MONASH University

FIT3164 Data Science Project Part 2

Project Management Report

Automated Health Information System

Team MDS2

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Automated Health Information System

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1. Introduction

The objective of the Automated Health Information System (AHIS) project was to improve the handling and accessibility of healthcare data by integrating advanced automated data entry technology. AHIS aims to incorporate the Handwritten Text Recognition (HTR) module into the web-based system for seamless integration with a mobile application. This integration aims to improve the precision and effectiveness of data entry tasks by decreasing the need for manual input.

AHIS allows healthcare providers to easily document patient diagnoses, register patients, and set appointments between doctors and patients. To ensure patient data security and facilitate efficient database retrieval, the system will include functions such as user verification and data validation. Integrating the HTR model with patient registration and diagnosis modules will enable automated population of relevant fields from submitted handwritten text images. This ability is anticipated to significantly decrease the time and energy required for inputting data, consequently enhancing efficiency in healthcare data management.

As a team, we function as developers but each has our varied responsibilities in the project. Alicia and Kai Yan, with background in web development, are concentrating on constructing the web app, while Eunice and Jesse are committed to researching, developing, and testing the HTR Model and Image Cutting Model.

2. Project Management

2.1. Introduction

Project management is crucial to the accomplishment of any large-scale project as it addresses the project scope, resources, and quality while achieving stakeholders expectations. For the following sections of the report, we will focus on our project management approach, detailing the methodology selected, resource allocation decisions, risk management strategies, and the limitations encountered. Through this reflection, we aim to provide a comprehensive view of our project management practices and their impact on the success of the project.

2.2. Methodology

2.2.1. Development of Methodology

In the beginning, the team chose to use the Agile project management methodology with the Scrum framework because we were unsure what challenges we would face as the supervisor only provided a vague direction without any specific details. The supervisor did not provide any datasets, suggesting that we should find our own if needed, as he believed a dataset was not essential for our project progression and completion. But as the project progressed, the actual methodology used instead was a hybrid

methodology where both agile and waterfall were combined as the team's project management methodology.

Due to the uncertainty aspect of the project, the team has adopted the Agile project management methodology with the Small-Scale Scrum framework (SSSF) as this methodology allows the flexibility needed to adapt to incoming sudden changes and incorporate new requirements from our stakeholders into the project. This approach guarantees the team can quickly and adaptably make incremental adjustments when necessary. SSSF is better suited for the team because it is designed for smaller teams, using straightforward communication methods such as WhatsApp for team member communication and Discord for communication with the supervisor. To sum up, SSSF enables the conduct of multiple casual meetings and planned sessions for the team, saving time and ultimately enhancing the project's effectiveness and efficiency.

In addition to that, the waterfall methodology was integrated into the project management methodology mainly for the development of the web application. The web application is developed in a step-by-step process that includes requirements, design, implementation, and testing stages. The requirements for each key element and component of the web application are detailed in a Google Document, while the basic design of complex components such as appointment and encounter is sketched by hand on a tablet to facilitate the implementation of the web application features. Unlike the normal version of the waterfall methodology that doesn't allow flexibility, each team member is responsible for at least one component of the web application so certain components are developed simultaneously at the same time but like the normal version of the waterfall methodology, each component must be done and working successfully before the member can move on to the next component. This modification was made to simplify the process of developing the web application and prevent one team member from significantly hindering another team member's progress. Minor disturbances might happen, but they can be efficiently managed as all team member components are separated.

2.2.2. Execution of Methodology

The positions of Scrum Master, Product Owner, and Development Team are not clearly outlined when the project begins, but as the web application is developed, each team member gradually assumes these roles. The roles currently held by each team member are displayed in Table 1.

Team Member	Scrum Roles	Responsibilities
Foo Kai Yan	Scrum Master	Facilitates the Scrum process and ensures the team adheres to Scrum principles and practices
Alicia Quek Chik Wen	Product Owner	Prioritizes the product backlog, communicates with stakeholders, and ensures the team delivers valuable features
Eunice Lee Wen Jing	Development Team	Research, develops, tests, and delivers increments of the product based on the project requirements during each sprint
Jesse Yow San Gene		

Table 1. Scrum Roles and Responsibilities

The project progresses through the execution of the Scrum-Waterfall Hybrid Methodology with each team member contributing their efforts and skills towards achieving the project objectives and goals. Scrum artifacts that were used in the project are product backlog and increment as listed in Table 2.

Scrum Artifacts	Description
Product Backlog	Dynamic, prioritized list of work items such as user stories and features that need to be done to create or enhance the final product
Increment	Completed and possibly deliverable tasks from a sprint, indicating a functional iteration of the product

Table 2. Scrum Artifacts and Description

The main purpose of the product backlog was to outline the features that the team needed to implement in order to meet project requirements. Every week, a sprint and scrum meeting is held simultaneously on Monday night to choose and prioritize work items for each team member to complete throughout the sprint. Throughout the sprint, members are expected to complete their tasks to the best of their abilities. Meeting minutes are recorded for each meeting done within the team. To-date, there were only 3 meetings in total done with the attendance of the supervisor as it was encouraged by the supervisor to only meet him when there exists a significant roadblock within the project development process. Meeting minutes sample can be found under Appendix A.

