TAGUIG CITY UNIVERSITY

ThesisTrack: An Algorithm-Driven Platform for Efficient Monitoring of Student Research Progress for CICT

A Thesis Presented to the Course Specialists

of the College of Information and Communication Technology

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By:

Balmoja, Dorothy Zoe L.

Jimenez, Althea Jasmine J.

Tanabe, Denise Koyasha H.

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INTRODUCTION

Introduction

The supervision of academic thesis is still heavily dependent on manual processes, which consume a lot of faculty time and resources, particularly when working with multiple students at once. To make sure that all essential elements, such as study background, problem statements, research objectives, significance, and scope definition, are included, advisors must manually go over each chapter that students submit. The supervision process suffers greatly by this time-consuming approach, which frequently results in inconsistent evaluations, long-term feedback loops, and increased uncertainty among students regarding their academic performance.

While learning management systems are used by many institutions for both document submission and basic assignment management, they are merely file repositories that lack the capacity to assess structural completeness, formatting compliance, or compliance to academic writing standards. Consequently, all thorough structural and content reviews are still carried out by faculty members by hand, which furthers the supervision process's inefficiencies. These problems are made worse by the absence of systematic progress tracking procedures, which prevent advisors and students from having clear visibility into the stages of thesis development. This leads to confusion, pointless revisions, and pointless back-and-forth communication that could be effectively facilitated by strategic automation.

Project context

This research addresses the documented inefficiencies in thesis supervision by proposing ThesisTrack, an AI-powered document parsing and workflow management platform designed for CICT thesis supervision processes. The system directly reads and parses the content of uploaded thesis drafts in Word or PDF formats.

Once parsed, the text is processed by a fine-tuned natural language processing (NLP) model to perform intelligent document analysis. The system automatically evaluates submissions for missing sections, spelling and grammar errors, citation formatting compliance, and overall writing quality. It also integrates an AI-written percentage detector to estimate the likelihood of AI-generated content within the thesis. The results are presented in the form of completeness scores and detailed feedback reports, enabling students to make revisions before formal review.

ThesisTrack supports a structured user role system: CICT 3rd Year Students, who upload and track their thesis drafts; Subject Advisors, who review documents, create student accounts, and provide targeted feedback; and Research Coordinators, who maintain read-only oversight access.

By automating repetitive document checks and providing immediate AI-driven insights, ThesisTrack reduces delays, ensures consistent evaluations, and allows advisors to focus more on research content rather than mechanical corrections. This results in a more efficient, fair, and supportive supervision process for both faculty and students.

Purpose and Description

ThesisTrack is an algorithm-driven platform designed to simplify and improve the thesis journey for both students and faculty within the College of Information and Communication Technology (CICT). By automating repetitive document checks and integrating intelligent analysis, the system ensures that structural completeness, spelling, grammar, relevancy , and originality are consistently verified—freeing professors to focus on providing meaningful academic feedback. Instead of students waiting days for confirmation on whether their thesis chapters are acceptable, the platform provides instant, AI-powered feedback, reducing delays and improving clarity throughout the supervision process.

A. Document Checker

This feature allows students to upload their thesis chapters in PDF or Word format. Once submitted, the system uses document parser to extract the text and runs it through the Fine-Tuned Flan T5 Base Model to analyze structural elements such as the background, methodology, objectives, and scope. The platform then generates a completeness score—for example, "75% complete"—and highlights what sections are missing or incomplete. This provides students with immediate direction for revisions and improvements.

B. Professor's Dashboard

Thesis advisors are given access to a personalized dashboard where they can view all student submissions organized by section. The dashboard allows them to see who is on track, check document statuses, and review each uploaded file. Advisors can provide feedback directly through the platform, assign scores, and update the progress status of

each thesis according to milestones. All student information is verified by advisors based on an official class masterlist during account creation, ensuring accuracy and structured supervision.

C. Student Panel

Students receive their login credentials from their assigned advisor and gain access to a personalized interface where they can upload thesis documents, view feedback, monitor progress, and track which chapters are under review, pending, or approved. The system is designed to help students clearly understand what's expected and stay organized throughout their thesis development.

