**TITLE OF YOUR STUDY**

**A Capstone Project Presented to the Faculty**

**of the Institute of Computer Studies**

**Rizal Technological University**

**In Partial Fulfillment of the Requirements for the Degree of**

**Bachelor of Science in Information Technology**

**By**

**(alphabetical)**

**SURNAME, FIRSTNAME, MI.**

**SURNAME, FIRSTNAME, MI.**

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**SURNAME, FIRSTNAME, MI.**

**SURNAME, FIRSTNAME, MI.**

**Month/Year**

**APPROVAL SHEET**

This Capstone Project 2 entitled, “ “, prepared and submitted by (Name of students, surname first) in partial fulfillment of the course requirements for the degree of BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY, has bee examined and recommended for acceptance and approval for Oral Examination.

Adviser

Approved by the Committee of Oral Examination on \_\_\_\_\_\_\_\_\_with a grade of \_\_\_.

Chairman

Panel Member Panel Member

Accepted as partial fulfillment of the course requirements for the degree in Bachelor of Science in Information Technology.

Director, Institute of Computer Studies

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_

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**DEDICATION**

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**ACKNOWLEDGEMENT**

*(Express gratitude to individuals or organizations who contributed to your project’s completion.)*

We would like to thank our advisor, Dr. [Name], for their guidance and support throughout this project…

**ABSTRACT**

*(Write a concise summary of your project, including key findings and their significance. This is one page only)*

This project explores the development of a machine learning model for early diagnosis of Alzheimer’s disease, achieving an accuracy of 88% and offering promising implications for early intervention and treatment…

# TABLE OF CONTENTS

Page

TITLE PAGE ……………………………………………………………….

APPROVAL SHEET……………………………………………………….

DEDICATION ….…………………………………………………………..

ACKNOWLEDGMENT…………………………………………………….

ABSTRACT ………………………………………………………………..

TABLE OF CONTENTS ………………………………………………….

LIST OF TABLES …………………………………………………………

LIST OF FIGURES ………………………………………………………..

CHAPTER I INTRODUCTION

1.1 Introduction ………………..…………………………..

1.2 Project Background …………………………………...

1.3 Objectives of the Study… ………..…………………..

1.3.1 Main Objective ………………………………

1.3.2 Specific Objectives ……………………….…

1.4 Scope and Limitations…………………..……….……

1.5 Definition of Terms ……………………………………

CHAPTER II REVIEW OF RELATED LITERATURE AND SYSTEMS

2.1 Related Literature ……………………..……………….

2.2 Related Systems……..……...………………………….

2.3 Synthesis …………………………….………………….

CHAPTER III DESIGN AND METHODOLOGY

3.1 System Development Life Cycle ………………………

3.2 Technical Background…………………………………..

3.3 Functional and Non-Functional Requirements………..

3.4 Design of Software, System and Processes………….

3.4.1 Use Case Diagram……… ……………………

3.4.2 Entity Relationship Diagram ………………….

3.4.3 Context Diagram………………………………..

3.4.4 Data Flow Diagram……………………………

3.4.5 System Architecture…………………………..

3.4.6 System Flowchart……………………………..

3.4.7 Cost-Benefit Analysis…………………………

3.4.8 Testing………………………………………….

3.4.9 Ethical Considerations………………………..

CHAPTER IV RESULTS AND DISCUSSIONS

4.1 Results of the Testing ………………………………….

4.2 Analysis of Results …………………….……………....

4.3 Discussion of Findings ………………………………....

CHAPTER V SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings …………………………………..

5.2 Conclusions……....…………………….…………….....

5.3 Recommendations………………………………………

BIBLIOGRAPHY ……………………………………………………………

APPENDICES ……………………………………………………………….

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**LIST OF TABLES**

*(If your project includes tables, list them with titles and page numbers.)*

Table 1: Demographic Distribution of Sample……………………………..

**LIST OF FIGURES**

*(If your project includes figures (e.g., charts, graphs), list them with titles and page numbers)*

Figure 1: ROC Curve for Predictive Model…………………………………..