How waterfall methodology is integrated into this project is that once all the project requirements are clearly defined then the basic design for the UI/UX is done for the web application. Database schema and overall technical structure of the web application was also designed throughout this process. With the design phase reaching completion, web application is now building in-progress based on the design specification done in the design phase. Blackbox and Whitebox testing is yet to be done as the web application is incomplete.

2.3. Project Resources Management

2.3.1 Resource Allocation Approach

In allocating resources, the team was split into two sub-teams, with each sub-team tackling one of the two main aspects of the project, consisting of the web-based health information system and the HTR model. Each sub-team, consisting of two members, was allocated based on their strengths, skill sets, and their familiarity with coding in Javascript and using the MEAN stack framework. Members with prior experience in developing the web application were assigned to develop the health information system, while the others were assigned to look into the HTR model and the integration of the model with the image-cutting model, followed by the integration into the web-based system. The table below outlines the members of each sub-team and their overall assigned responsibilities for the project.

Sub-team Members	Overall Responsibilities
Alicia Quek Chik Wen Foo Kai Yan	Developing and designing the web-based health information system, including the backend and frontend implementation.
Jesse Yow San Gene	Handle all aspects of the handwritten text recognition model, including

Eunice Lee Wen Jing	researching and testing the image cutting model and the pre-built HTR model.

Table 3. Sub-team members and their assigned responsibility

The team agreed to dedicate 8 to 10 hours per week to the final year project to ensure sufficient progress is being made every week and to avoid delays to the scheduled plan. Moreover, members' workloads were distributed fairly amongst the subteam with consideration of their level of commitment for the semester, their availability, and their coding capability. Furthermore, the team practices the concept of accountability, where the team leader regularly checks in with members to monitor their progress, which occurs at the end of the week in the chat group and during the weekly meeting. This consistent communication ensures that everyone stays productive and on track with their tasks to meet their respective deadlines. The details of the team project schedule plan have been outlined in the Gantt Chart in Appendix F.

2.3.2 Software Tools

To ensure effective communication and collaboration within the team, WhatsApp was utilized as the primary communication channel for quick discussions, scheduling meetings, daily work progress updates, and conveying other relevant information. Discord served as a secondary communication channel between the team and the supervisor, enabling prompt responses to general project inquiries and scheduling meetings. Weekly online meetings were conducted via Discord, with Zoom as an alternative, to address concerns and challenges encountered during the project development phase, review action plans, and seek assistance when needed. During these meetings, team members would also demonstrate their current progress, when applicable, and discuss the distribution of tasks for the upcoming week and sprint.

In monitoring the team project progress, Trello was used as the team task management tool in tracking our project tasks as well as managing and monitoring members' progress. In addition, it enables team members to easily reference their assigned tasks for the current or upcoming sprint, if confusion arises, and update their current task status. An example of our team's Trello board is provided in Appendix B. Additionally, ProjectLibre is used to create a Gantt Chart that illustrates the team project schedule plan. The Gantt Chart allows the team to visualize the start and end date of each task at a glance and monitor the progress of task completion versus the remaining workload for the particular task. This helps the team manage our time effectively, identify potential bottlenecks in advance, and redistribute the workload as necessary to ensure timely completion of project goals.

Moreover, GitLab was utilised as our source control system to manage and track changes in project source code files as well as to monitor the team technical progress. Members have their own branch within the shared Git repository to commit and push changes, before merging to the main branch after performing code review. This allows the team to collaborate and coordinate our work smoothly without affecting each other's work progress, ensuring code quality and minimise conflict. Furthermore, Google Drive was employed for managing project-related documents, including meeting minutes, progress status summary reports, product backlog and other relevant documentation. These documents are organised in respective folders, allowing team members to easily navigate and find relevant information as needed.

2.4. Risk Management

In any project, despite thorough planning and risk mitigation strategies, there's always the possibility that some risks will materialize. How these risks are handled can significantly influence the project's outcome. Our approach to risk management not only involved identifying and mitigating risks but also closely monitoring them throughout the project lifecycle. This vigilant monitoring allowed us to quickly identify risk when triggered and implement predefined response strategies to minimize its impact. In this section, we detail certain huge risks that might or were triggered during our project, how we handled these situations and the methods we used to continuously monitor the top risks to ensure they remained under control.

Risk ID	Risk Description	Risk Root Cause	Mitigation Method
1	Project Delays	Poor Time Management	We prioritized critical task and regular team meetings to rescheduled deadlines whilst doubling our efforts to make up for lost time
11	Incompatibility between web application, HTR model and Image Cutting model	HTR model is a pre-built model whilst image cutting model is a modified pre-built model which might not work seamlessly together	We currently can not mitigate this risk as the HTR and Image Cutting model has not been modified and developed yet
13	Lack of Required Skills	Inability to complete tasks due to lack of expertise	Content on web applications, HTR model and Image Cutting model were shared to the team member who was responsible for it. Regular check-ins were done to ensure that the members are doing the work they were assigned to, to prevent any delays in the development of the project

Table 4. Top 3 Identified Risk

The updated risk register which contains the remaining risks of the project can be found in Appendix D. Out of the top 3 risks mentioned, only risks 1 and 13 were triggered and the ways the team has managed these risks are detailed in the table provided above. Due to time constraints, Jesse and Eunice will focus on developing the HTR and Image Cutting Model, while Kai Yan and Alicia will continue to work on the web application. Jesse and Eunice were inexperienced in creating models, which meant they required extra time to learn the required skills for their assigned projects. This could potentially cause project delays, so regular meetings were held to ensure all members' wellbeing and also to prevent them from being overwhelmed with their tasks.

