

# A Comprehensive Study on Prompt Engineering

Nihala M S<sup>1</sup>, Pranav Lal K B<sup>1</sup>, Rahul Raj PS<sup>1</sup>, Ms. Siji K B<sup>2</sup>

Students, MCA, Vidya Academy of Science and Technology Thalakkottukara, Thrissur, India<sup>1</sup>

Assistant Professor, Department of Computer Applications<sup>2</sup>

Vidya Academy of Science and Technology, Thalakkottukara, Thrissur, India

**Abstract:** Prompt engineering has become a vital technique in artificial intelligence (AI), enhancing interactions with large language models (LLMs) and vision-language models (VLMs). By strategically crafting prompts, this approach improves AI performance across domains such as natural language processing (NLP), computer vision (CV), and healthcare. Techniques like zero-shot, few-shot, chain-of-thought (CoT), and retrieval-based prompting refine model responses, increasing accuracy and efficiency. Hard and soft prompting methods play distinct roles, balancing interpretability and customization. Applications range from content generation and conversational AI to medical diagnostics and education. As AI evolves, prompt engineering remains crucial for optimizing model adaptability, ensuring responsible AI usage, and expanding automation. This study provides a comprehensive analysis of methodologies, applications, and future directions in prompt engineering, highlighting its transformative impact on AI-driven solutions.

**Keywords:** Prompt Engineering, AI Optimization, NLP, Chain-of-Thought, Automation