D. Visual Progress Tracker (Kanban Board)

A visual Kanban board displays the status of each student's thesis progress. Chapters are shown as cards that move through different columns—such as "In Progress," "Submitted," "Under Review," and "Approved"—allowing both students and faculty to quickly understand where a student stands in their research journey. This eliminates confusion and encourages consistent tracking of milestones.

E. Admin / Research Coordinator Interface

The Research Coordinator acts as both the system administrator and a compliance officer. This role involves monitoring the overall system, creating advisor accounts, and assigning them to appropriate sections. While the Research Coordinator cannot modify thesis content or advisor feedback, they have read-only access across the platform, enabling them to ensure proper supervision processes are being followed and identify

trends or gaps in performance for oversight purposes. Their responsibilities are focused on maintaining operational integrity, verifying the legitimacy of user roles, and supporting the overall academic workflow.

Objectives of the Study

General Objective

This study aims to develop ThesisTrack, an algorithm-driven platform that uses AI-powered document analysis and a Kanban-based workflow system to streamline the thesis supervision process. The goal is to make tracking progress easier, reduce feedback delays, and support both students and faculty in managing thesis-related tasks more effectively.

Specific Objectives

Specifically, the study aims to:

1. Develop an automated document checker that verifies whether thesis chapters contain all required sections based on academic structure.

2. Integrate intelligent tools such as a grammar checker, citation format checker, spelling checker, and AI-generated content detector to ensure academic quality and authenticity in student submissions.

3. Implement a Kanban-style visual progress tracker that clearly displays each student's research status and chapter milestones.

4. Design an intuitive dashboard for thesis advisors to manage student accounts, review submissions, provide structured feedback, and monitor progress across assigned sections.

5. Include an administrative interface for research coordinators to oversee advisor sign-ups, assign advisors to specific sections, and maintain system-wide compliance with read-only access to student outputs and advisor feedback.

6. Evaluate the overall performance and quality of ThesisTrack: An Algorithm-Driven Platform for Efficient Monitoring of Student Research Progress for CICT using the ISO/IEC 25010 Software Quality Model, focusing on the following criteria:

4.1 Functionality

4.2 Reliability

4.3 Usability

4.4 Efficiency

4.5 Maintainability

4.6 Portability

Conceptual Paradigm

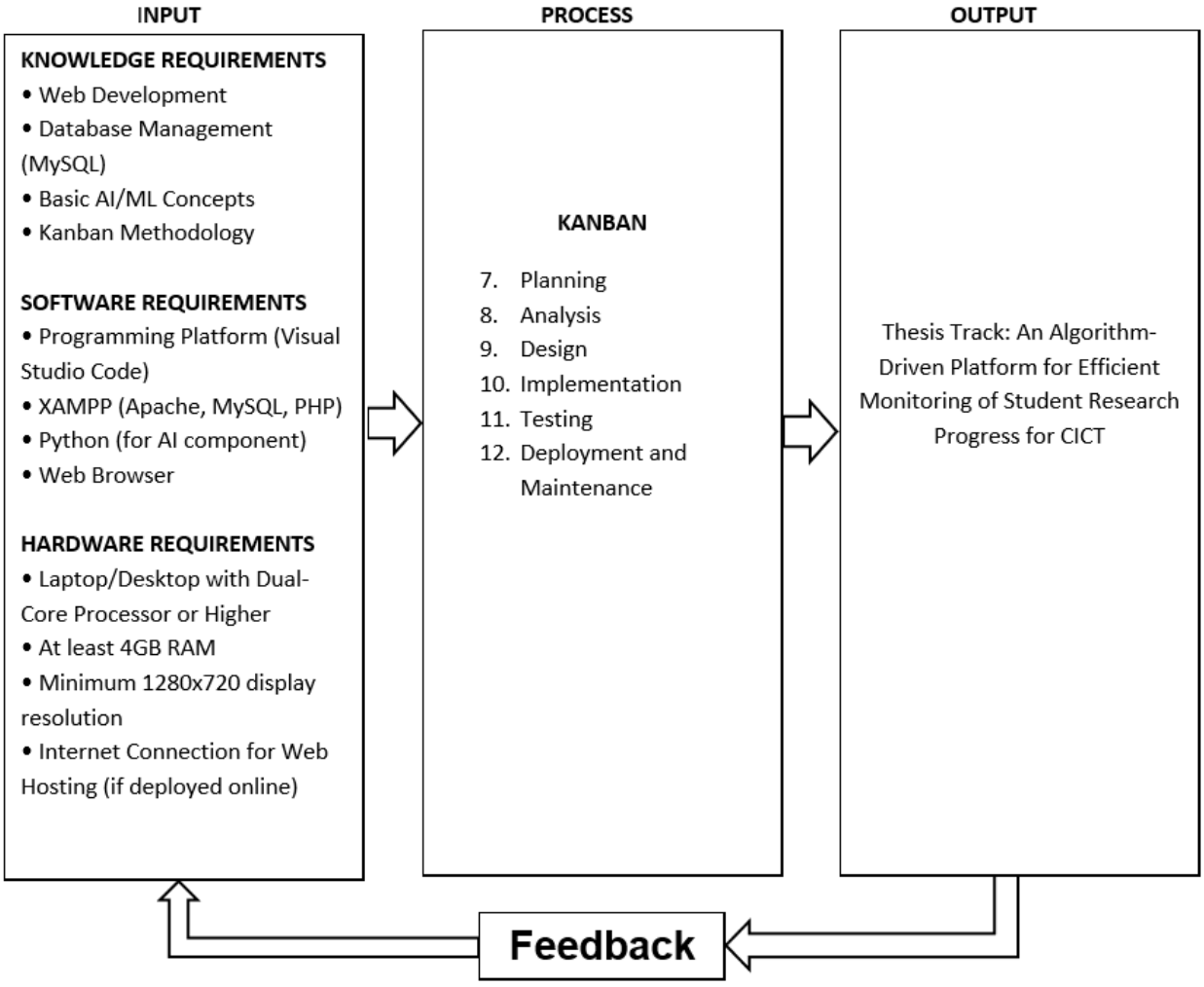

Figure 1. Conceptual Paradigm

Figure 1 depicts the development and design model of the study titled "ThesisTrack: An Algorithm-Driven Platform for Efficient Monitoring of Student Research Progress for CICT", which aims to assist students and advisors in tracking and managing the progress of thesis work through an AI-enhanced Kanban system. Artificial intelligence is incorporated into the system to facilitate work management and progress updates in an orderly and systematic way. The researcher's paradigm for the study, shown in Figure 1, is designed after the Input-Process-Output (IPO) model. The system is a web-based

platform intended to support academic institutions by improving thesis monitoring efficiency.

An Input component has three crucial sections: the knowledge required, the necessary software, and the required hardware. You should have knowledge about web development, MySQL, AI concepts, and machine learning, as well as be familiar with the Kanban methodology for managing workflows. They are necessary for users and developers of the platform to get the most out of it. Visual Studio Code is needed for writing code, XAMPP handles setting up a local web server with MySQL and PHP, and Python is the language for implementing machine learning parts of the software. It is important to have a web browser to connect and test the platform. The system is compatible with any laptop or desktop having at least a dual-core processor, 4GB of RAM, and a screen resolution of at least 1280x720. For the platform to be online, it requires an internet connection.

The model uses Kanban to describe the Process section, which explains the main phases involved in developing the system. They are made up of planning, analysis, design, implementation, testing, and deployment with maintenance. During the planning phase, what the system should do and how it will work are set. Analysts assess whether the needs are achievable and appropriate during this stage. When designing, designers first build the database, then design the user interface, and finally organize the system architecture. During this phase, programmers focus on constructing and uniting everything that involves adding thesis, scanning them, checking results with AI, and final implementation. Testing is designed to see if all parts of a system are working properly and are not riddled with

major problems. Finally, putting the system into use and caring for it include triggering the system and adjusting important updates.

The development ends with a fully operational platform called ThesisTrack, where students are able to check and update their status per chapter as they write their thesis. Professors are able to check the submissions, give responses or approvals, and output reports. It ensures that all uploaded content is checked by AI against academic guidelines and feedback is provided in real time to everyone.

