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Improving Documentation Quality and Patient Interaction with AI: A Tool for Transforming Medical Records — An Experience Report

Pedro Angelo Basei de Paula¹, Matheus Nespolo Berger¹, João Victor Bruneti Severino², Karen Dyminski Parente Ribeiro¹, Fillipe Silveira Loures, Solano Amadori Todeschini, Eduardo Augusto Roeder¹, Gustavo Lenci Marques¹

¹ Universidade Federal do Paraná

² Pontifícia Universidade Católica do Paraná

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Abstract

Background: The quality of medical records is crucial for effective patient care but is often compromised by the time doctors spend typing during and after consultations, contributing to physician burnout. Voa is an AI-driven tool developed in Brazil to convert audio from medical consultations into optimized clinical documents. This study examines the implementation of Voa in the clinical environment, employing technologies like Whisper and generative AI to enhance documentation quality, reduce medical errors, and improve doctor-patient interactions.

Methods: The study involved metrics such as the number of anamneses generated and user adoption rates from March to May 2024, related to healthcare professionals who used Voa during their routine consultations. System architecture involves real-time data capture, speech-to-text conversion by Whisper, and refinement of text through a GPT-4-based Large Language Model (LLM).

Results: The study observed an increase in document generation and user adoption over the analysis period. The cumulative number of documents generated reached 6,380 by mid-May 2024. The number of users grew steadily from approximately 100 in early March to nearly 900 by mid-May. The rolling average of daily document generation indicated consistent growth, with noticeable peaks and seasonality patterns. The variation in the weekly activation rate suggests many doctors registered but did not use the platform effectively, indicating a need for improved user retention through targeted onboarding, training, and support.

Conclusions: Metrics analysis showed an increase in document generation and users, reflecting growing acceptance. As Voa evolves, its adoption is expected to improve operational efficiency and patient care quality. Continuous improvements and user feedback mechanisms are expected to further increase its acceptance and integration into clinical workflows. Physicians who do not adopt such technologies may find themselves at a significant disadvantage in meeting the increasing demands of modern, data-driven healthcare systems.

Pedro Angelo Basei de Paula¹, Matheus Nespolo Berger¹, João Victor Bruneti Severino², Maria Han Veiga³, Karen

Dyminski Parente Ribeiro¹, Fillipe Silveira Loures⁴, Solano Amadori Todeschini⁴, Eduardo Augusto Roeder^{1,4}, and Gustavo Lenci Marques^{1,2}

¹*Federal University of Paraná, Brazil*

²*Pontifical Catholic University of Paraná, Brazil*

³*Ohio State University, USA*

⁴*Voa Health*

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Highlight box

Key findings

- Voa can enhance the quality and efficiency of medical documentation by automating transcription and structuring of medical records using AI technologies.
- The study observed an increase in document generation and user adoption, reflecting growing acceptance and confidence in the platform.

What is known and what is new?

- **Known:** Manual documentation during medical consultations is time-consuming, increases the risk of medical errors, and contributes to physician burnout.
- **New:** Voa leverages AI technologies like Whisper and GPT-4-based Large Language Models to transform audio from consultations into optimized clinical documents, significantly reducing the time doctors spend on clerical tasks. This manuscript adds the analysis of the implementation of Voa in clinical settings, demonstrating its potential to improve documentation quality, reduce medical errors, and enhance doctor-patient interactions. It also provides quantitative metrics on user adoption and document generation, highlighting the platform's growing acceptance.

What is the implication, and what should change now?

- **Implications:** The adoption of AI-driven tools like Voa can alleviate the clerical burden on doctors, allowing them to focus more on patient care. It can also reduce the incidence of medical errors associated with manual documentation.
- **Actions needed:** Healthcare systems should consider integrating AI-based documentation tools to enhance operational efficiency and improve patient care quality. Continuous improvements, user feedback mechanisms, and randomized controlled trials are essential for further analysis to increase the acceptance and effectiveness of such technologies. Collecting qualitative feedback will allow precise adjustments, better meeting the needs of doctors and encouraging more regular use.

1. Introduction

1.1. Background

An AI-driven tool called Voa was developed in Brazil to convert audio from medical consultations into optimized clinical documents. By employing a combination of automatic transcription technologies like Whisper^[1] and generative artificial intelligence, Voa converts speech into text, which is then processed by a generative AI layer that corrects common transcription errors, adapts specific medical terms, and optimizes grammar, ensuring the clinical and linguistic accuracy

required in medical records. Voa organizes and structures the text into a coherent medical document, regardless of the conversation's sequence, facilitating its integration into electronic medical record systems.

One of Voa's significant strengths is its ease of use. Doctors can initiate the recording at the beginning of a patient visit and continue their consultation as usual. When the recording is finished, the document is generated. The document can then be easily copied with a single click, edited, and printed, ensuring secure integration into the medical system.

The ability to generate documents with Voa using only consultation audio extends beyond anamnesis to include optimized prescriptions, medical certificates, referrals, examination requests, and clinical summaries. The clinical summary is particularly valuable as it translates the consultation into language that is easily understandable for the patient, providing an overview of key points discussed, diagnoses made, orientations given, and treatment plans.

1.2. Rationale and Knowledge Gap

A comprehensive study by Stanford Medicine and Google Health involving 254 primary care providers (PCPs) examined their experiences with electronic health record (EHR) documentation and attitudes towards AI-assisted documentation, aiming to identify the most time-consuming and burdensome aspects of EHR documentation and gauge PCPs' preferences for AI assistance. Key findings indicated that AI-assisted documentation could alleviate clerical burdens, allowing providers to focus more on cognitive tasks and patient care, emphasizing that AI tools should be inconspicuous, efficient, and provide high-quality, accurate notes^[2]. Voa aligns with these findings by offering an AI-driven solution to streamline clinical documentation, reducing the clerical workload for doctors.