2.5. Limitation

2.5.1. Technical Constraints

The HTR model presented considerable technical challenges that underscored limitations in our project management approach. Early in the project, we encountered issues with the HTR model's functionality. Initially, we attempted to troubleshoot and find solutions using resources online, hoping to resolve the problems through debugging. However, despite our efforts, the model continued to fail. We brought up the issue with Dr Fermi and were recommended to source a pre-built model that might better meet our needs. We followed this advice and intend to integrate a pre-built model into the system. While this alternative offered a potential solution, it became evident that more rigorous testing was required to ensure its reliability and compatibility with our project.

The project exposed several significant skill gaps within the team particularly in areas related to the technologies required for web development such as the MEAN stack. We believed that our collective skill set was sufficient to handle the project's demands. However, as development progressed, it became clear that additional expertise and knowledge were needed to meet the project's objectives effectively. The MEAN stack which forms the foundation of our web application, posed a steep learning curve for some team members who were less familiar with it. As a result, tasks had to be reallocated to better align with each member's strengths and experience level ensuring that the project continued to move forward despite these challenges.

2.5.2. Non-Technical Constraints

Our initial decision to adopt the Agile methodology was driven by the need for flexibility and adaptability in managing the project. Agile's iterative nature seemed ideal for handling the dynamic requirements and the need for continuous feedback. However, as the project progressed, we encountered significant challenges related to the uneven pacing of team members. Some team members completed their tasks ahead of schedule, while others lagged behind which created bottlenecks and inefficiencies in the workflow. This mismatch in progress led to difficulties in coordinating tasks and maintaining consistent momentum across the project. The limitations of Agile in this context became apparent as the methodology's reliance on iterative cycles did not suit the varying speeds at which different parts of the project were progressing. To address these issues, we incorporated elements of the Waterfall methodology during the testing and development phases. This hybrid approach allowed for more structured planning and clearer milestones that provided the team with a better framework for managing the project's complexities.

The availability of team members was inconsistent particularly during key periods such as the Winter Break and throughout the semester, due to the heavy load of other academic commitments. These periods coincided with the influx of assignments and other course requirements which impacted our ability to maintain a steady workflow on the project**.** This inconsistency in availability created challenges in sustaining momentum and ensuring that project milestones were met on time. The pressure to manage both the project and academic workload led to frequent adjustments in the project schedule as tasks had to be reassigned or delayed to accommodate the varying availability of team members. In some instances, the team had to push critical project activities to less busy periods which caused delays in the overall

timeline. It became clear that, despite our best efforts to plan ahead, the unpredictable nature of academic commitments required a more flexible approach to project management.

In facing these technical and non-technical constraints, our team has gained valuable insights into the complexities of project management. While challenges like the HTR model issues, skill gaps in web development and the limitations of our chosen methodologies have tested our ability to adapt, they have also strengthened our resolve to push forward. We remain committed to overcoming these hurdles by refining our approach and maintaining a flexible yet focused project plan.

2.6. Reflective Assessment

2.6.1. Success

Over the past 5 weeks, certain key milestones were achieved which have significantly contributed to the project's progress. A major success was the implementation of the web application, laying a solid foundation for the next phases. Valuable research online was found, which has been crucial in overcoming challenges related to the image cutting model and the HTR model, shaping our approach and helping us solve complex issues.

Additionally, our team dynamic has been strong and collaborative, with everyone being responsive and supportive, which has significantly boosted our productivity. We've successfully completed 60% of the patient and medication component in the web application, with valuable input from our supervisor. Consistent weekly team meetings have helped us stay focused, with everyone present through all meetings, demonstrating our commitment to the project. Our project manager, Kai Yan, has been instrumental in organising our efforts through a blend of agile and waterfall methodologies, helping us set clear deadlines for all tasks. Our strategy of seeking solutions independently and escalating issues when necessary has been effective in overcoming obstacles.

Overall, our ability to implement the web application, find relevant research, maintain a cohesive team dynamic, and receive valuable guidance has been the cornerstone of our success so far.

2.6.2. Shortcomings

Despite our successes, our team has faced several challenges that have impacted our project's progress. One significant issue has been our limited knowledge and skill sets regarding the HTR Model and the Image Cutting Model using OpenCV. None of us had prior experience with these technologies, which has required extra time and effort to learn.

Unavoidable delays also occurred as Alicia and Eunice were both enrolled in a winter unit during the break. The course was more intensive than expected, limiting their ability to contribute to the project as much as planned, which delayed the start of some components. Jesse also faced difficulties with the initial implementation of the HTR model, leading to a failed attempt and further delays.

Another challenge arises when Kai Yan's laptop's motherboard malfunctioned during Week 3, preventing her from continuing with the web application development. It took weeks to resolve the issue, temporarily slowing her progress. However, she is now back on track and has resumed work on the web implementation.

Additionally, the lack of resources provided by our supervisor has been a hurdle. We've had to independently search for relevant resources online and regularly consult with our supervisor during meetings and via Discord chat to ensure the resources we find are appropriate.