Also, feedback is important in allowing the model to progressively improve over time. Professors, students, and system analytics are used to improve the platform, confirm the correctness of its content, and ensure the guidelines are followed. Ensuring continuous development and improvement of the user experience and system performance is the purpose of the loop.

Scope and Limitation of the Study

This study covers the design and development of ThesisTrack, an AI-enhanced web-based platform aimed at improving thesis supervision and document management within the CICT department. The platform employs a document parser that directly reads and processes the digital content of submitted thesis chapters in Word or PDF formats. Parsed content is then analyzed using a fine-tuned NLP model to perform structural completeness checks. The system also integrates AI-powered tools, including a grammar checker, citation format validator, spelling checker, and an AI-generated content detector, to ensure academic writing integrity.

In addition to intelligent document analysis, the system implements a Kanban-inspired visual workflow to track the progress of each student's thesis across various milestones. However, the study has several limitations. The system is designed primarily for desktop and laptop access and is not optimized for mobile or tablet devices. It requires at least a dual-core processor and 4GB of RAM to function efficiently. Additionally, while the platform uses natural language processing for document analysis, it does not provide advanced semantic interpretation or predictive analytics. A stable internet connection is required for all major functionalities, including uploads, AI analysis, and dashboard access.

Significance of the Study

This research provides a practical solution to long-standing inefficiencies in thesis supervision by introducing ThesisTrack, a platform that blends AI-driven automation with visual workflow management. Traditionally, thesis reviews have been conducted manually, which consumes a significant amount of time and often leads to inconsistent assessments, delayed feedback, and duplicated effort. By automating document checks for completeness, grammar, citation format, and potential AI-generated content, the system helps ensure that students submit well-prepared drafts before reaching their advisors.

This study contributes an intelligent, structured, and user-friendly tool that aligns with academic institutions' goals of efficiency, consistency, and academic excellence.

For Professors. The AI automates checks for required sections, grammar, spelling, citation formatting, and AI content detection, freeing professors to focus on providing meaningful content feedback.

For Students. Students usually do not know whether they have done their work or not and what they are missing. The system gives instant AI feedback on missing sections and errors, helping students understand and improve their work promptly.

For Educational Institutions. ThesisTrack improves supervision efficiency, reduces delays, and supports timely thesis completion, benefiting both faculty and students

Future researchers. This study serves as a reference for developing advanced educational tools that integrate AI and visual workflow systems, particularly in thesis monitoring and academic process management.

Definition of Terms

Algorithm-Driven Platform. A computer program based on step-by-step computational methods (algorithms) that performs tasks automatically. In this research, it applies artificial intelligence (AI) to review thesis papers and a Kanban system to monitor progress.

Automated Document Verification. A procedure where it reviews thesis chapters for mandatory components (e.g., introduction, methodology) and gives a mark measuring completeness (e.g., "80% complete").

Artificial Intelligence. Is the ability of computer systems to accomplish tasks normally reserved for human intelligence, including learning, reasoning, problem-solving, perception, and decision-making. ThesisTrack applies AI to search thesis relevancy and completeness but not content quality.

Completeness Score. A percentage score provided by ThesisTrack reflecting how much of a thesis chapter is completed to a standard (e.g., "70% complete" if certain sections are missing).

Input-Process-Output (IPO) Model. The model informs ThesisTrack's architecture, which has as inputs student thesis submissions and guidelines for academics. The Process phase has AI document validation and progress tracking by Kanban. Outputs are completeness scores, comments, and visual reports of progress. This organized process automates the supervision with the assurance of constant evaluation.

ISO 25010. A quality standard used globally to measure the quality of software. ThesisTrack is tested according to: Functionality, Usability, Efficiency, Maintainability, and Portability

Kanban Methodology. A project management method that utilizes a visual board to monitor work progress. In ThesisTrack, it enables students and instructors to view which thesis sections are pending, in review, or done.

Learning Management System (LMS). Is an administrative software that is intended to support learning and development initiatives through the management of training

materials, progress tracking, report generation, work automation, and the facilitation of course or training program delivery.

Visual Workflow System. A system for viewing tasks in a graphical layout (e.g., progress boards). ThesisTrack's Kanban board makes it easy to view thesis progress at a glance.