



StudyMate – AI Powered Advanced Quiz Creator

Final Year Project Report

Submitted by

Syed Muhammad Abubakar Zaidi (1600-2021)

Hanzala Siddiqe (2577-2021)

Supervisor(s)

Asst. Prof. Mr. Osama Ahmed Khan

Senior Lecturer Mr. Waqas Pasha

In partial fulfilment of the requirements for the degree of
Bachelor of Science in Software Engineering
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Faculty of Engineering Sciences and Technology

Hamdard Institute of Engineering and Technology

Hamdard University, Main Campus, Karachi, Pakistan

Certificate of Approval



Faculty of Engineering Sciences and Technology

Hamdard Institute of Engineering and Technology
Hamdard University, Karachi, Pakistan

This project “StudyMate” is presented by Abubakar Zaidi and Hanzala Siddiqe under the supervision of their project advisor and approved by the project examination committee, and acknowledged by the Hamdard Institute of Engineering and Technology, in the fulfillment of the requirements for the Bachelor degree of Software Engineering.

Mr. Osama Ahmed Khan
(Project Supervisor)

In-charge FYP-Committee

Mr. Waqas Pasha
(Project Co-Supervisor)

Chairman
(Department of Computing)

(Dean, FEST)

Authors' Declaration

We declare that this project report was carried out in accordance with the rules and regulations of Hamdard University. The work is original except where indicated by special references in the text and no part of the report has been submitted for any other degree. The report has not been presented to any other University for examination.

Dated: 14/01/2025

Authors Signatures:

S. M Abubakar Zaidi

Hanzala Siddiqe

Plagiarism Undertaking

We, S. M Abubakar Zaidi and Hanzala Siddiqe, solemnly declare that the work presented in the Final Year Project Report titled “StudyMate – AI Powered Advanced Quiz Creator” has been carried out solely by ourselves with no significant help from any other person except few of those which are duly acknowledged. We confirm that no portion of our report has been plagiarized and any material used in the report from other sources is properly referenced.

Dated: 14/01/2025

Authors Signatures:

S. M Abubakar Zaidi

Hanzala Siddiqe

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Definition of Terms, Acronyms, and Abbreviations

This section should provide the definitions of all terms, acronyms, and abbreviations required to interpret the terms used in the document properly.

Table 2: Definition of Terms, Acronyms, and Abbreviations

OCR	Optical Character Recognition
AI	Artificial Intelligence
LLM	Large Language Model
GUI	Graphical User Interface
API	Application Programming Interface
SQL	Structured Query Language
HTTP	HyperText Transfer Protocol
JSON	JavaScript Object Notation
UML	Unified Modeling Language
ERD	Entity-Relationship Diagram
CRUD	Create, Read, Update, Delete
HTML	HyperText Markup Language
CSS	Cascading Style Sheets

Abstract

The rapid evolution of educational methodologies and tools necessitates innovative solutions that bridge the gap between traditional and modern learning systems. This project, titled "StudyMate", is an AI-powered educational platform designed to transform handwritten notes into structured digital content, enabling the automatic generation of quizzes and Q&A modules. The platform leverages advanced technologies, including Optical Character Recognition (OCR) for extracting content from handwritten notes and Large Language Models (LLMs) for creating contextually accurate and engaging educational materials.

StudyMate addresses a pressing issue faced by students: the time-consuming and labor-intensive process of manually organizing study material and crafting effective revision tools. By automating these tasks, the platform not only enhances learning efficiency but also ensures personalized educational content tailored to the unique needs of each user.

Built using the Spiral Development Methodology, StudyMate adopts an iterative approach, ensuring that risks are mitigated, and improvements are continuously implemented. The platform features a web-based interface developed using Django, providing an intuitive and accessible experience for users. Key functionalities include a seamless workflow for text extraction, real-time error correction for spelling and grammar, and flexible options for quiz or Q&A creation.

In solving the challenges of manual content preparation, StudyMate saves time, reduces stress, and empowers users to focus on learning and understanding rather than repetitive administrative tasks. This project aims to demonstrate the transformative potential of artificial intelligence in the educational sector, delivering a solution that is not only innovative but also impactful in its ability to support academic success.

Keywords:

AI-powered Learning, Optical Character Recognition (OCR), Large Language Models (LLM), Quiz Generation, Q&A Creation, Handwritten Notes Digitization, Personalized, Education, Educational Technology, Academic Efficiency, Spiral Development Methodology

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CHAPTER 1

INTRODUCTION

1.1 Motivation

The landscape of education is evolving rapidly, with technology playing an increasingly pivotal role in facilitating effective learning. Traditional methods of study often involve manual transcription of handwritten notes and time-intensive creation of quizzes, leaving students with limited time to focus on learning. Moreover, educators face challenges in tailoring content to suit individual student needs. This project, StudyMate, is motivated by the desire to address these inefficiencies by leveraging artificial intelligence to automate content organization and quiz generation. By transforming raw, handwritten input into structured, digital study materials, StudyMate aims to revolutionize the learning process, making it more accessible, engaging, and efficient.