Our team has made every effort to manage our time effectively and stay on course with the project, despite these setbacks and the extra challenge of managing several incoming assessments throughout the semester. We persist in moving ahead, working towards achieving our objectives and conquering the challenges we encounter.

3. Conclusion

In summary, a hybrid approach was utilised to effectively manage the problems encountered and fulfil project requirements. Agile is mainly used for managing projects as a whole, whereas Waterfall was specifically used for developing web applications. With the hybrid approach, we could remain flexible while upholding a structured developmental procedure. We used applications like Whatsapp and Discord for frequent team discussions and virtual meetings with our manager. Trello was utilised for task management and progress tracking in project management, whereas ProjectLibre was utilised for Gantt Chart creation and monitoring. Source control was done using GitLab, and project-related documents were managed using Google Drive. Moreover, a risk register was employed to predict and prevent possible risks, helping us to tackle obstacles in advance.

While no single approach is flawless, integrating these tactics provided a solid groundwork for guiding the project to a successful completion. Despite encountering obstacles, our emphasis on effective project management, such as holding frequent team meetings to ensure transparency, was crucial in keeping the project on track. There is room for development, particularly in enhancing organizational processes, but overall, our approach has successfully directed the project thus far.

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5. Appendix

Appendix A. Meeting Minutes

FIT3164 Data Science Project 2

MDS2
Meeting Minutes 1

Date: 15th June 2024 Time: 8pm - 8.30pm Venue: Online Zoom

Participant Attendance:

I. Alicia Quek Chik Wen
II. Eunice Lee Wen Jing
III. Foo Kai Yan
IV. Jesse Yow San Gene

Meeting Objectives:

I. Allocate tasks amongst the members
II. Create and sign group contract
III. Create and clone GitLab Repository to each member individual devices

Pre-work:

I. Kai Yan schedule and distribute work responsibilities and draft out group contract

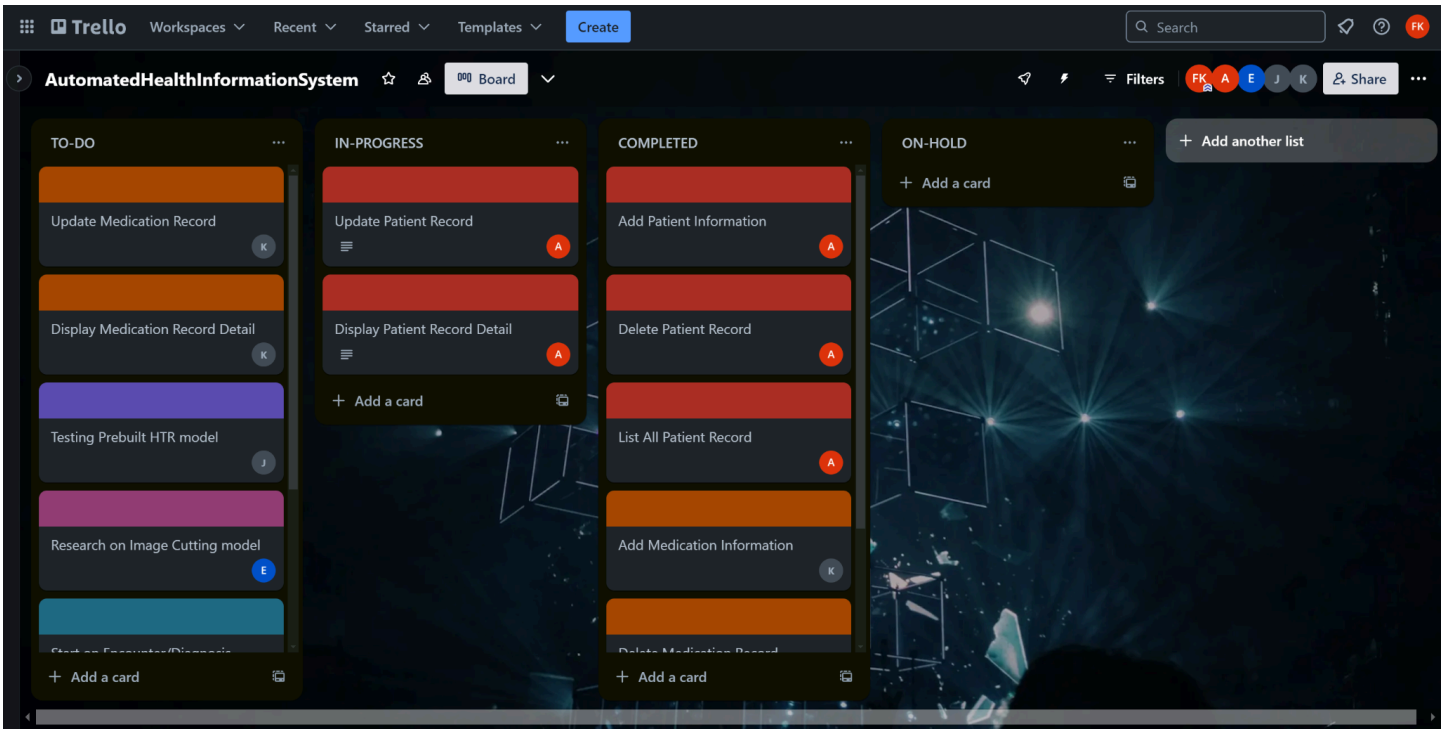
Meeting Details:

