

A lightweight methodology for using generative AI chatbots in education and research in the field of computer networks.

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This paper presents a streamlined and effective methodology for integrating generative artificial intelligence (AI) chatbots into educational and research activities focused on computer networks. The proposed approach leverages the capabilities of generative AI to assist in each phase of a typical network analysis workflow: selecting appropriate software tools, generating and capturing network traffic, extracting relevant data, and conducting iterative analysis. For the experimental part, we went through these steps to analyze the functioning of the TCP protocol. The methodology begins with the identification of suitable software tools to achieve the objectives. For the experimental part, iperf is used for traffic generation and tshark for packet capture and processing. To address the challenges of manual traffic generation and data collection, AI-assisted scripting (e.g., PowerShell) is employed to automate these tasks. Given the limitations of chatbot environments in handling raw packet capture files (.pcapng), the methodology includes transforming these files into lightweight, structured formats (e.g., .csv) using AI-generated scripts (e.g., Windows Batch files). These processed files are then analyzed within the chatbot environment using iterative prompt engineering, enabling dynamic exploration of network behavior, such as TCP protocol analysis. The study demonstrates that generative AI chatbots significantly enhance productivity by aiding in tool selection, code generation, data transformation, and analytical reasoning. This methodology not only simplifies complex technical tasks but also promotes deeper understanding and engagement in computer networking education and research.

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