



Author: Kenny L. Cruz Hernandez
 Advisor: Prof. Victor Uribe
 Department of Engineering

Abstract

This research investigates the practical application of Artificial Intelligence (AI) within the administrative framework of a federal construction engineering entity. The project initially aimed to leverage AI for a wide range of functions including administrative assistance, project scheduling, and proposal analysis. The CAMO GPT platform, an AI tool operating on a secure DoD network, was assessed to test this potential. Findings revealed that while the platform excels at text-based administrative tasks like information retrieval and redaction, it has critical limitations in data manipulation and analysis. The study concludes by providing a realistic framework for AI integration, highlighting its current utility as a specialized administrative assistant rather than a comprehensive project management tool.

Introduction

The integration of Artificial Intelligence (AI) holds transformative potential for the construction industry by alleviating administrative burdens and optimizing project inefficiencies. This project was designed to address the research gap concerning the specific application of AI within the unique administrative and regulatory framework of a federal construction engineering entity. It details the assessment of the CAMO GPT platform, analyzing the significant gap between AI's theoretical promise and its current real-world capabilities in a secure government environment.

Background

The literature confirms that AI applications in the private construction industry are mature, enhancing nearly all phases of projects [1]. For example, machine learning effectively forecasts project events and creates resilient schedules [2]. Simultaneously, AI adoption in the U.S. federal government is accelerating, with agencies using it to improve communication, track programs, and automate routine administrative tasks. Government use often focuses on enhancing administrative efficiency, such as using RPA as a "tireless assistant" for repetitive tasks [3].

Problem

Federal construction engineering entities face significant challenges with administrative burdens, project scheduling, and process inefficiencies. While AI is widely used in the private sector for complex analytics and scheduling, federal agencies operate under unique regulatory and bureaucratic constraints that prevent direct adoption of these methods [4]. The core problem is determining how the advanced predictive capabilities of AI can be effectively adapted and integrated into the administrative workflows of a federal engineering entity while ensuring security and compliance.

Methodology

The project employed a mixed-methods approach. It began with a literature review and a needs assessment of a federal construction engineering entity. The CAMO GPT platform, a generative AI on a secure government network, was selected for simulation. Its performance was measured against the initial project objectives through practical testing. The results of traditional methods were compared with those of AI-enhanced methods to identify their benefits and limitations.