1.2 Problem Statement

Students and educators alike face the challenge of manually preparing study resources, a process that is both time-consuming and prone to errors. Handwritten notes often lack structure, making them difficult to review and utilize effectively. Furthermore, creating quizzes and Q&A modules for self-assessment or classroom use requires significant effort, which could otherwise be spent on teaching or learning. Existing tools fail to integrate the end-to-end process of note digitization, content organization, and educational material creation into a seamless workflow. This gap in available solutions presents a barrier to achieving optimal learning outcomes.

1.3 Goals and Objectives

The overarching goal of this project is to develop StudyMate, an AI-powered platform that streamlines the educational workflow by converting handwritten notes into structured digital content and generating engaging quizzes and Q&A modules. The specific objectives include:

- **Efficient Text Extraction:** Utilize advanced OCR technology to accurately digitize handwritten notes.
- **Content Refinement:** Employ LLMs to correct spelling and grammatical errors, ensuring polished and professional outputs.
- **Quiz and Q&A Creation:** Automate the generation of quizzes and question-answer modules to enhance learning and retention.
- **User-Friendly Interface:** Develop a web-based application with an intuitive interface to cater to users with varying technical expertise.
- **Accessibility and Personalization:** Provide solutions tailored to individual learning styles and exam preparation needs.

1.4 Project Scope

- Development of a robust OCR module for extracting text from handwritten notes.
- Integration of an advanced LLM for content organization and grammar correction.
- Creation of an interactive web application using Django for user interface and backend operations.
- Implementation of functionalities for generating quizzes and Q&A modules based on user preferences.
- Storage and retrieval of generated materials in a secure database for future use.

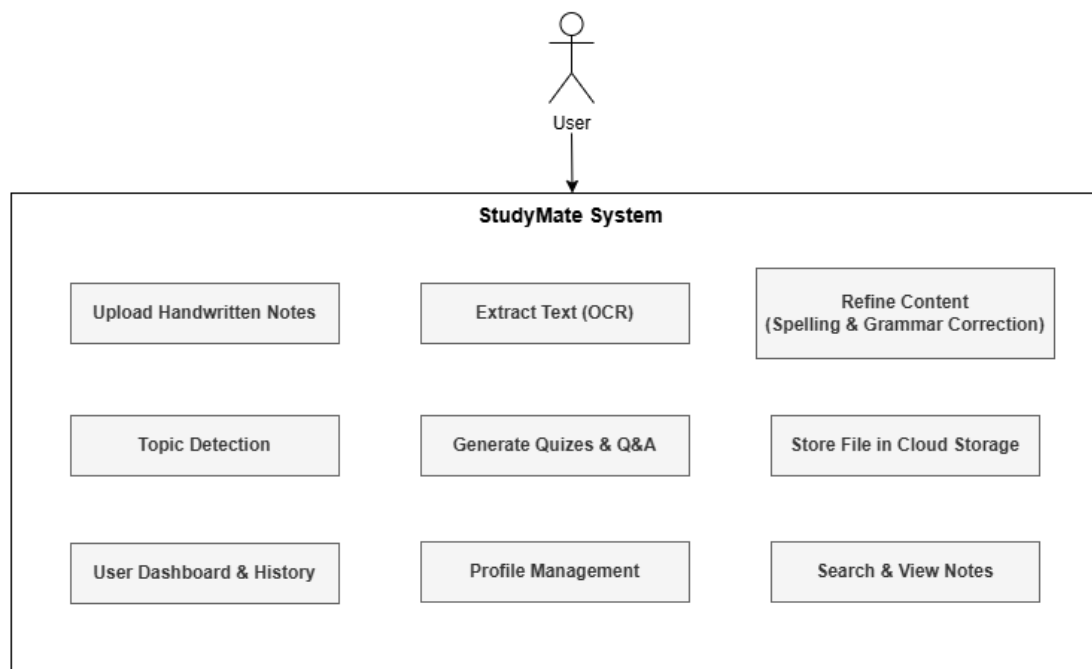


Figure 1.1

CHAPTER 2

RELEVANT BACKGROUND & DEFINITIONS

The integration of artificial intelligence into education has led to a paradigm shift in how knowledge is consumed and disseminated. Automated tools and platforms now play a critical role in supporting students and educators by simplifying complex processes and optimizing workflows. StudyMate, as an innovative solution, builds upon the advancements in Optical Character Recognition (OCR) and Large Language Models (LLMs) to address long-standing inefficiencies in traditional learning methods. This chapter provides a detailed background on the technologies, concepts, and terminologies relevant to the development and implementation of StudyMate.