# CHAPTER I

## **PROJECT BACKGROUND**

### Introduction *(Provide an overview of your project, explaining its significance and relevance. Introduce the problem your project aims to solve and set the stage for the detailed information that will follow. Mention the purpose and goals of the project briefly.)*

### Example:

### The healthcare industry is increasingly reliant on technology to manage patient data and improve service delivery. However, many institutions still use outdated systems, leading to inefficiencies and errors. This capstone project aims to develop a modern data management system to streamline healthcare operations and enhance patient care…

### Project Background *(Describe the context and rationale behind your project. Explain why this project is necessary and provide background information that led to its inception. Include any relevant historical or contextual details that help in understanding the project’s importance.)*

### Example:

### The project was conceived after observing the challenges faced by a local hospital in managing patient records. The existing system, primarily paper-based, resulted in lost records, delays in information retrieval, and compromised patient care. By implementing an automated data management system, and the project aim to address these issues and improve overall efficiency…

### *(Clearly articulate the specific problem your project aims to address. Detail the issues, challenges, or gaps that exist in the current state of affairs. This section should highlight the critical need for your project and why it is essential to find a solution.)*

### Example:

### The current data management system in many healthcare institutions faces several critical challenges. How can the inefficiencies in manual data entry processes be addressed? What measures can be taken to reduce errors and prevent the loss of patient records? Additionally, how can access to patient information be improved to ensure timely retrieval and decision-making? Furthermore, what strategies can be implemented to integrate different departmental systems and improve communication within healthcare institutions? Addressing these questions is essential to developing a more efficient and reliable data management system…

### Main Objective *(State the primary goal of your project. This should be a broad, overarching aim that your project seeks to achieve. Make sure it is specific and measurable.)*

### Example:

### The main objective of this project is to design and implement an automated, integrated data management system that enhances the accuracy of patient data handling in healthcare institutions…

### Specific Objectives *(State the specific, smaller objectives that will help you achieve your main objective. These should be clear, detailed, and focused goals that guide the development and implementation of your project.)*

### Example:

### To achieve the main objective, several specific objectives have been identified. Firstly, the project aims to develop a user-friendly interface for healthcare providers to efficiently enter and retrieve patient data. Secondly, it seeks to integrate the new system seamlessly with existing hospital information systems to ensure compatibility and interoperability. Thirdly, the project endeavors to ensure that the system complies with healthcare data security and privacy regulations, safeguarding patient information. Lastly, the project aims to provide comprehensive training for healthcare staff to effectively utilize the new system, ensuring smooth implementation and adoption. By addressing these specific objectives, the project will work towards achieving its overarching goal of improving the efficiency and accuracy of patient data management in healthcare institutions…

### Scope and Limitations of the Project *(Define the boundaries of your project. Explain what your project will cover and what it will not. This section should clarify the extent of your project and any limitations that might affect the outcomes or implementations.)*

### Example:

### This project will focus on the development and implementation of the data management system within a single healthcare institution. It will include software development, system integration, and user training. However, it will not cover hardware procurement, multi-institution implementation, or long-term maintenance beyond the initial deployment phase…

### Definition of Terms *(Provide definitions for any specialized terms, acronyms, or jargon used in your project. This ensures that readers unfamiliar with the topic can understand your content. Include technical terms and any specific terminology relevant to your project.)*

### Example:

### Data Management System: A software solution designed to store, manage, and retrieve data efficiently.

### User Interface (UI): The visual part of the software that users interact with.

### Integration: Linking together different computing systems and software applications physically or functionally.

### Compliance: Adherence to laws, regulations, guidelines, and specifications relevant to the project.

### End-User: The person or group who will use the system once it is completed.

# CHAPTER II

## **REVIEW OF RELATED LITERATURE AND SYSTEMS**

### Foreign Literature *(Summarize relevant studies, articles, and publications from international sources. Highlight key findings, methodologies, and conclusions that relate to your project. Explain how these sources contribute to the understanding of your topic.)*

### Example:

### Smith et al. (2020) conducted a study on the benefits of cloud-based data management systems in healthcare. They found that such systems significantly improve data accessibility and scalability. Similarly, Lee (2019) highlighted the potential of AI-driven analytics to enhance patient data management, leading to better clinical decisions…

### Local Literature *(Review relevant studies, articles, and publications from local sources. Focus on findings and insights that are specific to your region or context. Discuss how these local studies inform and support your project.)*

