reasoning for VideoQA.** Hammad Ayyubi, Junzhang Liu, Ali Asgarov, Zaber Ibn Abdul Hakim, Najibul Haque Sarker, Zhecan Wang, Chia-Wei Tang, Hani Alomari, et al. *MAR Workshop, NeurIPS 2024 SPOTLIGHT*. [paper](#) 2024
- **So2al-wa-Gawab: A New Arabic Question-Answering Dataset Trained on Answer Extraction Models.** Hani Alomari, Rehab Duwairi. *ACM TALLIP 2023*. [paper](#) 2023
- **DLJUST at SemEval-2021 Task 7: Hahackathon—Linking Humor and Offense.** Hani Alomari, Isra’a AbedulNabi, Rehab Duwairi. *SemEval 2021*. [paper](#) 2021
- **EmoDet2: Emotion Detection in English Textual Dialogue Using BERT and BiLSTM Models.** Hani Alomari, Malak A. Abdullah, Samira Shaikh. *ICICS 2020 (IEEE)*. [paper](#) 2020
- **JUSTDeep at NLP4IF 2019 Task 1: Propaganda Detection Using Ensemble Deep Learning Models.** Hani Alomari, Malak Abdullah, Ola AlTiti, Samira Shaikh. *NLP4IF 2019*. [paper](#) 2019
- **MTRECS-DLT: Multi-Modal Transport Recommender System Using Deep Learning and Tree Models.** Ayat Abedalla, Ali Fadel, Ibraheem Tuffaha, Hani Alomari, et al. *SNAMS 2019 (IEEE)*. [paper](#) 2019
- **EmoDet at SemEval-2019 Task 3: Emotion Detection in Text Using Deep Learning.** Hani Alomari, Malak Abdullah, Nabeel Bassam. *SemEval 2019*. [paper](#) 2019

Research Experience

Research Assistant, Virginia Tech

Mar 2023 — Present

- Led diversity-aware image–text retrieval; introduced a maximal-matching objective with multi-embedding, improving performance by up to 7.1% over state-of-the-art baselines, which led to publication at **ACL 2025 (Main)**.

- Built a diversification pipeline that generates a variable number of facet-specific captions with vision-language models, covering literal, non-literal, idiomatic, figurative, and abstract aspects, which enhanced the descriptive richness beyond static COCO and Flickr30k captions.
- Leading generative room-geometry work using line-segment representations, conditioning on room-impulse responses (RIRs) to reconstruct top-view layouts.
- Collaborated with Columbia University on ENTER and JourneyBench; implemented, annotated, and evaluated state-of-the-art models, which led to publications at **NeurIPS 2024** and **MAR @ NeurIPS 2024**.
- Contributed to hospital deployment of a real-time, multi-view classifier (95 instrument types); delivered high accuracy and SUS 81.7, improving tray assembly and reducing cancellation risk tied to $\sim 80\%$ misassembled trays.

Research Assistant, Jordan University of Science and Technology Feb 2020 — Nov 2022

- Created *So2al-wa-Gwab*, an Arabic QA span-extraction dataset: scripted Arabic Wikipedia scraping, led a three-person annotation workflow (2 annotators, 1 moderator), applied a three-stage QC process, and produced 10K QA pairs across diverse domains.
- Trained and benchmarked span-extraction models across seven Arabic QA datasets; implemented span alignment to derive start/end indices and evaluated with EM and F1, observing BERT outperforming baselines.
- Systematic literature review of Arabic QA extraction; identified gaps (reliance on Machine Translation, short contexts, scarcity of human-authored items) and used findings to define my thesis scope and dataset design.
- Led an Arabic humor detection and rating project: built an end-to-end NLP pipeline, fine-tuned transformer models for classification and regression, delivered reproducible benchmarks and error analysis, and ranked 7/45 (top 15%) on first task.

Research Assistant (Intern), Jordan University of Science and Technology Jun 2019 — Aug 2019

- Built and debugged deep learning pipelines using TensorFlow and spaCy for propaganda and emotion detection in the NLP4IF 2019 competition, and ranked 7/26 (top 27%) in the SLC task.

Academic Contributions

- **Graduate Teaching Assistant:** CS4804: Intro to AI (Spring 2025); CS5914: AI Tools in Software Dev (Fall 2023, Spring 2024, Fall 2024); CS1064: Intro to Programming in Python (Summer I 2023, Summer I 2024); CS5824/ECE5424: Advanced ML (Spring 2023).
- **Serving as Reviewer:** WACV 2024; ACL Rolling Review (Feb & May 2025).

Honors & Awards

- Sanghani Center Travel Fund — \$750, Virginia Tech (2025).
- CS Dept Travel Fund - \$750, Virginia Tech (2025).
- GPSS Travel Fund Grant — \$500, Virginia Tech Graduate School (2025).
- Outstanding Graduate Student Award — full scholarship for M.S., JUST (2020–2022).
- Outstanding Undergraduate Student Award — #1 in class of 62 (Feb 2020); multiple Honors List mentions.

Conferences & Presentations

ACL 2025 — 63rd Annual Meeting of the Association for Computational Linguistics

Vienna, Austria

Poster Presentation: “Maximal Matching Matters: Preventing Representation Collapse for Robust Cross-Modal Retrieval”

July 2025

Technical Skills

- **Programming:** Python, C++, Java, Bash, Latex, CSS, SQL
- **ML Frameworks:** PyTorch, TensorFlow, Transformers, scikit-learn, Keras
- **Data Handling:** NumPy, Pandas, spaCy, NLTK, seaborn, matplotlib
- **Tools:** Conda, Git, Wandb, Docker
- **Languages:** English, Arabic