Pavithra PM Nair

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SUMMARY

An early-career AI researcher skilled in natural language processing (NLP) and large language model (LLM) application development. My recent work focuses on the disambiguation of natural language requirements, developing conversational AI to foster critical thinking, and improving human-computer interaction in automated systems. I am dedicated to creating solutions that foster deeper learning, informed decision-making, and improved language understanding.

EDUCATION

Amrita Vishwa Vidyapeetham
Bachelor of Technology in Computer Science and Engineering (Artificial Intelligence)   *2020 - 2024*
CGPA - 9.36/10, Department Rank - 6

Ben-Gurion University of the Negev
Data Mining and Business Intelligence Summer School   *August 2023 - September 2023*

SKILLS

- **Expertise:** Deep Learning, Natural Language Processing
- **Technical:** Python, Pytorch, Langchain, Pandas, Git, Linux
- **Tools:** GitHub, Docker
- **Soft Skills:** Cross-functional Team Leadership, Communication, Presentation

EXPERIENCE

Tata Research Development and Design Centre (TCS Research)
Researcher   *August 2024 - Present*

- **Ambiguity Handling** – Explored existing techniques for detecting and resolving ambiguities in natural language requirements, and developed a novel approach that highlights missing attributes through retrieval augmented generation techniques.
- **Regulatory Automation** – Used LLMs and NLP algorithms to streamline the regulatory compliance process by automating document analysis for complex regulatory requirements.

Prodago - AI Governance (as contracted through Traboda Cyberlabs)
Researcher   *November 2023 - August 2024*

- **Prompt Engineering** - Led content generation efforts within the team, enhancing output quality through prompt engineering techniques, including n-shot prompting, chain-of-thought prompting, and tool use, resulting in a 28% improvement in the generated content.
- **Retrieval Augmented Generation (RAG)** - Implemented RAG mechanism using vector databases like Pinecone, enhancing the output quality and relevance in a compliance chatbot application, resulting in more accurate and contextually appropriate responses.
- **LLM Performance** - Used cutting-edge frameworks like Ragas and metrics such as answer relevancy, similarity, context precision, and context recall to assess and optimize the quality of generated outputs.
- **Model Selection** – Conducted research and experimentation with a variety of LLMs, including Claude, Cohere, LLaMA, GPT-4, and Gemini, to optimize the selection of models best suited for product-specific use cases.

Association of Computing Machinery
Research Intern   *July 2023 - August 2023*

- **Bias Detection** – Identified and analyzed biases in computer vision datasets that could impact model performance and fairness.
- **Bias Mitigation** – Contributed to the development of a novel approach to mitigate bias through techniques such as data augmentation and reweighing, improving model accuracy and fairness.

PROJECTS

Athena – AI Socratic Chatbot for Cybersecurity Education Funded by Patrick J. McGovern Foundation
Researcher & Developer *Jan 2024 - August 2024*

- **AI Chatbot Development** – Designed and developed an LLM-powered chatbot using Python and LangChain, tailored to stimulate critical thinking and cognitive engagement through Socratic questioning techniques.
- **LLM Performance Optimization** – Improved response quality through prompt engineering and RAG, leading to a tangible increase in user engagement and knowledge retention.
- **User Testing and Platform Integration** – Integrated the chatbot into the Traboda Cyberlabs Capture the Flag (CTF) platform and conducted A/B testing to measure its effectiveness in engaging users and promoting deeper learning.

Solicitation of Assistance for Cognitive Engagement
Researcher *Aug 2024 - Jan 2025*

- **Comparative Study on Assistance Delivery Mechanisms** – Analyzed user behavior when given the option to solicit versus receiving unsolicited AI assistance, focusing on susceptibility to misleading suggestions and cognitive engagement.
- **Impact Analysis and User Behavior** – Measured the impact of assistance paradigms on alignment with misleading suggestions, decision accuracy, time spent on decision-making, and user experience.
- **Overreliance Prevention** – Explored how solicitation-based assistance reduces overreliance on automated suggestions, contributing actionable insights for enhancing user autonomy in interactive systems.

EXTRACURRICULARS, LEADERSHIP AND INITIATIVES

amFOSS - Computer Science Club
Mentor & Member *2020 - 2024*

- **Open Source Contribution** - Contributed to open source projects both within the club (amFOSS CMS) and external projects (Navidrome, Ersilia Open Source Initiative).
- **Podcast** - Led ideation for and hosted the amFOSS Podcast to promote open-source engagement.

Google Developer Student Club
Lead *2023 - 2024*

- **Technical Knowledge Sharing** – Conducted hands-on workshops on topics such as web development, AI, and cloud computing, emphasizing practical skills and real-world applications.
- **Event Management** – Managed and organized events with other GDSC chapters across India.

AWARDS AND HONORS

- **Full Scholarship Recipient, Data Mining and Business Intelligence Summer School, Ben-Gurion University of the Negev (2023)**: Awarded a full scholarship to attend the competitive summer school program at BGU, focusing on machine learning and cybersecurity.
- **Economic Times Campus Star (2023)**: Recognised by The Economic Times after a four-round evaluation process, including technical assessments and interviews, for demonstrating technical expertise and professional skills.
- **Finalist, European Rover Competition (2021)**: Contributed to the software enabling remote navigation of a rover through a simulated Mars-like environment in an international robotics competition.

VOLUNTEERING

C20 Summit for Technology, Security and Transparency
Volunteer *May 2023*

Coordinated and organized all notetakers for the summit, ensuring accurate and timely documentation. I developed a comprehensive volunteer schedule, assigned tasks based on skill sets, and led briefings for notetakers.

Student Social Responsibility - Menstrual Hygiene Awareness
Organizer *October 2022*

Organized a live workshop on menstrual hygiene at a government school in Kerala, educating students and teachers about proper hygiene practices, the importance of menstrual health, and available resources. Coordinated with local health experts and managed logistics for the workshop.