

Abdul Aahad Vakani

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RESEARCH INTERESTS

Multilingual Natural Language Processing, Code-Switching, Computational Sociolinguistics, Low-Resource Languages, Cross-Lingual Processing, Community-Centered NLP, Artificial Intelligence

EDUCATION

DePauw University, Greencastle, IN, United States

August 2022 — May 2026

Bachelor of Arts: Computer Science & Creative Writing (Double Major)

RESEARCH EXPERIENCE

CodeBoard: Multilingual Code-Switching Data Platform

Independent Research Project

Greencastle, IN

February 2025 — Present

- Designed and developed full-stack community-sourced platform for collecting code-switched data with social context annotations across 176+ languages
- Implemented technical architecture using Next.js frontend, Express.js backend API, and PostgreSQL/Supabase database management
- Integrated FastText language identification to automatically detect switch points, which users verify to create computationally usable and sociolinguistically grounded training data
- Built flexible schema design supporting any language pair and handling romanization for non-Latin scripts (Urdu, Hindi, Arabic)
- Currently piloting with DePauw multilingual faculty and students with IRB approval to validate annotation scheme for pragmatic functions (formality, audience, communicative intent)
- **Manuscript in preparation:** Target ACL 2026 Student Research Workshop

Branches: AI-Assisted Decision Visualization Tool

Computer Science Capstone Project

Greencastle, IN

August 2025 — Present

- Developed interactive web-based decision-making tool combining decision tree visualization with AI-powered outcome analysis
- Implemented D3.js for dynamic tree visualization with 3D view options, enabling users to explore complex life decisions through weighted outcome modeling
- Built React frontend with Google OAuth authentication and probability scoring system for short-term vs. long-term decision tracking
- Demonstrated interdisciplinary approach combining computational systems with human-centered problem-solving
- Implemented an Analytical Hierarchy Process (AHP) weighing system to properly compare and calculate node weights.

Hindi-English Code-Switching Analysis

Independent Research Project

Greencastle, IN

December 2024 — February 2025

- Conducted quantitative analysis of 2,500+ tweets from L3Cube HingCorpus to identify code-switching patterns and pragmatic functions
- Used Python (pandas, regex) to extract switching patterns across phrase boundaries, mid-word switches, and between sentences
- Examined correlations between formality, community identity, discourse context, and code-switching behavior
- Findings revealed that existing datasets erase social context that makes code-switching meaningful—motivating Code-Board development

PUBLICATIONS

Manuscript in Preparation

- Vakani, A. A. (In preparation). *CodeBoard: A Community-Sourced Platform for Multilingual Code-Switching Data Collection with Social Context*.

Manuscript in Preparation

- Gulum, Mehmet. Vakani, A. A. Bhattarai, Shulabh. Nguyen, Thienh. (In preparation). *Artificial Intelligence in Agriculture: A Review of Opportunities for Plant Disease Detection and Dual-Use Risks in Biosecurity*.

SELECTED COURSES

Computer Science Courses

- Machine Learning (CSC 496) — Grade: A
- Applied Computational Linguistics (HONR 300CA) — Grade: B+
- Introduction to Computer Science (CSC 121) — Grade: A
- Data Structures and Algorithms
- Object-Oriented Software Development
- Senior Capstone in Computer Science (CSC 498A)

English Writing Courses

- Fiction Writing Workshop
- Writing for the Real World — Grade: B
- Form & Genre — Grade: A-
- AI and The Future of Writing — Grade: A

AWARDS & HONORS

Honors Program Member

DePauw University

Greencastle, IN
2022 — 2025

Presidential Ambassador

DePauw University

Greencastle, IN
2025 — 2026

Deans List Member

DePauw University

Greencastle, IN
2022

TECHNICAL SKILLS

- **Programming Languages:** Python, JavaScript, R, SQL
- **NLP & Machine Learning:** PyTorch, Hugging Face Transformers, spaCy, FastText, scikit-learn
- **Web Development:** React, Next.js, Express.js, Node.js, PostgreSQL, Supabase
- **Data Science & Visualization:** pandas, D3.js, Matplotlib, NumPy
- **Human Languages:** English (native), Urdu (native), Sindhi (conversational), Hindi (reading proficiency)

CLUBS/ACTIVITIES

DepAI Club

Vice President

2025 — Present

REFERENCES

Dr. Amity Reading

Associate Professor of English and Global Studies Scholar

Dr. Scott Thede

Herrick E.H. Greenleaf Professor of Computer Science

Dr. Harry Brown

Professor of English and Co-Director of the Environmental Fellows Program

Dr. Mehmet Gulum

Assistant Professor of Computer Science

Dr. Dave Berque

Vice President for Academic Affairs