**Project Report: BiomedParse Extension for Layman-Accessible Medical Interpretation**

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Understanding biomedical research papers is inherently challenging for non-experts due to their technical language and complex structure. While **BiomedParse** offers an effective solution for extracting structured data from biomedical literature, such as section headers, tables, and figure captions, it does not address the broader issue of accessibility. Specifically, patients and the general public still struggle to interpret critical findings—such as tumor location, severity, and treatment recommendations—without guidance. To address this gap, my project proposed an extended interface that integrates BiomedParse with a visual and conversational component to assist laypeople in understanding and interacting with their medical data.

The core idea behind my proposal was to build an interface that could take outputs from medical image segmentation (e.g., tumor locations) and highlight them visually. The interface would also include a **ChatGPT-powered chatbox** capable of summarizing diagnosis, stage, and treatment in simple, accessible terms. For example, after parsing a biomedical article and identifying a tumor in a scan, the interface would highlight the tumor’s location, indicate its severity, and provide a plain-language explanation of the treatment plan. The goal was to make these results understandable to a non-technical audience, such as patients or caregivers.

The project used the **BiomedParse dataset**, which includes millions of open-access full-text biomedical articles. I also explored using GPT-4 and GPT-4o as conversational baselines for the explanation component. On the backend, I aimed to connect image segmentation models to detect tumors and summarize key clinical insights. The frontend design was envisioned to display structured content from articles alongside a user-friendly layout that included tumor highlights and a treatment overview. This design also embedded a chat interface where users could ask questions and receive explanations from ChatGPT in natural language. Unlike traditional parsing tools, my approach emphasized not just data structuring, but also **user comprehension and accessibility**.

However, the actual implementation did not lead to functional improvements. Several limitations prevented the system from working end-to-end. First, I encountered issues linking image analysis outputs directly to ChatGPT. Current APIs do not support direct image processing or visual input unless third-party tools or paid services are used. Second, the user interface components required to build a seamless and interactive frontend were often locked behind premium features or subscriptions, which were beyond the scope of this project. As a result, the **ChatGPT explanation layer was simulated but not operational**, and the full vision of the system could not be realized within the available constraints.

Looking forward, if I had an additional 10 weeks, I would pivot the development strategy toward more lightweight, open-source solutions. Specifically, I would use tools like **Streamlit** or **Gradio** to develop a simplified interface without relying on commercial frameworks. I would also explore converting image insights into text using third-party captioning models, which could then be fed into ChatGPT for explanation. Another key focus would be building a **demo using pre-annotated data**, simulating the tumor highlight and explanation functionality without requiring full backend integration. This would allow me to demonstrate the user experience and value of the tool, even without full technical implementation.

In reflecting on this project, it became clear that bridging the gap between powerful AI models and practical, user-friendly medical tools remains a significant challenge. Tools like BiomedParse and ChatGPT are highly capable on their own, but integrating them in a way that is **affordable, explainable, and secure** for everyday users requires more than just engineering—it calls for thoughtful design, ethical sensitivity, and long-term collaboration between developers, clinicians, and patients. Making medical AI truly accessible will involve not only better models, but also systems built with real-world usability and human understanding in mind.