For every hour physicians spend with patients, nearly two additional hours are spent on EHR and desk work within the clinic day, with another one to two hours of personal time each night dedicated to additional computer and clerical tasks^[3]. Physicians spend 34% to 55% of their workday creating notes and reviewing medical records in the EHR^[4]. Primary care physicians spent more time working in the EHR than they spent in face-to-face time with patients in clinic visits^[5]. The 2020 Medscape National Physician Burnout and Suicide Report indicated a burnout rate of about 43%, with too many bureaucratic tasks topping the list of burnout causes^[6]. Healthcare workers, and especially perioperative clinicians seem to be at particular risk for burnout^[7]. By automating the documentation process, Voa can significantly reduce the time doctors spend on EHR tasks, potentially alleviating burnout.

Studies have shown that manual documentation during medical consults increases the risk of medical errors and decreases the overall quality of care. The repetitive use of "copy and paste" can cause severe adverse patient events by introducing inaccuracies and spreading outdated information. It leads to discordant notes and contributes to creating long notes that mask essential clinical information, significantly contributing to these issues^[8]. A mistake in copy-pasting is reported to account for over 36% of errors in data entry, which can have serious implications for patient safety^[9]. Voa addresses this by automating the documentation process and allowing doctors to copy the generated text with a single click, thereby reducing the potential for errors introduced by manual copying.

AI can free up physicians' cognitive and emotional space for patients and shift the focus away from transactional tasks to

personalized care^[10]. AI increases learning capacity and provides decision support systems at scales that are transforming the future of healthcare^[11]. Tools like ChatGPT use large language models (LLMs), multi-layer neural networks trained on large amounts of data to simulate human conversation^[12]. LLMs have already been used to interpret electronic medical record data^[13] and demonstrate a high level of understanding of clinical dialogue structure, evidence towards the potential of AI-assisted tools in reducing clinical documentation burden^[14]. Voa leverages these advancements by generating high-quality clinical documents from audio recordings, ensuring that the summaries are both accurate and useful.

A study found that summarizing electronic health records (EHRs) burdens clinicians. Eight large language models (LLMs) were adapted for radiology reports, patient questions, progress notes, and doctor-patient dialogue. Summaries from well-adapted LLMs were equivalent (45%) or superior (36%) to those by medical experts, suggesting LLMs can reduce documentation burdens and improve patient care^[15]. AI-generative technologies such as the Med-Gemini platform have demonstrated how highly capable, multimodal models specialized in medicine can significantly improve clinical reasoning and multimodal understanding in medical contexts^[16]. Voa utilizes similar AI technologies to improve the accuracy and efficiency of medical documentation.

Digital scribes or intelligent documentation support systems, leveraging advances in speech recognition, natural language processing, and artificial intelligence, automate the clinical documentation task currently conducted by humans. These tools offer a gateway into the clinical workflow for more advanced support for diagnostic, prognostic, and therapeutic tasks^[17]. The more seamless the digital scribe solution, the greater the support for the clinician engagement with patients. Any digital scribe solution that requires ongoing input and supervision throughout the consultation will distract clinicians from patients and replace the distractions and disruptions of using an EHR with those of a digital scribe^[18]. Voa's integration of AI and voice technology exemplifies this trend, providing a seamless solution for medical note-taking.

Technologies like Voa emerge as solutions to optimize the documentation process, enhance clinician satisfaction, and reduce documentation time. This possibility is supported by studies demonstrating that AI can improve these tasks for doctors and alleviate issues related to performing numerous tedious, repetitive, and often difficult tasks, such as adding documentation to electronic medical records^[19]. It underscores the view that artificial intelligence will not replace doctors but will enhance their capabilities and their efforts to care for patients. Perhaps the only healthcare providers who will lose their jobs over time may be those who refuse to work alongside artificial intelligence^[20]. Voa, by automating routine tasks and allowing clinicians to focus more on patient care, exemplifies the positive impact AI can have on healthcare workflows.

1.3. Objective

This study aims to validate Voa as a generative AI tool offered as a Software as a Service (SaaS) solution, designed to improve the creation of medical records, relieve doctors of repetitive and bureaucratic tasks, and allow them to spend more time interacting with patients. Additionally, it will discuss Voa's functionality, including its technical operations and the practical benefits it provides in clinical settings. The study will also cover metrics related to the implementation of Voa,

discussing its acceptance on doctors who have used the tool in their consultations.

2. Methodology

This study aimed to evaluate the implementation of Voa's generative AI tool in a set of medical consultations, showcasing its potential to address the documented issues in medical record-keeping literature. Additionally, the study aimed to demonstrate the functionality and ease of use of Voa, and provide an overview of the technologies employed. The metrics analysis period spanned from March to May 15, 2024.

2.1. Step-by-Step Usage

- Starting a Consultation:** Doctors initiate the process by clicking on the "Start Recording" button at the beginning of a consultation. This allows Voa to capture the entire conversation between the doctor and the patient. It is also possible to upload an audio file if necessary.
- Pausing and Continuing:** If needed, the recording can be paused and resumed, providing flexibility during the consultation. During the consultation, doctors can speak naturally without worrying about the order of information. The system is designed to handle parallel conversations and unrelated remarks seamlessly. Non-essential information and side conversations are filtered out, allowing the focus to remain on critical medical details. This flexibility allows doctors to maintain a natural flow of conversation, enhancing the overall patient experience without compromising the quality and accuracy of the medical documentation.
- Finishing the Consultation:** At the end of the consultation, doctors click "Generate Anamnesis", and Voa generates the document.



