

OZEL YILMAZEL

PhD Student in Computer Science, University of Massachusetts Amherst

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RESEARCH SUMMARY

My research focuses on designing retrieval systems for agentic consumption, studying how agent-system interactions can inform more effective retrieval and search design, and how search agents' behavior and faithfulness change under uncertainty.

Keywords: search agents, RAG, deep research, faithfulness, evaluation

EDUCATION

University of Massachusetts Amherst

Amherst, MA

Ph.D. in Computer Science, College of Information and Computer Sciences

Present

M.S. in Computer Science, GPA 4.0 — B.S. in Computer Science, GPA 4.0

May 2026 / May 2025

Awards: Bay-State Fellowship; Phi Kappa Phi; Summa Cum Laude; Outstanding UCA Award

RESEARCH EXPERIENCE

Center for Intelligent Information Retrieval – UMass Amherst

April 2025 – Present

Research Assistant, advised by Hamed Zamani and James Allan

Amherst, MA

- Developing interaction-focused retrieval models for autonomous search agents that rank from an agent's tool-use history rather than a single query, and evaluating agent faithfulness under uncertainty.
- Led work on cross- and multi-domain personalization for retrieval-augmented generation and long-form generation, beating state-of-the-art baselines (SIGIR '26); trained and served LLMs with PyTorch and vLLM on multi-GPU SLURM clusters.
- Delivered MassAITC contract work on a generative AI facilitation agent for a caregiver-support chat platform that pioneered generative AI for conversational facilitation.

Center for Data Science and Artificial Intelligence – UMass Amherst

May 2024 – May 2025

Student Researcher

Amherst, MA

- Built the music recommendation engine for SingFit, a music-therapy app for older adults at risk of Alzheimer's, using learning-to-rank models (XGBoost, scikit-learn) over song and listener features.
- Fine-tuned geo-predictive models in PyTorch using user-generated labels from iNaturalist, improving species location inference accuracy.
- Built an LLM text-classification experimentation suite (LangChain) and full-stack annotation platforms (React, PostgreSQL, Azure) for NSF Buzzards Bay and iNaturalist.

Initiative for Digital Public Infrastructure – UMass Amherst

February 2025 – September 2025

Student Researcher

Amherst, MA

- Clustered large-scale YouTube video embeddings (~16K samples) to map platform-wide topic structure, characterizing how embedding choice controls topic granularity in media understanding.
- Built a multilingual recommendation-tree pipeline over the YouTube Innertube API to measure cross-language exposure and discovery paths; People's Choice award, UMass CSS poster session.

College of Information and Computer Sciences – UMass Amherst

September 2022 – Present

Teaching Assistant, CS446 Search Engines

Amherst, MA

- Designed and taught a new Retrieval-Augmented Generation module for CS446 (assignments, autograders, office hours); supported hundreds of students across CS121, CS230, and CS326.

SELECTED PROJECTS

Cold-Start Playlist Generation | *Music information retrieval, Spotify Million Playlist Dataset*

- Led a five-person study on generating 100-track playlists from a title alone (100K playlists, 683K tracks, no listening history); built the indexing, evaluation, and baseline suite (BM25, QL, SVD, WMF).
- Designed a two-stage re-ranker feeding lexical candidates into a listwise XGBoost model over collaborative-filtering, popularity, and semantic-feature signals: +21.5% P@5 and +26.4% MRR over the best baseline.
- Built a single-stage hybrid retriever interpolating lexical, fine-tuned dense (DPR/FAISS), co-occurrence, and LLM-annotated genre/mood signals, matching the two-stage pipeline at a fraction of its training cost.

OpenResearcher | *Agentic search platform for research funding and collaboration*

- Built a hybrid lexical/dense retrieval server with agentic search and automated report generation (FastAPI, Next.js, LangChain).

SKILLS

Languages: Python, C, C#, Java, JavaScript/TypeScript, SQL, HTML/CSS

AI/ML: PyTorch, HuggingFace Transformers, vLLM, LangChain, scikit-learn, XGBoost, NLTK, NumPy, pandas

Systems: multi-GPU training, SLURM, HPC, Docker, Git, PostgreSQL, MongoDB, Azure, Unity

Yilmazel, O., Zamani, H., & Allan, J. (2026). Exploring and Improving Cross- and Multi-Domain Personalized Question Answering via a Dual Retrieval Augmentation Approach. In *Proceedings of the 49th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR '26)*, 4316–4321.
<https://doi.org/10.1145/3805712.3809932>

Senapati, R., Druck, G., Zeng, C., Fatima, F., Rastogi, R., & Yilmazel, O. Does Retrieval Augmented Generation Collapse When It Retrieves AI-Generated Documents? In *Grounding Language Models: Learning Faithfully and Efficiently @ EMNLP 2026*. openreview.net/forum?id=JHwIkYmtxb

Myers, J. R., et al. Developing an equitable machine learning-based music intervention for older adults at-risk for Alzheimer's: Pilot findings for algorithm development and validation. *JMIR Aging*; October 2025; (In Review).

Yilmazel, O., McGrady, R., Partridge, V., & Zuckerman, E. YouTube Topic Modeling. *Computational Social Science Poster Session 2025*; May 2025; UMass Amherst, Amherst. Winner of the People's Choice Award.

Yilmazel, O., Zhu, A., Navarrete, P., Pogorelov, S., & Partridge, V. iNatator: Obtaining Expert Feedback on Species Ranges. *New England Computer Vision Workshop (NECV)*; November 2024; Yale University, New Haven.