### Example:

### Reyes (2021) highlighted the inefficiencies in local hospitals sue to reliance on paper-based records. The study emphasized the need for digital transformation to reduce operational costs and improve patient care. Gonzales (2018) reported successful implementation of electronic health records (EHR) in several local hospitals, which resulted in improved data accuracy and accessibility…

### Synthesis *(Integrate the insights from both foreign and local literature. Discuss the common themes, patterns, and gaps identified in the literature. Explain how the reviewed literature informs your project and supports its relevance and necessity.*

### Example:

### The literature review reveals a consensus on the need for modernizing healthcare data management systems. Both foreign and local studies underscore the benefits of digital solutions, such as improved efficiency, accuracy, and decision-making. These insights support the rationale for our project and provide a solid foundation for its development…

# CHAPTER III

## **DESIGN AND METHODOLOGY**

### System Development and Life Cycle

**Technical Background**

### Software *(Describe the software components of your project. Specify the programming languages, frameworks, and tools you will use. Explain why you choose these technologies and how they will help achieve your project objectives.)*

|  |  |
| --- | --- |
| **Category** | **Description** |
| **Programming Language:** Python | Python was selected as the primary programming language for its readability, simplicity, and extensive library support. Its versatility makes it well-suited for developing web applications and handling data processing tasks efficiently. |
| **Web Framework:** Django | Django, a high-level Python web framework, will be used for rapid development of the project’s web application. It provides built-in features for handling authentication, URL routing, database migrations, and templating, streamlining the development process and ensuring code maintainability. |
| **Database Management System:** PostgreSQL | PostgreSQL, a robust open-source relational database management system, will be utilized to store and manage the project’s data. Its support for complex queries, data integrity constraints, and scalability makes it suitable for handling large volumes of healthcare-related data securely. |
| **Data Encryption:** AES (Advanced Encryption Standard) | AES encryption algorithm will be employed to encrypt sensitive patient information stored in the database. AES is a widely adopted symmetric encryption algorithm known for its security and efficiency in protecting data confidentiality. |

### Hardware *(Outline the hardware requirements for your project. Detail the specifications for servers, workstations, and other necessary hardware. Explain the reasons behind your choices and how they will support the software and overall project functionality.)*

|  |  |
| --- | --- |
| **Category** | **Description** |
| **Servers** | High-performance servers will host the project’s web application, database, and other essential services. |
| **Workstations** | Workstations equipped with modern hardware configurations will serve as the primary interface for healthcare professionals to access the project’s web application for data entry and retrieval. |
| **Networking Equipment** | Ethernet switches, firewalls, and intrusion detection/prevention systems will form the network infrastructure to facilitate secure and efficient communication between servers, workstations, and other network devices. |
| **Server Room Infrastructure** | The dedicated server room will provide a controlled environment for housing the project’s servers, ensuring optimal operating conditions and minimizing the risk of hardware failures due to environmental factors. |

### Design of Software, System and Processes

### Diagrams and Flowcharts *(Provide diagrams and flowcharts that visually represent your system architecture, data flow, and user interactions. These should help in understanding the structure and functionality of your system. Ensure the diagrams are clear and well-labeled.)*

### Network Layout *(Detail the configuration of your network components, including servers, routers, switches, and firewalls. Explain how your network will be set up to ensure and efficient data transmission.)*

### Hardware Network Layout *(Describe the physical arrangement of your hardware components within the network. Include the placement of servers, workstations, and other peripherals. Explain how this layout will optimize performance and facilitate maintenance.)*

### System Testing and Evaluation *(Describe the testing process, the tools used, and the metrics evaluated to determine the success of the system.)*

### Example:

The testing was conducted at three levels:

1. Unit Testing: Performed using Python’s unittest framework to test individual components like the login functionality and data retrieval processes.
2. System Testing: Ensured that the entire system worked as a cohesive unit. This was done using Selenium for automated testing of the web interface.
3. User Acceptance Testing (UAT): Healthcare professionals were invited to use the system in a controlled environment. Their feedback was used to assess the system’s ease of use, functionality, and overall performance.