Research Methodology Flowchart

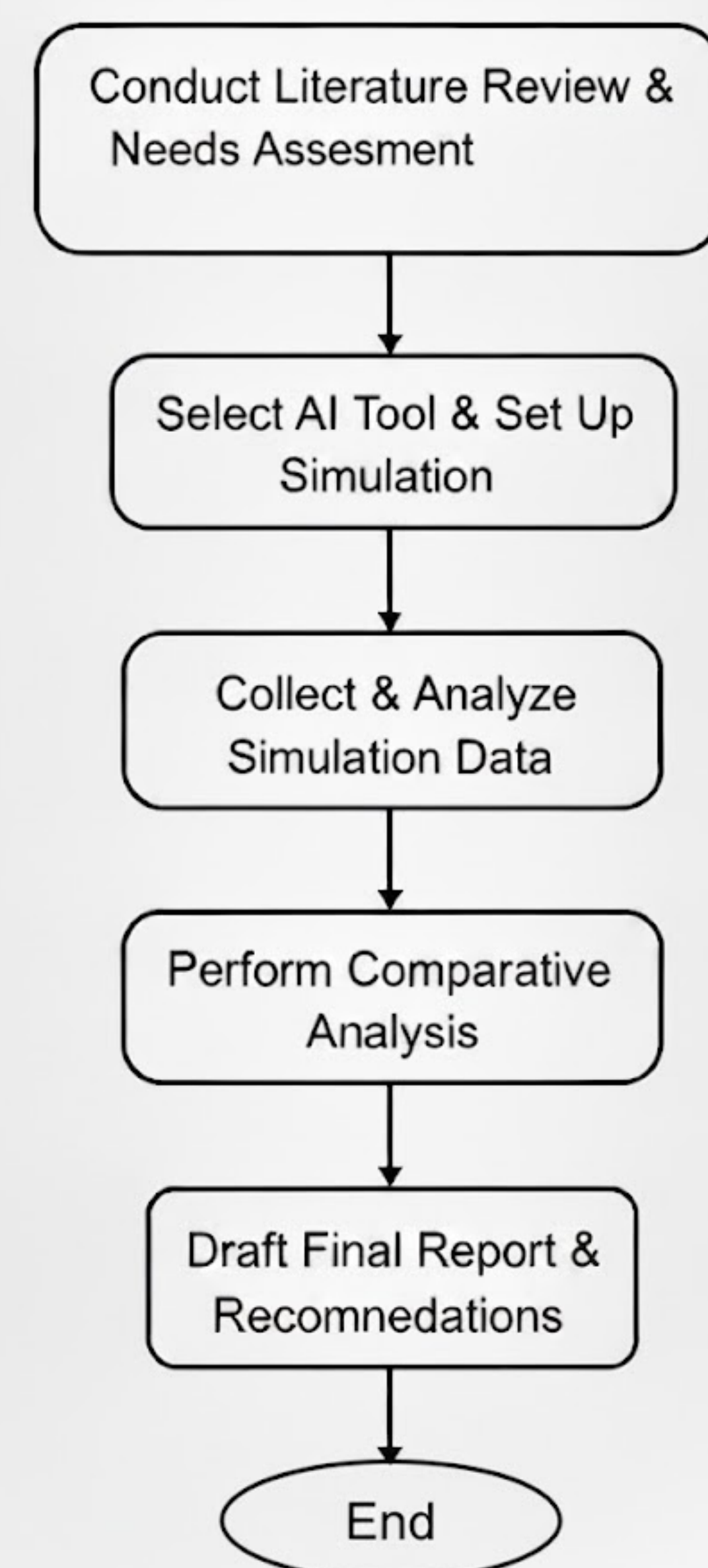


Figure 1
Methodology Flowchart

Phase 1: Foundation and Planning. Established the project's context through a literature review and a needs assessment of a federal engineering entity.

Phase 2: Practical Application and Testing Conducted hands-on testing of the CAMO GPT platform in simulated scenarios to gather quantitative and qualitative performance data.

Phase 3: Synthesis and Analysis. Performed a comparative analysis of AI versus traditional methods to identify benefits and limitations, culminating in the final report and recommendations.

Results and Discussion

The assessment revealed a significant gap between expectations and reality.

- **Case Study:** The CAMO GPT platform was used as the primary tool for analyzing a contract modification within a USACE project. In one practical test, the tool successfully located a critical clause within a 500-page contract in under 30 seconds, a task that would have taken a subject matter expert 15-20 minutes to complete manually. While the main uses were focused on proposal analysis and market research assistance, this demonstrated a significant, quantifiable improvement in efficiency for information retrieval tasks.
- **Data Analysis Limitations:** CAMO GPT failed at core data-handling tasks. Attempts to utilize its "Panda AI" tool to modify spreadsheet data were unsuccessful, and the system was unable to effectively compare or summarize data between documents.
- **Administrative Strengths:** The platform performed exceptionally well as a search tool for quickly retrieving information from large documents and was highly proficient at redacting sensitive information from memoranda.

Discussion: The tool's success in text-based tasks aligns with the documented use of AI in public administration for streamlining workflows. While it is not the transformative analytical engine initially envisioned, it is a highly effective administrative assistant for specific, language-oriented tasks.

