Business case for Automated Health Information System

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Introduction / Background

As the healthcare industry constantly collects and produces immense amounts of data each day, adopting an efficient health information system is crucial to streamline the documentation of patients' health data and optimize daily workflows in hospitals and clinics. However, current systems face certain inefficiencies that hinder their full potential, particularly the issue of slow data entry. This issue not only impacts patients but doctors as well when recording patient symptoms and diagnoses, as practitioners would have to spend extra time entering data, leading to less time spent with patients and longer workdays, which is counterproductive to the intended use of the health information system. Therefore, our project aims to initiate the use of AI technology to incorporate voice recognition and handwritten recognition systems to enhance the daily data entry operation.

Business Objective

The objective of the project is to implement and develop an automated health information system that improves the efficiency of data entry by incorporating voice recognition and handwritten recognition modules while extending its web-based functionalities to integrate with a mobile application. The integration of AI-powered mechanisms into the system for data entry enables users to seamlessly input data using speech and handwritten notes, which will accelerate the data entry process for practitioners. With voice recognition, users will be able to note patient information directly into the system, reducing reliance on manual input and improving users' efficiency. Moreover, the inclusion of a handwritten recognition system will allow healthcare professionals to input handwritten notes and prescriptions instantly into the system, which will be transcribed accurately into patient records. This initiative will not only expedite data entry tasks but improve users' experience and productivity, resulting in better patient care.

Current Situation and Problem / Opportunity Statement

The project's goal was to integrate a fundamental web-based health information system with a mobile app. Currently, this system is mainly utilized for recording patient information, yet it's impeded by a slow data entry process that could cause delays in patient management, compromise care quality, and overlook the crucial period for effective patient treatment. Enhancing the data input method by linking the web-based system with a mobile application presents an opportunity, allowing for the entry of patient data in any context, provided there is access to a mobile phone. Moreover, AI technology will be employed to improve daily data entry tasks through the implementation of voice and handwriting recognition systems. Nonetheless, the AI technology does have its constraints, as it requires the spoken or written words to be somewhat legible for a high accuracy recognition done by the AI.

Critical Assumption and Constraints

Critical Assumptions

- Private Access: The mobile application developed as part of the project will only be accessible to internal staff, ensuring the security and confidentiality of patient data. This restriction is crucial to prevent unauthorized access and maintain patient confidentiality, aligning with regulatory requirements and ethical standards in healthcare.
- Database Updates: It is assumed that the health database can be updated periodically to ensure the accuracy and relevance of patient information. Regular updates to the database are essential to reflect changes in patient demographics, medical history, and treatment plans, ensuring healthcare professionals have access to up-to-date information for informed decision-making.

Constraints

- Technical Skills: Constraints exist regarding the technical skills of the project team members, requiring additional time and effort to enhance their capabilities in developing the mobile application and implementing AI technologies. The team may need to do some online research and go for workshops to bridge any skill gaps and effectively execute project tasks.
- Availability of Training Data: The effectiveness of AI-based recognition modules depends on the availability of diverse and high-quality training data. Constraints related to the availability or quality of training data may hinder the performance of these modules, necessitating additional data collection efforts. Ensuring access to a diverse range of training data, encompassing various accents, dialects, and handwriting styles, is critical to achieving optimal performance and accuracy in recognition tasks. If constraints arise, efforts to augment existing datasets or collect

additional data may be required to overcome these limitations and enhance the robustness of the AI models.

Analysis of Option and Recommendation

There are three options for addressing this opportunity:

1. Do nothing, the healthcare industry has the necessary technology to support themselves.
2. Implement an AI that is trained in voice recognition into the application for easier access of patients' data. The AI can be used by medical professionals to retrieve patients' information faster and more efficiently. However, technical skills and project management skills will be required to execute this option.
3. Purchase specific softwares that already exists that satisfies immediate demands of the healthcare industry. In order to completely follow healthcare procedures, it is unavoidable to integrate these softwares with the current setups.

Based on discussions with team members, we believe option 2 is the best. Option 2 provides a convenient solution to patients and medical professionals as both parties are able to access patient data swiftly and accurately. This leads to improved patient care and more efficient workflows. In addition, the integration of AI enhances healthcare services further increasing trust and confidence between patients and stakeholders.

Preliminary Project Requirements

After careful considerations, the primary characteristics of the mobile-integrated web-based health information system are as follows:

1. Access to the main database on where all patients' information is stored at. Users could add, update or delete existing patient information when required.
2. A log of which user edited the database would be added to the site system's audit trail to ensure accountability and traceability of changes made within the database.
3. Enhance the performance of the automated speech recognition system and its handwritten text recognition module to improve accuracy, reduce error rates, and expand the system's ability to understand diverse accents and handwriting styles which in turn would help in assisting the daily operational workflow.
4. Support for multiple languages is essential for the application, given that the presence of the healthcare industry all around the world and the diverse languages spoken and used for communication across different nations.
5. Sufficient security measures to ensure full site access for all internal employees. A robust set of protocols and technologies will be designed and implemented to protect

the site from unauthorized access while allowing legitimate users to perform their duties without hindrance.

6. Any additional functionalities recommended by users that enhance or contribute value to the application. This would consequently aid in supporting the routine operational processes.

Schedule Estimate

The project is scheduled for completion prior to the conclusion of the second semester of the year 2024 as shown in the table below:

	Start Date	End Date
Define Project Requirements	11th March 2024	17th May 2024
Project Planning	18th May 2024	31th May 2024
Implementing Prototype	1st June 2024	31th August 2024
Testing and Debugging	1st September 2024	31th October 2024
Finalizing Project	1st November 2024	17th November 2024

This schedule highlights the outline of the tasks that are needed to be carried out through two semesters. In the first semester, we will be doing a lot of research on the healthcare industry and AI that exist in the current setting. This includes choosing a topic, creating a project conceptual model, data analysis report, etc. In the second semester, we will be implementing the prototype, meeting up with the supervisor for advice, debugging the prototype and finally completing the project. The project is estimated to complete in 8 months. There is some flexibility in this schedule where we may be able to finish earlier or later.

Potential Risks

1. Teammates Falling Sick: The risk of team members falling ill and being unable to contribute to the project could lead to delays in project milestones and overall progress. Contingency plans, such as cross-training team members or establishing clear communication channels for remote collaboration, should be in place to mitigate the impact of potential absences.

2. Cybersecurity Issues: Cybersecurity threats, such as data breaches and malicious attacks, pose a significant risk to the confidentiality, integrity, and availability of patient data

within the automated health information system. Implementing robust security measures, including encryption, access controls, and regular security audits, is essential to mitigate the risk of cybersecurity incidents and protect sensitive healthcare information from unauthorized access or exploitation.