

# Zoher Kachwala

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## Research Interest

I am passionate about bridging the gap between language understanding and structured knowledge. I am particularly intrigued by the potential of local knowledge graphs like Abstract Meaning Representations (AMRs), to augment Large Language Models (LLMs) in trust-sensitive applications like fact-checking and question answering. My current research focuses on developing efficient graph-based methods to leverage and evaluate the semantic richness of AMRs.

## Papers and Articles

**MISMATCH of Knowledge Graphs for Natural Language Inference** Jan 2024-  
In Progress

A metric that can leverage mismatching AMRs to infer textual entailment

**REMATCH: Robust and Efficient Knowledge Graph Matching for Improved Structural and Semantic Similarity** Jan 2023-Dec 2023

NAACL 24

A metric that balances structural similarity of AMRs with the semantic similarity of source text, while being five times more efficient

**A Multi-Platform Collection of Social Media Posts about the 2022 U.S. Midterm Elections** Aug 2022-May 2023

ICWSM 2023

A collection of social media posts from Twitter, Facebook, Instagram, Reddit, and 4chan

**The Inexplicable Efficacy of Language Models** Nov 202-Jan 2023

XRDS: Crossroads, The ACM Magazine for Students

A brief insight into the development and rise of Language Modeling

## Research Projects

**Text2Graph** Jan 2019-May 2023

Developed a tool that uses semantic role labeling to create pseudo-AMRs from text

**Review of Attention Models** May 2021-Aug 2021

Deep dive into transformer-based language models (BERT, GPT) secured passage of doctoral candidacy exam

**DARPA INCAS Team** Oct 2021-May 2021

Part of a team developing tools for DARPA INCAS to prevent malicious influence campaigns online.

## Teaching

**Introduction to Network Science** Fall 2022, Fall 2023, Fall 2024

Developed and conducted coding-based network science tutorials using programming to reinforce theoretical concepts in class.

**Elements of Artificial Intelligence** Fall 2019, Spring 2021, Fall 2021

The most popular graduate course at our university that dives deep into AI, from search algorithms to neural nets. To grade the homeworks of 300 students, I built a pytest autograder

**Applied Machine Learning** Fall 2020

## Class Projects

**Generative Models for MNIST Digit Images** Fall 2020

Leveraged deep learning (GANs, RNNs, VAEs) to generate user-queried digits, impute missing data, and represent irregular patterns in MNIST images

**Speech Denoising and Speaker Verification** Fall 2020

Applied deep learning (FCNs, CNNs, RNNs) for speech denoising and speaker verification (Siamese Nets, 74% accuracy)

**Part-of-Speech Tagging** Fall 2017

Our n-gram-based POS tagger achieved 95.38% accuracy and 7.826ms/sentence runtime on a dataset of 50k sentences, ranking 2nd among 50 teams in a competition

## Education

**Indiana University, USA**

CGPA 3.62

PhD in CS May 2025

MS in Data Science May 2022

MS in CS May 2019

**NMIMS Mumbai, India**

First Class

B.Tech CE May 2017

## Technical Familiarity

Python, Bash, NumPy, SciKit, ScaPy, Pandas, NetworkX, PyTorch, Tensorflow, Neo4J, MySQL, R, C++.

## Research Familiarity

Attention Models, Transformer Architecture, Knowledge Graph Mining and Construction, Multi-hop Fact-checking, Graph Search, Markov Models, Linear and Logistic Regression, Clustering Techniques, Ensemble Learning, Word2Vec, Transformers, Gender and Computerization

## Internships

**PricewaterhouseCoopers**

Technology Consultant  
Summer 2018

## Service

**Peerj Computer Science**

Peer Reviewer

**Harvard WorldMUN**

Represented India and NMIMS at 'olympics of Model UN' with 2000+ participants from 110 countries

**Graduate Government IU**

Representative of the Computer Science department

**Luddy Ambassador IU**

Coordinated visits for prospective students and help them settle at IU

## Hobbies

Liverpool Football Club, Cooking, Baking, Resistance Training, Board Games, Operas, Orchestras, Theatre Dramas, Hiking, Galleries.