No.	Item(s)	Discussion & Notes
1	Task Allocation	• Split the team into 2 subteam, with each team focusing on 1 main aspect of the project: ○ Web Development ■ Allocated to Alicia and Kai Yan ○ Handwritten Text Recognition (HTR) Model ■ Allocated to Jesse and Eunice
2	Web Development Team Tasks	• Revise on MEAN stack framework learned from FIT2095 ○ To be hopefully completed in 3 weeks ○ **Note: Maybe delayed due to Alicia having winter unit** • Start setting up the website
3	HTR Model Team Tasks	• Research on HTR model online ○ To be hopefully completed in 3 weeks ○ **Note: Maybe delayed due to Eunice having winter unit** • Learn to develop model from tutorials online if able to
4	Next Meeting	• 22th July 2024

Action Items and Conclusion:

Responsibility	Action Items	Deadlines / Checkpoint
Kai Yan	Create GitLab Repository for the project	19th June 2024
Everyone	Clone GitLab Repository to their local machines	23th June 2024
Alicia and Kai Yan	Relearn and Revise on FIT2095 content	14th July 2024
Jesse and Eunice	Research on HTR model online	14th July 2024
TBD	Set up the website base	TBD (To be determined)

Appendix B. Trello



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Appendix C. Product Backlog

ID	User Stories	User Acceptance	Major Activities	Time Estimation	Sprint	Progress Status	Person In Charge	Cooperated By
PB4	As a patient, I need assurance that my personal health data and diagnosis remain confidential in order to safeguard my privacy and prevent any potential misuse of my information.	The AHIS have adequate encryption and security measures in place to protect patient personal health data.	Investigate how login credentials function	1 Week	1	Completed	Kai Yan	Alicia
			Investigate encryption technique	1 Week	1	Completed	Kai Yan	Alicia
			Select appropriate encryption technique	1 Week	2	In-Progress	Kai Yan	Alicia
			Develop role-based access control (RBAC) system	2 Weeks	2	Not Started	Kai Yan	Alicia
			Implement user authentication system	2 Weeks	3	Not Started	Kai Yan	Alicia
			Set up security logging and alerting	2 Weeks	4	Not Started	Kai Yan	Alicia
			Perform system security testing and finetune it if needed	3 Weeks	4	Not Started	Kai Yan	Alicia
PB5	As a system administrator of a healthcare clinic, I need a scalable database design that can handle increasing amounts of data without any performance degradation, ensuring that we can continue to provide timely care as our patient base grows.	The database can scale horizontally without significant performance loss.	Investigate different database structures	1 Week	1	Completed	Alicia	Kai Yan
			Select appropriate database structure	1 Week	2	Completed	Alicia	Kai Yan
			Design and implement a scalable database structure	3 Weeks	3	Completed	Alicia	Kai Yan
			Test scalability of database	2 Weeks	4	Completed	Alicia	Kai Yan
			Monitor and fine-tune database performance	2 Weeks	4	Completed	Alicia	Kai Yan
			Integrate database to AHIS	2 Weeks	4	Completed	Alicia	Kai Yan
PB6	As a healthcare clinic pharmacist, I need a system that helps me manage medication prescriptions and history, so that I can track and verify patient medications efficiently.	Authorized personnel can retrieve and verify prescriptions or medication information that is prescribed to patients quickly and accurately.	Investigate on how doctors' prescription is retrived	1 Week	1	Completed	Kai Yan	Alicia
			Implement a secure prescription retrieval system	3 Weeks	2	In-Progress	Kai Yan	Alicia
			Optimize database indexing for efficient query search	2 Weeks	2	Not Started	Kai Yan	Alicia
			Implement role-based data access	2 Weeks	3	Not Started	Kai Yan	Alicia
			Ensure compliance with healthcare regulations	1 Week	4	Not Started	Kai Yan	Alicia
PB7	As a nurse, I need a user-friendly interface for our health information system, so that I can navigate and use the system easily.	The AHIS will be designed so that it can be easily used with minimal staff training required.	Investigate how the system will impact user satisfaction	1 Week	1	Completed	Kai Yan	Alicia
			Investigate on intuitive user interface (UI) designs	1 Week	1	Completed	Kai Yan	Alicia
			Select appropriate UI designs to implement	1 Week	2	Completed	Kai Yan	Alicia
			Implement selected UI design	3 Weeks	3	In-Progress	Kai Yan	Alicia
			Test the system with real users and improve from feedback	2 Weeks	4	Not Started	Kai Yan	Alicia
PB8	As a doctor's assistant, I need to be able to help doctors to schedule appointments for registered patients, ensuring that their care is organized and timely.	Appointments between patient and doctor can be scheduled without errors. AHIS will update changes in these appointments with doctors' calendars in real-time.	Investigate on appointment scheduling feature	1 Week	1	In-Progress	Kai Yan	Alicia
			Investigate on real-time update feature	1 Week	1	In-Progress	Kai Yan	Alicia
			Implement appointment scheduling feature with real time updates	2 Weeks	2	Not Started	Kai Yan	Alicia
			Integrate appointment scheduling feature into AHIS	2 Weeks	3	Not Started	Kai Yan	Alicia
			Integrate appointment scheduling feature with doctors' calendars	2 Weeks	3	Not Started	Kai Yan	Alicia
			Monitor and test for accuracy and reliability	2 Weeks	4	Not Started	Kai Yan	Alicia
	As a doctor, I want the system to allow me to initiate patient encounters based on the	Doctors can initiate patient encounters	Investigate on encounter initiation feature	1 Week	1	In-Progress	Alicia	Kai Yan
			Select appropriate encounter initiation feature to implement	1 Week	2	Not Started	Alicia	Kai Yan
			Implement the encounter initiation feature	2 Weeks	2	Not Started	Alicia	Kai Yan