Figure 1. Fields of Starting a Consultation(1), Pausing and Continuing(2), and Finishing the Consultation(3)

- Reviewing Transcriptions:** Additionally, there is a window with the transcription of the consultation that allows doctors to review what has been literally converted from the conversation between the doctor and the patient. Every minute of

the consultation, the transcribed parts are updated in real-time as the consultation is being recorded. Upon concluding the consultation and generating the anamnesis, the complete literal transcription is also presented. This allows for comparative analysis by the doctor between what was spoken and what has been organized and structured into a document.

- Adding Annotation:** Doctors can type notes in this annotation field while recording, and when generating the document, Voa will consider both the annotations and the audio. These notes can include specific instructions or additional information that was not covered during the audio recording, such as clinical information about the patient, including medication lists, previous medical records, and examination lists. Voa incorporates these notes into the final structured document, ensuring all relevant information is captured accurately.



Figure 2. Fields of Transcription of Consultation(4) and Annotations(5)

- Anamnesis:** Voa organizes the recorded audio into a structured document, which includes sections such as Chief Complaint, History of Present Illness, Lifestyle Habits, Past Medical History, Vaccination History, Current Medications, Family History, Physical Examination, Vital Signs, Test Results, Diagnostic Hypotheses, Prescribed Medications, Recommendations, Additional Tests, Medical Certificate, and Referral. Voa automatically completes these sections if the relevant information is mentioned during the consultation. If a topic is not discussed, it is simply left out of the document.
- Regenerating the Document:** Doctors can add additional notes even after the anamnesis has been generated. Once the annotations are added, the doctor can regenerate the anamnesis document. Voa incorporates these notes into a new structured document, ensuring all relevant information is reorganized.
- Finalizing and Integrating:** The final document is organized and structured in medical language appropriate for clinical records. It can be edited if necessary and then securely copied and pasted into the medical record system with a single click, ensuring all patient data is accurately recorded and easily accessible. It is also possible to print the document with a single click. By following these steps, Voa significantly streamlines the process of medical documentation, making it more efficient and allowing healthcare providers to dedicate more time to patient care.
- Document Sharing:** It is possible to share documents with other Voa users by generating a link. Doctors can select to allow editing or restrict the document to view-only, facilitating better case discussions and collaboration among medical professionals.

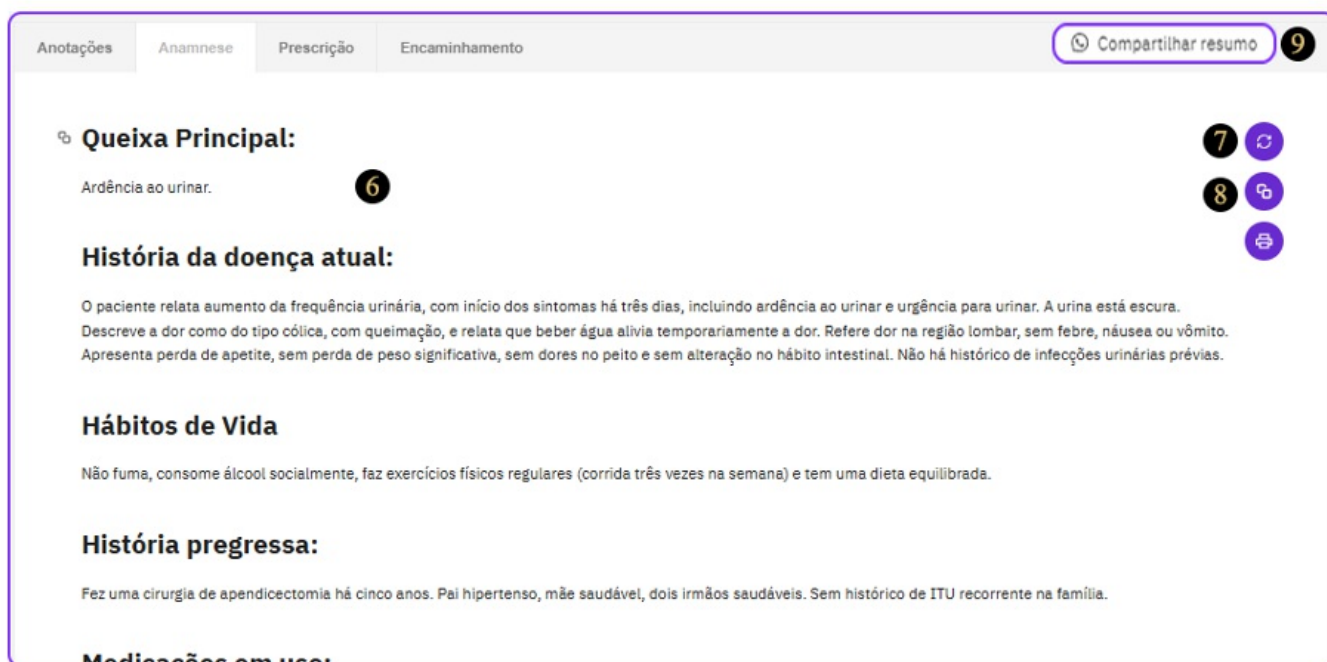


Figure 3. Example of Anamnesis with Voa(6), Regenerating button(7), Copy and Print buttons(8), Share document button(9)

- 10. Additional Document Generation:** Besides anamnesis, Voa can generate other essential documents such as Prescription, Medical Certificate, Referral, Examination Request, and Clinical Summary. These documents are generated after the anamnesis and are created if the doctor has discussed these topics during the consultation. If the anamnesis document contains relevant information on these topics, Voa can subsequently generate these additional documents, organizing everything accurately. The Clinical Summary is particularly useful as it provides a summary of the consultation in accessible language for patients.

