Ibrahim Khebour

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Education

Colorado State University August 2022 – Present
PhD in Computer Science *Fort Collins, Colorado, USA*

Tunisia Polytechnic School, Université de Carthage Sep 2019 – June 2022
Multidisciplinary Engineering degree *Tunis, Tunisia*

Preparatory Institute for Engineering Studies of El Manar Sep 2017 – June 2019
Ranked 36^{th} out of 2000 in the national entrance exam for engineering schools *Tunis, Tunisia*

Research Experience

Graduate Research Assistant August 2022 – Present
Colorado State University, Situated Grounding and Natural Language (SIGNAL) Lab *Fort Collins, Colorado, USA*

- Developing Multimodal Machine Learning models for students engagement and collaborative status while performing a group task, as well as tracking their progress.
- Adapting and optimizing previously developed AI models to function effectively in real-time environments, ensuring minimal latency and performance loss.
- Projects funded by NSF Institute for Student-AI Teaming (iSAT) and DARPA Friction for Accountability in Conversational Transactions (FACT).

Graduation Internship February 2022 – June 2022
Colorado State University, Situated Grounding and Natural Language (SIGNAL) Lab *Fort Collins, Colorado, USA*

- Developing a binary classification model for Loanword detection.
- Data augmentation for loanwords and non-loanwords.
- Introduction to research and paper writing process.

Data Science Internship June 2021 – August 2021
Datagram *Tunis, Tunisia*

- Developing a semantic similarity LLM for a retail client.
- Performing a proof of concept on a small textual data of retail products.
- Working with a team of data scientist for a summer internship.

Publications

VanderHoeven, H., Bhalla, B., Khebour, I., Youngren, A. C., Venkatesha, V., Bradford, M., Fitzgerald, J., Mabrey, C., Tu, J., Zhu, Y., Lai, K., Jung, C., Pustejovsky, J., & Krishnaswamy, N. (2024). TRACE: Real-time multimodal common ground tracking in situated collaborative dialogues. Under review for the NAACL 2025 Conference. Under Review
A real-time system that tracks group beliefs during a collaborative task.

Khebour, I., Jung, C., Fitzgerald, J., & Krishnaswamy, N. (2024). Non-verbal feature contributions to multimodal interpretation of meaning. Accepted for publication to the HCII 2025 Conference. HCII 2025
Investigate the role of non-verbal features in enhancing multimodal AI models.

Palmer, D., Zhu, Y., Lai, K., VanderHoeven, H., Bradford, M., Khebour, I., Mabrey, C., Fitzgerald, J., Krishnaswamy, N., Palmer, M., & Pustejovsky, J. (2024). Speech Is Not Enough: Interpreting Nonverbal Indicators of Common Knowledge and Engagement. Accepted for publication to the AAAI 2025 Conference. AAAI 2025

Multimodal analytics to track nonverbal and verbal interactions.

VanderHoeven, H., Bradford, M., Jung, C., Khebour, I., Lai, K., Pustejovsky, J., Krishnaswamy, N., & Blanchard, N. (2024). Multimodal design for interactive collaborative problem-solving support. In International Conference on Human-Computer Interaction (pp. 60-80). Cham: Springer Nature Switzerland. HCII 2024

Highlight the design and integration of multimodal AI systems to support collaborative problem-solving in small groups.

Zhu, Y., VanderHoeven, H., Lai, K., Bradford, M., Tam, C., Khebour, I., Brutti, R., Krishnaswamy, N., & Pustejovsky, J. (2024). Modeling Theory of Mind in Multimodal HCI. In International Conference on Human-Computer Interaction (pp. 205-225). Cham: Springer Nature Switzerland. HCII 2024

Apply Simulation Theory of Mind and Dynamic Epistemic Logic to model belief attribution and track dynamic common ground in multimodal human-computer interactions.

Khebour, I., Lai, K., Bradford, M., Zhu, Y., Brutti, R., Tam, C., Tu, J., Ibarra, B., Blanchard, N., Krishnaswamy, N., & Pustejovsky, J. (2024). Common Ground Tracking in Multimodal Dialogue. In Joint International Conference on Computational Linguistics, Language Resources and Evaluation (LREC-COLING). ACL. LREC-COLING 2024

Detection of shared knowledge among a triad of participants during a collaborative task using textual, visual and acoustic channels.

Khebour, I., Brutti, R., Dey, I., Dickler, R., Sikes, K., Lai, K., Bradford, M., Cates, B., Hansen, P., Jung, C., Wisniewski, B., Terpstra, C., Hirshfield, L., Puntambekar, S., Blanchard, N., Pustejovsky, J., & Krishnaswamy, N. (2024). When Text and Speech are Not Enough: A Multimodal Dataset of Collaboration in a Situated Task. Journal of Open Humanities Data, 10(1). JOHD 2024

Comparing automatically segmented speech using Google and OpenAI's tools after a thorough annotation process.

Venkatesha, V., Nath, A., Khebour, I., Chelle, A., Bradford, M., Tu, J., Pustejovsky, J., Blanchard, N., & Krishnaswamy, N. (2024). Propositional extraction from natural speech in small group collaborative tasks. In Proceedings of the 17th International Conference on Educational Data Mining (pp. 169-180). EDM 2024

Evaluates methods for extracting shared beliefs and task-relevant propositions from natural speech.

Bradford, M., Khebour, I., Blanchard, N., & Krishnaswamy, N. (2023). Automatic Detection of Collaborative States in Small Groups Using Multimodal Features. In International Conference on Artificial Intelligence in Education (pp. 767-773). AIED 2023

Multi label classification of group of students' collaborative status using BERT, openSMILE and skeletal data collected using Azure cameras.

Terpstra, C., Khebour, I., Bradford, M., Wisniewski, B., Krishnaswamy, N., & Blanchard, N. (2023). How Good is Automatic Segmentation as a Multimodal Discourse Annotation Aid?. In Proceedings of the 19th Joint ACL-ISO Workshop on Interoperable Semantics (ISA-19) (pp. 75-81). ISA-19 2023
Comparing automatically segmented speech using Google and OpenAI's tools after a thorough annotation process.

Nath, A., Saravani, S. M., Khebour, I., Mannan, S., Li, Z., & Krishnaswamy, N. (2022). A generalized method for automated multilingual loanword detection. In Proceedings of the 29th International Conference on Computational Linguistics (pp. 4996-5013). COLING 2022
Using Multilingual LLMs to detect loan words across an extendable list of languages.

Specialized Skills

Programming Languages: Python (Expert), C/C++ (Intermediate), R (beginner)
Mathematics: Calculus, Linear algebra, Probability, Statistics.
Communication: Fluent in English, French and Arabic. Learning Italian.
Adaptability: Enthusiastic about continuous learning and acquiring new skills.