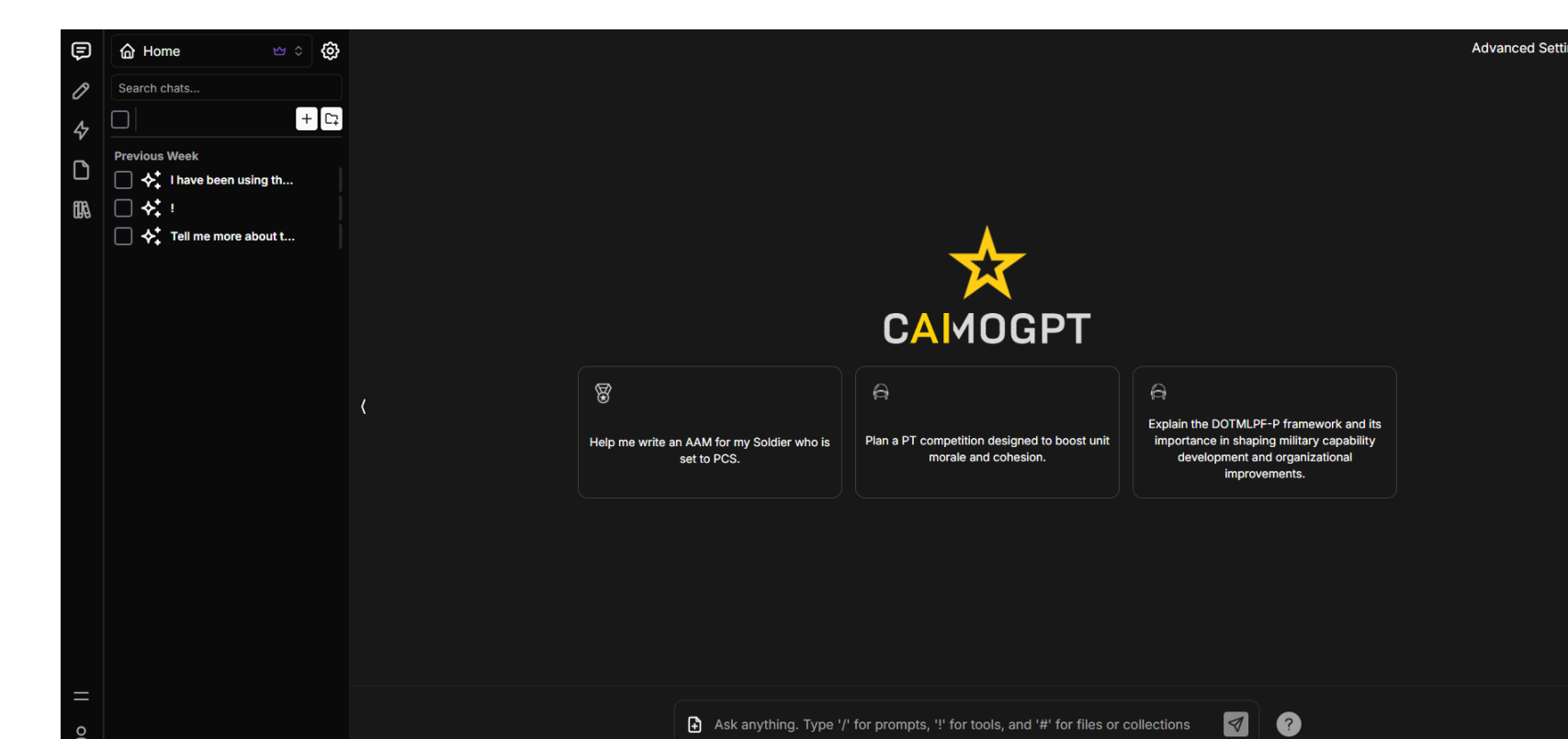


Figure 2
CAMOGPT Homepage

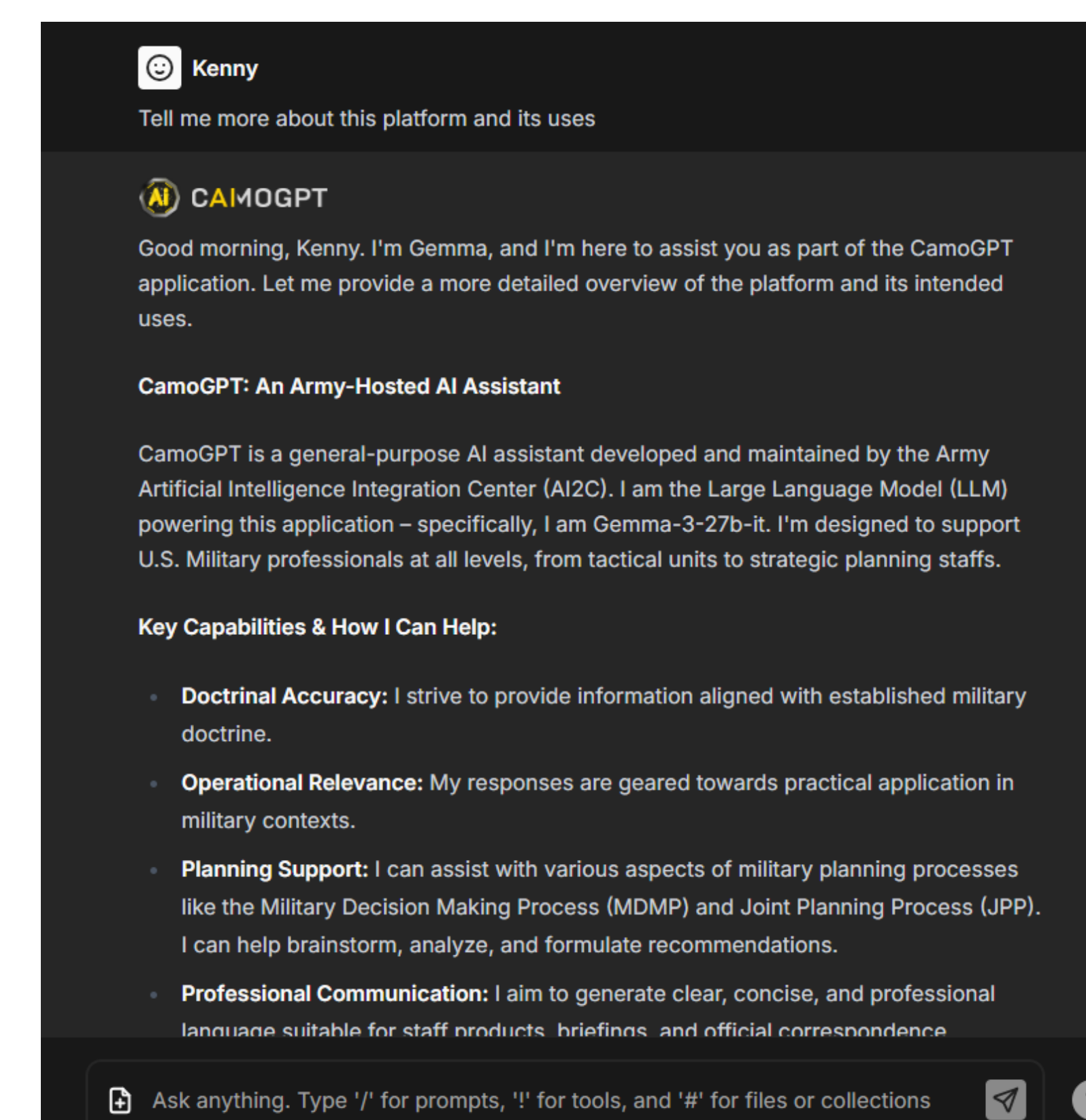


Figure 3
CAMOGPT Uses

Conclusions

- CAMO GPT is not currently a transformative tool for quantitative analysis or project scheduling in a federal construction context due to significant data-handling limitations.
- The platform is a valuable and effective tool for enhancing administrative efficiency through its powerful information retrieval and redaction capabilities.
- The practical role for this class of AI in government today is as a specialized, supplemental assistant for language-based tasks, not as a replacement for existing analytical processes.

Future Work

For platform developers, future efforts should prioritize enhancing spreadsheet and data manipulation functionalities to unlock the tool's broader potential. With a version of Microsoft Copilot expected to be released for government use, future research should focus on a direct comparative analysis of its data-handling capabilities against CAMO GPTs to determine the primary AI tool for federal agencies.

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References

- [1] M. Pan, C. Han, and J. Zhang, "A review of artificial intelligence in construction management," *Journal of Civil Engineering and Management*, 2020.
- [2] J. Wang, S. Ma, and Z. Li, "Application of machine learning for project schedule management: a systematic review," *Automation in Construction*, 2021.
- [3] Defense Acquisition University. (n.d.). *A GUIDE TO AI FOR DAF CONTRACTING OFFICERS* [Online]. Available: <https://www.dau.edu/>.
- [4] *Artificial Intelligence: Generative AI Use and Management at Federal Agencies*, U.S. Government Accountability Office, Washington, D.C., Rep. GAO-24-106519, 2024.