2.2. System Architecture and Technologies Used

The system architecture incorporates several components. First, data capture is performed securely and in real-time, ensuring that audio from consultations is immediately available for processing. The initial transcription is handled by Whisper, which converts the speech to text. Subsequently, templates developed by Voa, associated with a Large Language Model (LLM) based on GPT-4o and adapted to the needs of various specialties, refine the text, structuring it into a coherent and contextually accurate medical document. This refined transcription includes additional annotations provided by the physician, which are processed together with the audio transcription by the AI to generate a comprehensive, organized, and structured medical document. The output is formatted in Markdown and rendered for the user in a WYSIWYG editor. Audio recordings are anonymized and encrypted in accordance with the Brazilian General Data Protection Law (LGPD) to ensure the security and privacy of patient information.

2.3. Implementation and Evaluation

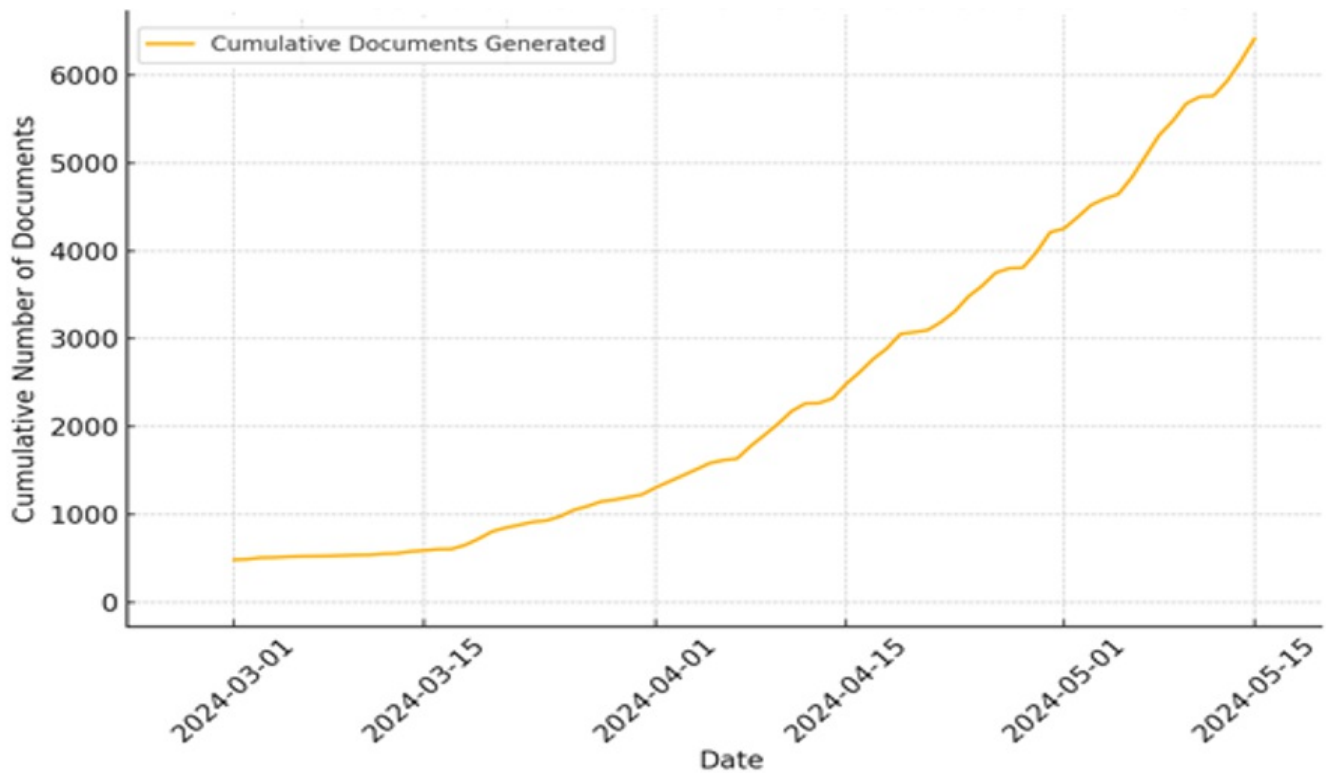
The adoption of the system was assessed based on metrics such as the number of anamnesis generated and the number

of users, involving doctors who created an account on Voa after being informed through advertisements and webinars. These doctors were given the opportunity to use the platform during routine consultations in a clinical environment. This approach allowed us to measure acceptance and effective use of the technology by healthcare professionals. Notably, this study did not involve traditional human subjects but focused on analyzing metrics related to the tool's usage by voluntary doctors who integrated the system into their practice. All collected information was anonymized, ensuring no access to patient data or identifiable information, thus obviating the need for approval from a research ethics committee. The study prioritized evaluating an already implemented technology without compromising data privacy or security. The paper's evaluations are based on tool usage metrics and data, not patient-specific information.

Daily monitoring of the number of anamneses generated provided continuous tracking of the tool's usage volume. Additionally, adherence to the technology was measured by tracking the number of new users per day, the cumulative number of users, and the weekly activation rate, defined as the percentage of new users who registered and generated at least one anamnesis within a week, offering insights into the platform's acceptance. Other data included the number of documents generated daily and the total accumulated. Voa was officially launched in February, but for consistency in metrics and to allow sufficient time to validate the activation rate, the study metrics were collected from March to May for a more accurate analysis.

