

Summary

Approximately 36% of U.S. adults possess basic or below-basic health literacy, which is linked to adverse health outcomes such as increased hospitalizations and higher mortality rates among seniors. In electronic health systems, around 25% of adults exhibit low electronic health literacy (eHL), making them less likely to perceive web-based patient portals as useful and limiting their engagement with digital health resources. Simplifying patient portals is crucial to improve accessibility and usability, particularly for individuals with low health literacy.

The primary objective of CapRx is to develop and integrate a generative AI system that automatically captions and interprets data visualizations while providing tailored, interactive chatbot-mediated advice within patient portals. Additionally, we aim to ensure seamless integration with Electronic Health Records (EHRs) and conduct user-centric design and usability testing to enhance portal usability and engagement, fostering more confident and informed healthcare decision-making.

We will incorporate Med-PaLM, a generative AI model from Google Research designed for medical use, into web-based patient portals to automatically caption and interpret data visualizations. Leveraging patient-specific data from Electronic Health Records (EHRs), the AI-driven chatbot will deliver personalized health plans and coaching, enhancing data transparency and patient engagement. An iterative UI/UX design process, including usability testing with diverse patient groups, will refine the interface to ensure accessibility, while robust data security measures will safeguard patient information and ensure HIPAA compliance. Post-implementation, we will evaluate the system's effectiveness by measuring patient health outcomes, surveying perceived usefulness through patient feedback, and monitoring portal usage rates to quantify increases in engagement and satisfaction.

CapRx is anticipated to significantly improve patients' comprehension of their lab results, health trends, and care plans through automated captions and an interactive chatbot, targeting a 50% increase in patient engagement and a 50% improvement in perceived usefulness scores based on post-implementation surveys. Additionally, the personalized health plans and coaching facilitated by the chatbot are projected to enhance patient satisfaction and empower more informed healthcare decision-making, ultimately contributing to better health outcomes.

CapRx targets the \$3.7 billion patient portal market, which is projected to grow at a 17% compound annual growth rate through 2030. We will commercialize our solution through a subscription-based model, supplemented by premium feature and service offerings on a per-use basis, enabling scalable revenue growth and broad adoption across healthcare providers seeking to enhance patient engagement and data interpretation.

Ultimately, this project will transform patient portals into more accessible and empowering tools, significantly enhancing patient engagement and informed healthcare decision-making.

Narrative

Low electronic health literacy (eHL) significantly impedes patients' ability to effectively utilize web-based patient portals, resulting in decreased engagement and suboptimal health outcomes. CapRx aims to address this challenge by integrating Med-PaLM, a generative AI model developed by Google Research for medical applications, into patient portals to automatically caption and interpret data visualizations. By leveraging patient-specific data from Electronic Health Records (EHRs), the AI-driven chatbot will deliver personalized health plans and coaching, enhancing data transparency and patient engagement. Successful implementation of this project will not only increase portal usage and perceived usefulness among patients with varying levels of eHL but also empower them to make more informed healthcare decisions, thereby improving overall health outcomes.

References Cited

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Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low Health Literacy and Health Outcomes: An Updated Systematic Review. Annals of Internal Medicine 2011;155:97. <https://doi.org/10.7326/0003-4819-155-2-201107190-00005>.

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Facilities & Other Resources

Our team operates from a fully equipped office space within The University of Iowa, providing a collaborative environment conducive to interdisciplinary work. We utilize Google Cloud Platform (GCP), specifically services like Google Kubernetes Engine and BigQuery, to host Med-PaLM and manage our AI-driven chatbot functionalities, ensuring scalability and reliability. High-performance workstations and dedicated servers are available for efficient AI model training and data processing. Robust cybersecurity measures, including firewalls and encryption protocols, are in place to protect sensitive patient information and ensure HIPAA compliance. Our partnerships with the University of Iowa provide access to diverse patient populations for usability testing and feedback, further enhancing the project's effectiveness.

Equipment

CapRx is supported by a range of specialized equipment essential for the development, testing, and deployment of our generative AI solution. Our high-performance development workstations are equipped with advanced CPUs, GPUs, and ample RAM to facilitate efficient AI model training and data processing. Dedicated servers hosted on Google Cloud Platform enable the deployment of Med-PaLM and manage real-time data processing and chatbot interactions. Tools like UserTesting and Lookback are used for conducting and recording usability tests with diverse patient groups. Advanced encryption software and secure storage devices protect patient data, and our network security hardware, including firewalls and intrusion detection systems, safeguards our internal network from unauthorized access and cyber threats.