Evaluation metrics included response time, system uptime, and user satisfaction. For example, the average response time for data retrieval was reduced to 2.5 seconds, meeting the performance goal of less than 3 seconds…

### System Design *(Explain the overall design and methodology used to develop the system. Include diagrams or visual aids if necessary to illustrate the architecture.)*

### Example:

### The system follows a three-tier architecture that includes the presentation layer, logic layer, and data storage layer. The presentation layer was developed using HTML, CSS, and Reach.js for an interactive and user-friendly interface. The logic layer, built in Python and Django, handles data processing, while the data storage layer uses PostgreSQL for secure and efficient data management. This structure allows for modularity, making future upgrades and maintenance easier…

### System Architecture *(Describe the different components and modules of the system. Provide an architecture diagram and explain how data flows through the system.)*

### Example:

### The system architecture is divided into five main modules:

* User Authentication Module: Manages user login, role verification, and security protocols using Django’s authentication framework.
* Data Management Module: Handles CRUD (Create, Read, Update, Delete) operations for patient record, stored in PostgreSQL.
* Reporting Module: Allows users to generate and export reports based in specified criteria.
* Notification Module: Sends alerts and reminders to users about pending tasks.
* Integration Module: Facilitates communication between the system and external systems like hospital databases.

Data flows from the user interface, where actions trigger the logic layer to process the data, which is either fetched from or saved to the database…

**Development Process** *(Outline the tools, techniques, and methodologies employed during the development phase. Discuss the iterative nature of the development cycle if applicable.)*

Example:

The development process was based on the **Agile methodology**, with each sprint lasting two weeks. The tools used included **Visual Studio Code** for coding, Git for version control, and Jira for task management and tracking. The first sprint focused on the authentication module, the second on the data management module, and subsequent sprints addressed other features. This iterative process allowed for continuous feedback from stakeholders and rapid adjustments based on their input…

# CHAPTER IV

## **RESULTS AND DISCUSSIONS**

### Results of the Testing *(Provide the results obtained form system testing, including the metrics or key performance indicators measured.)*

### Example:

### The system achieved an average response time of 2.5 seconds during testing, meeting the benchmark of less than 3 seconds. User feedback from the UAT indicated that 90% of participants found the system intuitive and easy to use. Error rates during data entry decreased by 25% compared to the legacy system, demonstrating improved accuracy…

### Analysis of Results *(Analyze the testing results, discussing how they meet or fall short of the project’s objectives.)*

### Example:

### The results indicate that the system successfully achieved the goal of reducing response times and improving data management efficiency. The reduced error rate suggests that the system’s input validation mechanisms are working as intended. However, the limitations in mobile responsiveness need to be addressed to ensure that the system can be used in a broader range of healthcare environment, especially in emergency situations where mobile access may be crucial…

### Discussion of Findings *(Relate the findings form the testing phase to the overall objectives of the project. Discuss any unexpected outcomes.)*

### Example:

### The findings validate the project’s objective of streamlining data management in healthcare settings. The significant reduction in data entry errors directly supports the goal of improving record accuracy. An unexpected outcome was the high demand for a mobile version of the system, which was not originally in the project’s scope but is now recognized as a critical feature for future iterations…

# CHAPTER V

## **SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

### Conclusion *(Summarize the key findings and contributions of the project. Emphasize the outcomes in relation to the original problem.)*

### Example:

### This project successfully developed and implemented a healthcare data management system that significantly improved data accuracy and reduced processing time. The system met its objectives by offering an intuitive interface and efficient data handling. The positive feedback form user acceptance testing confirms that the system is a viable solution for healthcare institutions seeking to modernize their record-keeping processes…

### Recommendations *(Provide suggestions for improving the system or for future research or development.)*

### Example:

### It is recommended that the system be further developed to include a mobile-responsive design for healthcare professionals working in the field. Additionally, integration with SMS notifications should be prioritized to enhance the system’s alerting capabilities. Future research should explore the long-term impact of the system on patient outcomes and workflow efficiency across multiple hospital departments.

## **BIBLIOGRAPHY**

*(List all the sources cited in your project. Complete citations in the required format.)*

Smith, J. (2020. *Machine Learning in Healthcare.* Journal of Medical Research, 45(2), 123-135.

…

## **APPENDICES**

*(Include supplementary materials that supports your study. Additional data, detailed calculations, questionnaires, etc.)*

Apendix A: Relevant Source Code…………….……………………………

Apendix B: Evaluation Tool or Test Documents……………………………