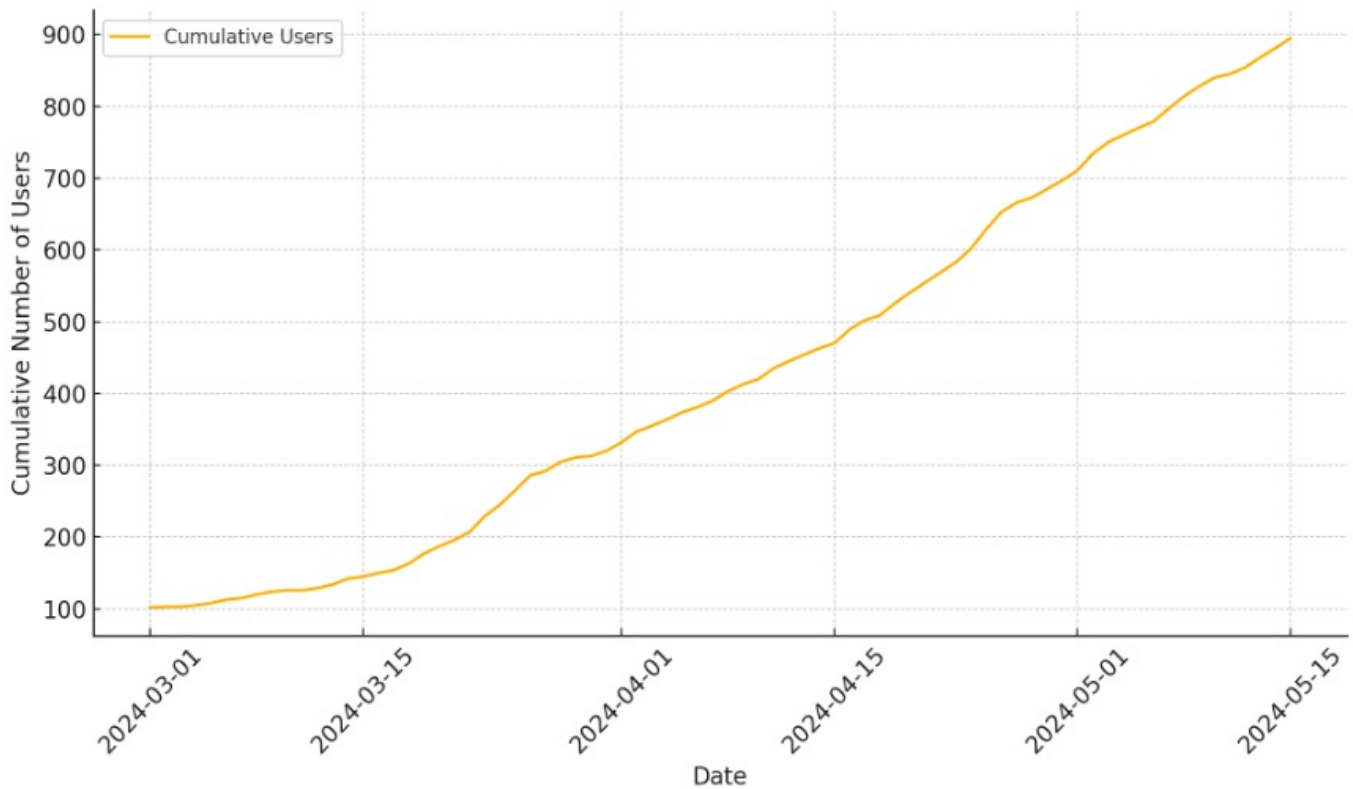
While the user feedback collection system is still under development, limiting the availability of qualitative evaluations, this does not hinder the objective measurement of the technology's impact and acceptance. The absence of a comprehensive feedback system presents an opportunity for future refinements, emphasizing the innovative and initial phase of this project in a clinical environment. The available quantitative metrics provide a basis for future discussions about the technical capabilities and acceptance of the Voa solution and understanding about the retention, essential for its broader adoption in the healthcare field.

3. Results



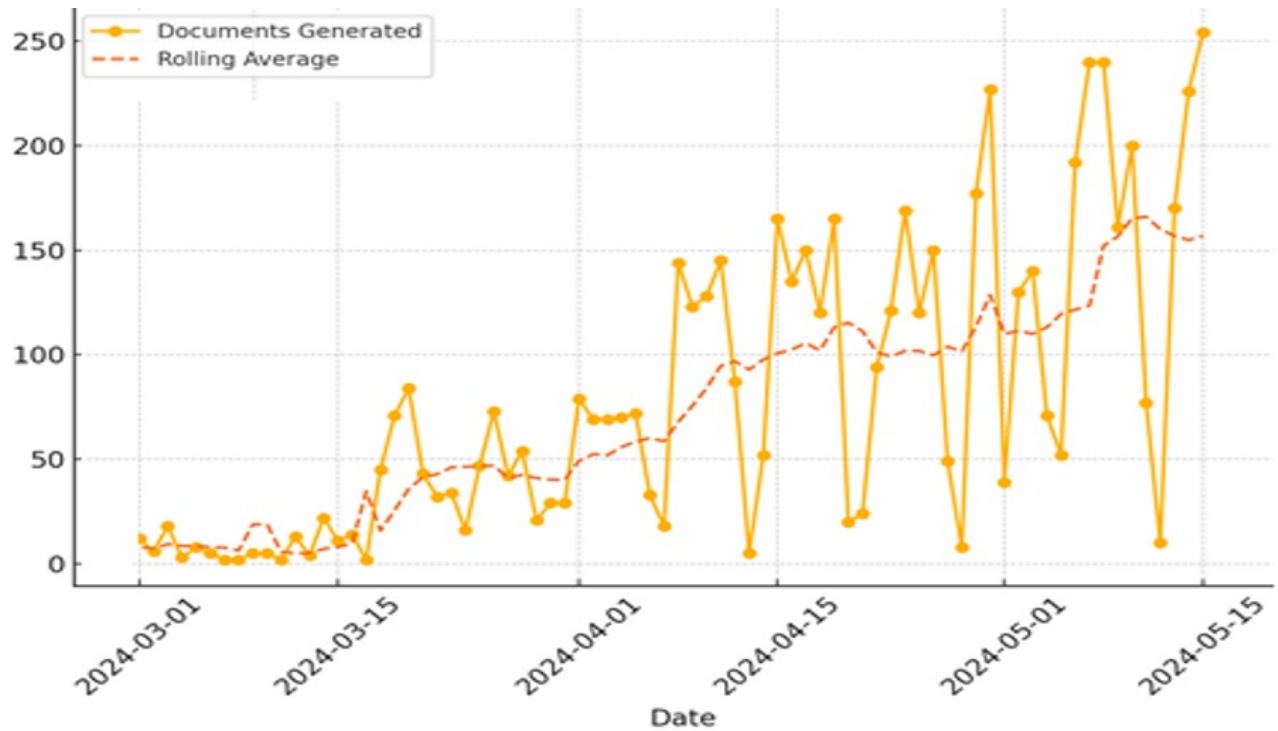
Graph 1. *Cumulative Documents Generated Over Time*