Image/Product Backlog Link: MDS2 - Product Backlog

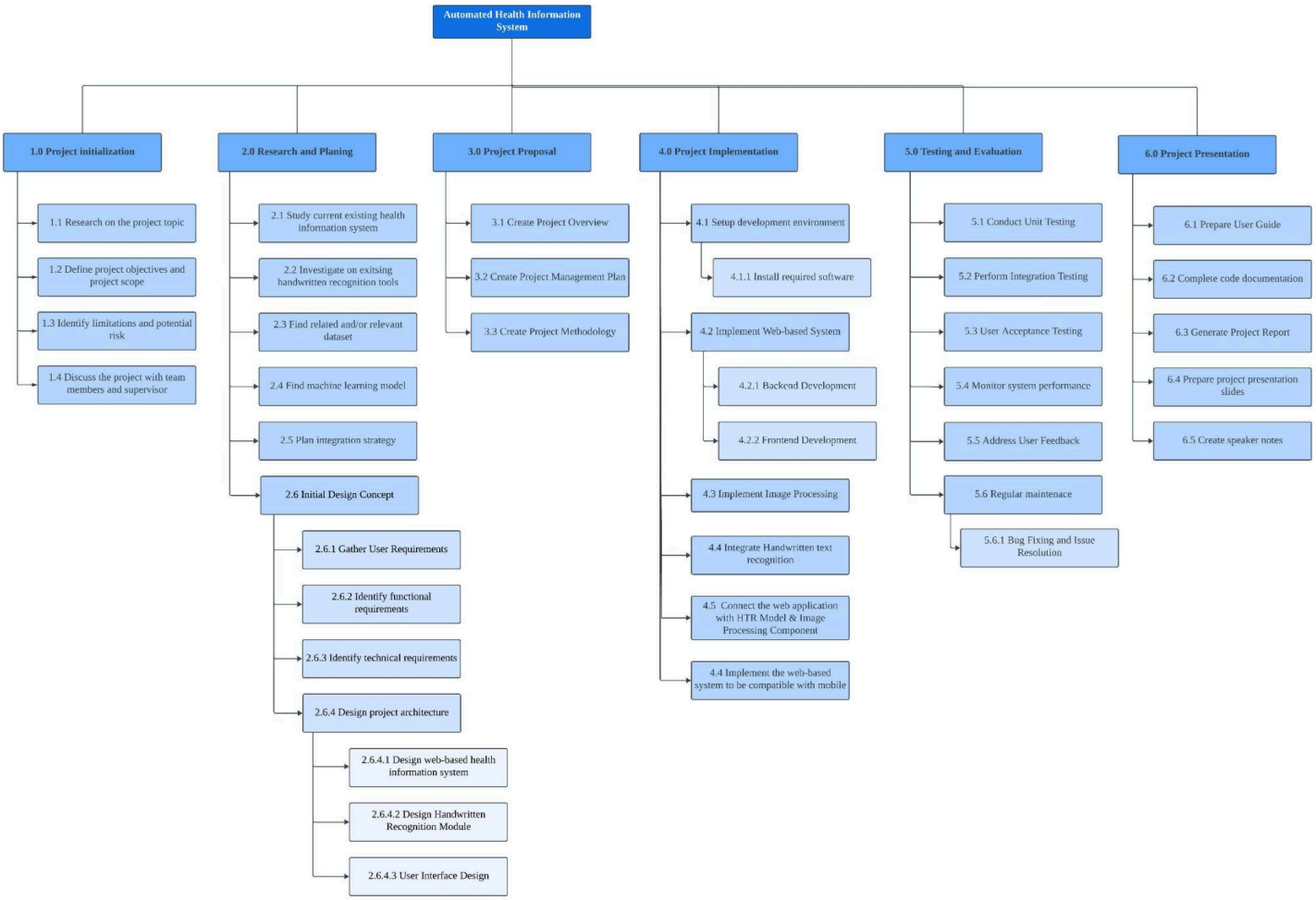
Appendix D. Risk Register (Updated)

ID	Risk Description	Risk Category	Root Cause	Trigger	Probability	Impact	Owner	Mitigation
1.	Project Delays	Project Management	Poor Time Management	Unexpected technical and non	Medium	High	Kai Yan	Ensure group members prioritize