The "Cumulative Documents Generated Over Time" graph illustrates the cumulative number of documents generated using the Voa platform from its inception from March 1 to May 15. Until mid-May, a total of 6,380 anamneses were generated using the Voa platform. The upward trend in the graph demonstrates a consistent and significant increase in document generation, reflecting the growing adoption of the platform among physicians. Initially, the growth was relatively slow in the first few weeks, but it accelerated noticeably starting in mid-March. The consistent increase could suggest an initial learning and adaptation phase, followed by more intensive and regular use. It also can indicate growing acceptance and confidence in the platform.



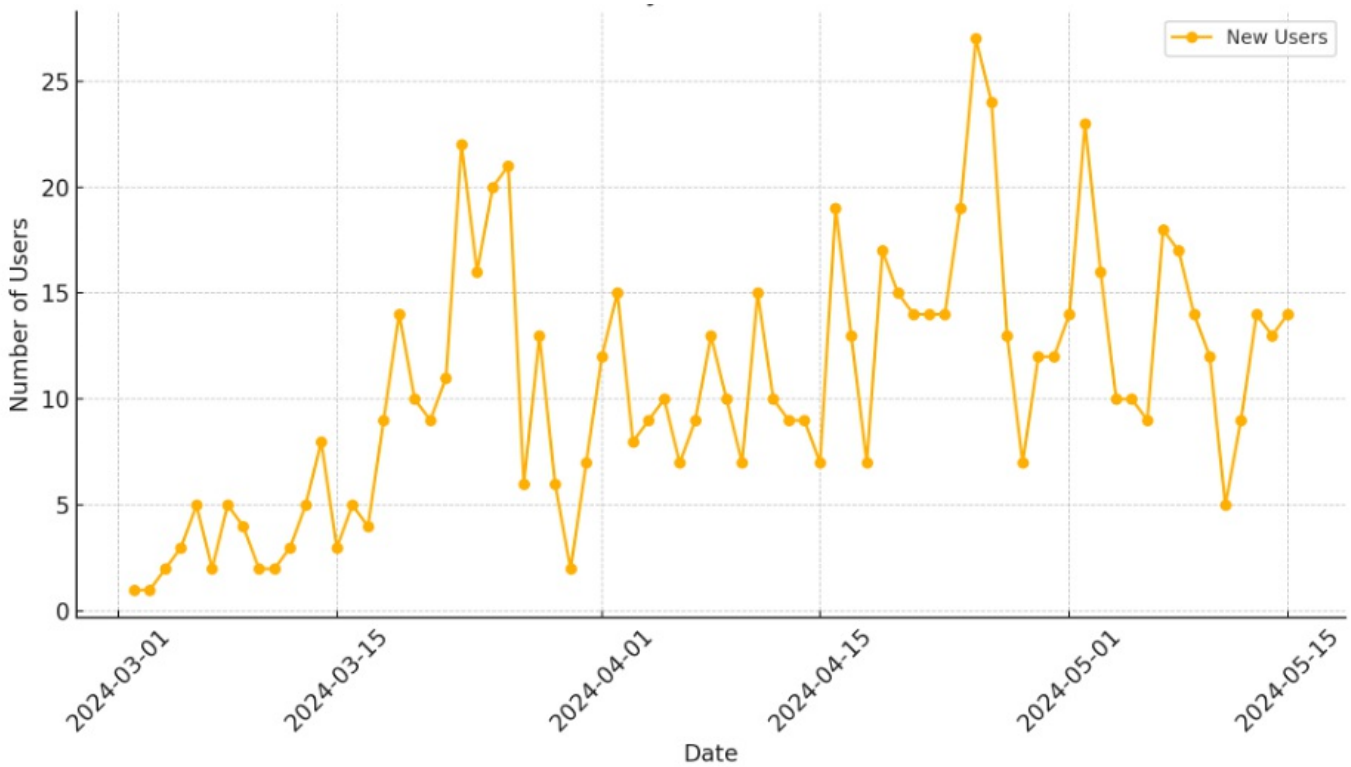
Graph 2. *Cumulative Users Over Time*

The "Cumulative Users Over Time" graph shows the cumulative number of Voa platform users from March 1 to May 15. The graph depicts a steady and smooth increase in users over time, indicating growing and continuous acceptance of the platform among healthcare professionals. Starting with approximately 100 users in early March, the number steadily grew to nearly 900 users by mid-May. The number of physicians using the platform is not fixed, and new users were added during the recorded time, contributing to the overall increase in document generation. This progressive growth suggests a positive response to the system and effective user base expansion. Additionally, this trend may be attributed to several factors, such as improved marketing campaigns, increased word-of-mouth recommendations, and effective onboarding processes that helped physicians quickly understand and integrate the platform into their routines. User interviews have not been considered in this study because the qualitative analysis is still under development, and they will be included in future studies.