				technical issues, starting project late				high priority tasks and ensure all tasks is completed on time
2.	Hardware Issues	Technical	Faulty or Old Hardware	Hardware malfunctions or failure	Low	Medium	Jesse	Regular hardware maintenance or repair malfunctioned hardware
3.	Software Compatibility	Technical	Differences in Software Versions or Dependencies	Incompatibility error when integrating software components or updates	High	High	Alicia	Conduct compatibility testing and ensure chosen software is compatible when integrating with hardware
4.	Data Privacy Breach	Ethical/ Technical	Poor Security Measures	Unauthorized access or data breach incident	Medium	High	Eunice	Implement strong encryption method and conduct regular security audits
5.	Inaccurate Model	Technical	Poor Model Training	Low accuracy during testing	Medium	High	Jesse	Use cross-validation and continuously improve the model with more data and better algorithms.
6.	Insufficient Data Collection	Data Quality	Incomplete or Missing Data	Incomplete data found in the dataset during preprocessing	Medium	High	Kai Yan	Conduct thorough data cleaning (remove rows with incomplete data etc)
7.	Team Member Availability	Project Management	Scheduling Conflicts	Delays in task completion	Medium	Medium	Kai Yan	Develop a flexible project schedule
8.	Miscommunication	Project Management	Misunderstanding Between Team Members	Misunderstandings, missed deadlines	Low	Medium	Eunice	Ensure that all teammates understand and are on the same wavelength
9.	Insufficient Training Data Quality	Data Quality	Low-Quality Data	Low model performance	Medium	High	Kai Yan	Ensure data quality through validation
10.	Supervisor Unavailability	Project Management	Scheduling Conflicts or Personal Issues	Delayed feedback or approvals	Low	High	Eunice	Schedule regular check-ins in advance and request for supervisor's advice/approvals earlier
11.	Difficulty in model integration into system	Technical	Compatibility Issues	Errors during system integration testing	Medium	High	Alicia	Ensure model is of compatible version with system or else request advice from supervisor
12.	Unexpected Data Loss	Technical	Loss during testing or not saving work	Corrupted data or unsaved progress	Low	High	Jesse	Ensure that all work and project versions are backup in Google Drive
13.	Lack of Required Skills	Technical	Inability to complete tasks due to	Corrupted data or unsaved progress	Medium	High	Kai Yan	Research articles and training videos focused on model development

			lack of expertise					and image processing. Pair team members with more experienced colleagues in these areas to facilitate knowledge transfer and hands-on learning.
14.	HTR Model Failure	Technical	Incompatibility or configuration issues with the pre-built model	The model fails to function as expected during testing	Medium	High	Jesse	Consult with the supervisor and allocate time for additional troubleshooting.

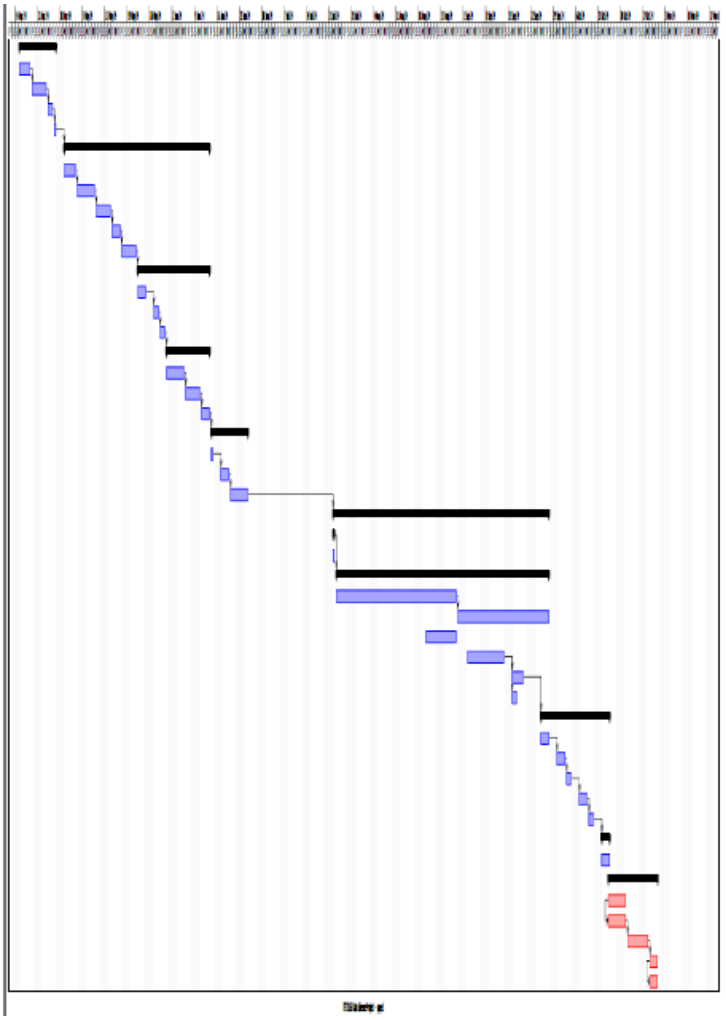
Appendix E. Work Breakdown Structure (Updated)



Appendix F. Gantt Chart (Updated)

	Name	Duration	Start	Finish	Predecessors	Resource Names
1	**Project Initialization**	**10 days?**	**4/15/24 8:00 AM**	**4/26/24 5:00 PM**		
2	Research on the project topic	4 days?	4/15/24 8:00 AM	4/18/24 5:00 PM		
3	Define project objectives and project scope	3 days?	4/19/24 8:00 AM	4/23/24 5:00 PM	2	
4	Identify limitations and potential risk	2 days?	4/24/24 8:00 AM	4/25/24 5:00 PM	3	
5	Discuss the project with team members and supervisor	1 day?	4/26/24 8:00 AM	4/26/24 5:00 PM	4	
6	**Research and Planing**	**34 days?**	**4/29/24 8:00 AM**	**6/13/24 5:00 PM**	**5**	
7	Study current existing health information system	4 days?	4/29/24 8:00 AM	5/2/24 5:00 PM		
8	Investigate on existing handwritten recognition tools	4 days?	5/3/24 8:00 AM	5/8/24 5:00 PM	7	
9	Find related and/or relevant dataset	3 days?	5/9/24 8:00 AM	5/13/24 5:00 PM	8	
10	Find machine learning model	3 days?	5/14/24 8:00 AM	5/16/24 5:00 PM	9	
11	Plan integration strategy	3 days?	5/17/24 8:00 AM	5/21/24 5:00 PM	10	
12	**Initial Design Concept**	**17 days?**	**5/22/24 8:00 AM**	**6/13/24 5:00 PM**	**11**	
13	Gather User Requirements	3 days?	5/22/24 8:00 AM	5/24/24 5:00 PM		
14	Identify functional requirements	2 days	5/27/24 8:00 AM	5/28/24 5:00 PM	13	
15	Identify technical requirements	2 days	5/29/24 8:00 AM	5/30/24 5:00 PM	14	
16	**Design project architecture**	**10 days?**	**5/31/24 8:00 AM**	**6/13/24 5:00 PM**	**15**	
17	Design web-based health information system	4 days?	5/31/24 8:00 AM	6/5/24 5:00 PM		
18	Design Handwritten Recognition Module	3 days?	6/6/24 8:00 AM	6/10/24 5:00 PM	17	
19	User Interface Design	3 days?	6/11/24 8:00 AM	6/13/24 5:00 PM	18	
20	**Project Proposal**	**8 days?**	**6/14/24 8:00 AM**	**6/25/24 5:00 PM**	**19**	
21	Create Project Overview	1 day?	6/14/24 8:00 AM	6/14/24 5:00 PM		
22	Create Project Management Plan	3 days?	6/17/24 8:00 AM	6/19/24 5:00 PM	21	
23	Create Project Methodology	4 days?	6/20/24 8:00 AM	6/25/24 5:00 PM	22	
24	**Project Implementation**	**50 days?**	**7/22/24 8:00 AM**	**9/27/24 5:00 PM**	**23**	
25	**Setup development environment**	**1 day?**	**7/22/24 8:00 AM**	**7/22/24 5:00 PM**		
26	Install required software	1 day?	7/22/24 8:00 AM	7/22/24 5:00 PM		
27	**Implement Web-based System**	**49 days?**	**7/23/24 8:00 AM**	**9/27/24 5:00 PM**	**25**	
28	Backend Development	28 days?	7/23/24 8:00 AM	8/29/24 5:00 PM		
29	Frontend Development	21 days?	8/30/24 8:00 AM	9/27/24 5:00 PM	28	
30	Implement Image Processing Model	8 days	8/30/24 8:00 AM	9/9/24 5:00 PM		
31	Integrate Handwritten text recognition	10 days?	9/1/24 8:00 AM	9/13/24 5:00 PM		
32	Implement the web-based system to be compatible wit...	4 days?	9/16/24 8:00 AM	9/19/24 5:00 PM	31	
33	Combine web application with HTR Model	2 days?	9/16/24 8:00 AM	9/17/24 5:00 PM	31	
34	**Testing and Evaluation**	**16 days?**	**9/25/24 8:00 AM**	**10/16/24 5:00 PM**	**32**	
35	Conduct Unit Testing	3 days?	9/25/24 8:00 AM	9/27/24 5:00 PM		
36	Perform Integration Testing	3 days?	9/30/24 8:00 AM	10/2/24 5:00 PM	35	
37	User Acceptance Testing	2 days?	10/3/24 8:00 AM	10/4/24 5:00 PM	36	
38	Monitor system performance	3 days?	10/7/24 8:00 AM	10/9/24 5:00 PM	37	
39	Address User Feedback	2 days	10/10/24 8:00 AM	10/11/24 5:00 PM	38	
40	**Regular maintenace**	**3 days**	**10/14/24 8:00 AM**	**10/16/24 5:00 PM**	**39**	
41	Bug Fixing and Issue Resolution	3 days	10/14/24 8:00 AM	10/16/24 5:00 PM		
42	**Project Presentation**	**12 days?**	**10/16/24 8:00 AM**	**10/31/24 5:00 PM**		
43	Prepare User Guide	4 days?	10/16/24 8:00 AM	10/21/24 5:00 PM		
44	Complete code documentation	4 days?	10/16/24 8:00 AM	10/21/24 5:00 PM	43SS	
45	Generate Project Report	5 days?	10/22/24 8:00 AM	10/28/24 5:00 PM	44	
46	Prepare project presentation slides	3 days?	10/29/24 8:00 AM	10/31/24 5:00 PM	45	
47	Create speaker notes	3 days?	10/29/24 8:00 AM	10/31/24 5:00 PM	46SS	

FIT3163 Data Science Project



Gantt Chart Link: MDS2 - Gantt Chart.pdf

6. Acknowledgement

I acknowledge the use of Microsoft Copilot (https://copilot.microsoft.com/) to generate materials for background research and self-study in the process of completing this assessment. I entered the following prompts on 18 August 2024:

- Explain how normal Hybrid project methodology works between Agile and Waterfall

The generated output from the artificial intelligence was adapted, modified, and used for some of the final responses.