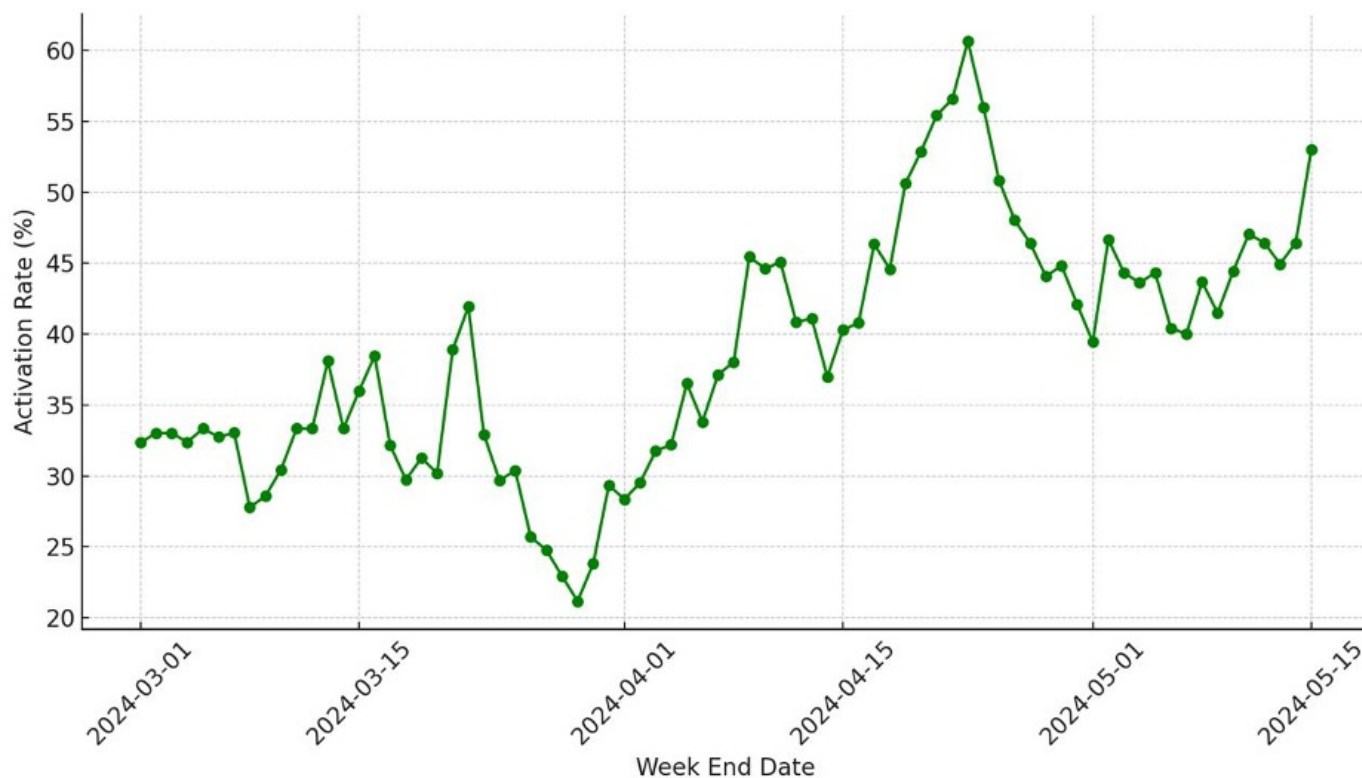
Graph 3. Daily Documents Generated and Rolling Average

The "Daily Documents Generated and Rolling Average" graph presents the number of documents generated daily by the Voa platform, along with a rolling average that smooths out daily fluctuations to better visualize trends over time, from March 1 to May 15. The solid yellow line represents the number of documents generated each day, showing considerable day-to-day variation, with peaks exceeding 200 documents. The dashed red line indicates the rolling average of the documents generated, providing a more smoothed view of these fluctuations. The rolling average shows a growth trend over time, indicating progressively higher and more consistent platform adoption. This gradual increase suggests that more users are utilizing the platform over time. One aspect of the graph is the seasonality, particularly on weekends. The lower document generation numbers on Saturdays and Sundays suggest that doctors use the platform less frequently during these days, which could account for the observed dips in the daily document counts. Despite daily oscillations, the overall trend is one of growth in platform usage, underscoring its acceptance in the clinical environment. Visualizing these trends is important for understanding the real impact of the technology on healthcare professionals' routines and clinical documentation management.



Graph 4. Daily New Users

The "Daily New Users" graph illustrates the number of new daily users of the Voa platform from March 1 to May 15, 2024. The yellow line represents the number of new users registered each day during this period. The data indicates a gradual increase in adherence over time, though with some fluctuations typical in the launch of new technologies. User numbers may vary depending on awareness and available learning opportunities. Visualizing this metric is important to understand how the platform is received and which strategies might be most effective for increasing user engagement over time. These insights can help inform future training strategies to maximize the adoption and effective use of the technology.



Graph 5. Weekly Activation Rate

The graph titled "Weekly Activation Rate" shows the weekly activation rate of new users on the Voa platform from March 1 to May 2024. The activation rate is defined as the percentage of new users who registered and generated at least one anamnesis within a week. The green line traces the weekly variations in the activation rate, starting at about 32% in early March and showing fluctuations over the subsequent weeks. An increase is observed between April and May, with the activation rate rising to over 60%. Understanding these trends helps identify periods of strong user adoption and areas where improvements may be needed, ultimately guiding strategies to enhance user retention and platform success. The upward trend in the activation rate towards the end of the period demonstrates that more new users are becoming regular users over time. However, it also highlights that while many doctors registered to test the platform, not all became regular users. The variation in the activation rate underscores the need for targeted strategies to enhance user retention. Ensuring that new users receive adequate support and training is crucial for maintaining high engagement levels. Continuous improvements in the platform and addressing user feedback will be essential to sustaining this positive trend.

4. Discussion

4.1. Key Findings

The implementation and analysis of the Voa platform highlight its potential to transform clinical documentation and enhance healthcare efficiency. The platform has shown a notable increase in the number of users and a continuous rise in document generation. Daily document generation data, along with the rolling average, highlights Voa's increasing role in

daily clinical practices. Despite daily fluctuations and seasonality, the overall growth trend underscores Voa's growing acceptance and effectiveness in streamlining documentation processes, ultimately enhancing workflow efficiency and clinician satisfaction. The relationship between the weekly activation rate with cumulative number of documents generated and the cumulative number of users suggests that not all doctors are becoming regular active users. Although the platform is continuously attracting new registrations, user retention can be improved.

4.2. Strengths and Limitations

The implementation of Voa presents several strengths and limitations that are important to consider. One of the primary strengths of Voa is its ability to significantly enhance the efficiency of medical documentation. By automating the transcription and structuring of clinical records, Voa reduces the clerical burden on physicians, allowing them to focus more on patient care. This has the potential to improve the overall quality of medical records and reduce the incidence of errors associated with manual documentation processes.

Another notable strength is the user-friendly design of Voa, which integrates seamlessly into the clinical workflow. The system's ease of use encourages adoption among healthcare professionals, as evidenced by the steady increase in the number of users and the volume of documents generated over the study period. The positive reception and growing confidence in the platform highlight its potential to become a valuable tool in modern healthcare settings.

However, considering the tool's recent introduction, the study primarily relies on quantitative metrics, such as the number of documents generated and user adoption rates, without incorporating comprehensive qualitative feedback from users. While these metrics provide valuable insights into the platform's reception, they do not fully capture the user experience or potential areas for improvement.

4.3. Comparison with Similar Researches

Studies have shown that manual documentation during medical consults increases the risk of medical errors and decreases the overall quality of care due to inaccuracies introduced by "copy and paste" practices^{[8][9]}. AI technologies, such as Voa, can automate documentation, improve accuracy, and enhance the quality of medical records^{[2][10][11]}. Other AI tools, like digital scribes, have demonstrated similar benefits in reducing the documentation burden and improving patient care^{[12][14][15][16][17][18][19]}. Voa's integration of AI and voice technology exemplifies this trend, providing a seamless solution for medical note-taking and supporting doctors in their clinical duties, reducing time spent on clerical tasks, enhancing the quality of documentation and improving patient care.

4.4. Explanations of Findings

The initial slow growth in document generation followed by significant uptake suggests a learning period where users needed time to become familiar with the technology. This pattern is typical for innovative tool adoption, where initial hesitation gives way to increased confidence and regular use. The steady rise in users and the cumulative number of

documents generated indicates that Voa is being progressively integrated into daily clinical practice.

The variation in weekly activation rates indicates that while many doctors registered to test the platform, not all became regular users. It can be attributed to the fact that many doctors registered to test the platform but did not use it effectively or only used it once. This suggests that some users may require additional support or training to fully integrate Voa into their workflow.

4.5. Implications and Actions Needed

The positive results observed so far are promising and point to the potential for continuous growth with the planned enhancements. Voa's integration of advanced AI and voice technologies showcases its transformative potential in clinical settings. By automating routine tasks and allowing clinicians to focus more on patient care, Voa aligns with broader healthcare trends to reduce EHR-related burdens and enhance clinician satisfaction. The continuous growth in document generation and users underscores Voa's effectiveness and potential to significantly improve clinical documentation practices, contributing to better healthcare outcomes. Targeted strategies such as comprehensive onboarding, user training sessions, and continuous support should be implemented to ensure users fully understand and utilize the platform's capabilities to improve the weekly activation rate.

The evaluation of a feedback system will be important to identify the barriers faced by new users and improve the activation and retention rates. Future studies with NPS (Net Promoter Score) surveys to assess user satisfaction and likelihood of recommendation, and randomized controlled trials (RCTs) in different medical specialties are in development to provide valuable data on patient and physician satisfaction, documentation time, and record quality, contributing to continuous improvements in the platform and data on medical literature. Collecting qualitative feedback allows precise adjustments, better meeting the needs of doctors and encouraging more regular use.

5. Conclusion

This report provided an overview of the Voa's artificial intelligence in clinical settings and its potential to optimize medical records. The analysis of the metrics revealed an increase in both the number of documents generated and the number of users, reflecting growing acceptance and confidence in the platform. The variation in the weekly activation rate indicates that not all registered users are utilizing the platform consistently. This suggests a need for enhanced onboarding and continuous support to ensure that new users can fully integrate Voa into their practice. Addressing these limitations through targeted strategies and ongoing improvements will be essential for maximizing the platform's impact and ensuring its long-term success in the healthcare industry.

The study reinforces the idea that artificial intelligence is redefining the boundaries of medical practice, making tools like Voa not just aids but essential components in clinical processes. As Voa continues to evolve, it is expected that its adoption will expand, bringing continuous improvements in operational efficiency and patient care quality. As highlighted, it is increasingly evident that doctors who choose not to integrate these advanced technologies into their practices may find

themselves at a significant disadvantage. Reluctance to adopt innovative AI-based solutions may limit doctors' ability to efficiently meet the demands of a complex and data-driven healthcare system. Thus, adopting these technologies may not only be a matter of maintaining competitiveness but a necessity to ensure the provision of high-quality and effective healthcare.

Statements and Declarations

Funding: None.

Conflicts of Interest: The authors have no conflicts of interest to declare.

Ethical Statement: This study focused solely on the usage metrics of the Voa tool by healthcare professionals and did not involve direct human subject interactions or patient-specific data. All audio recordings were anonymized and encrypted following the Brazilian General Data Protection Law (LGPD). As the research did not access any personally identifiable information, approval from a research ethics committee was not required.

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