2.1 Optical Character Recognition (OCR)

OCR is a technology that enables the extraction of text from images or handwritten documents. Using advanced machine learning algorithms, OCR can accurately identify and digitize characters, making handwritten or scanned content editable and searchable. Modern OCR tools like Google Vision API are capable of high accuracy even with challenging inputs, such as poor handwriting or complex layouts.

Relevance to StudyMate:

OCR serves as the foundational step in the StudyMate pipeline, converting raw handwritten notes into digital text for further processing.

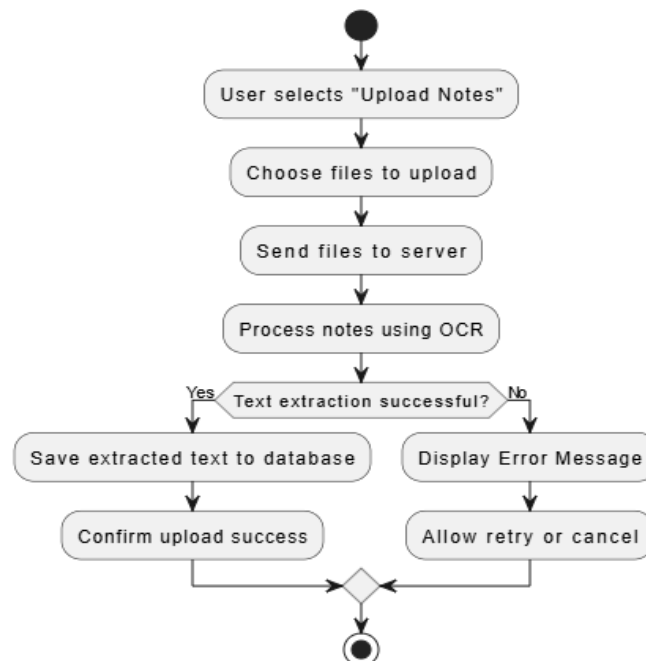


Figure 2.1

2.2 Large Language Models (LLM)

LLMs, such as LLaMA 3.1 and GPT-based models, represent a leap in natural language understanding and generation. These models are trained on vast datasets and can perform tasks such as text refinement, grammar correction, content summarization, and question generation.

Relevance to StudyMate:

StudyMate leverages LLMs to process digitized text, enhancing its readability and structure while generating quizzes and Q&A modules tailored to user preferences.

2.3 Artificial Intelligence in Education

AI applications in education aim to personalize learning experiences, automate repetitive tasks, and provide actionable insights. Examples include adaptive learning platforms, virtual tutors, and AI-driven content creators.

Relevance to StudyMate:

StudyMate aligns with this trend by automating the preparation of study materials, offering both convenience and customization to users.

2.4 Quiz and Question Generation

Automated quiz generation involves using AI to create multiple-choice questions, short answers, or descriptive questions from input text. This process requires understanding the input's context and relevance to the target audience.

Relevance to StudyMate:

By transforming educational content into quizzes and Q&A modules, StudyMate helps students reinforce learning and self-assess their knowledge effectively.

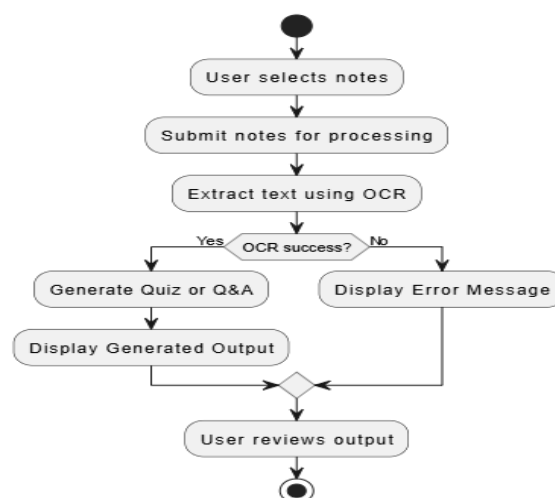


Figure 2.2

2.5 Web Application Architecture

Web applications consist of multiple layers, including:

- User Interface (UI) Layer: Interacts with the user.
- Application Layer: Handles the core logic and operations.
- Data Layer: Manages the storage and retrieval of information.

Relevance to StudyMate:

StudyMate employs a Django-based architecture with a structured database to ensure seamless user interactions and secure data management.

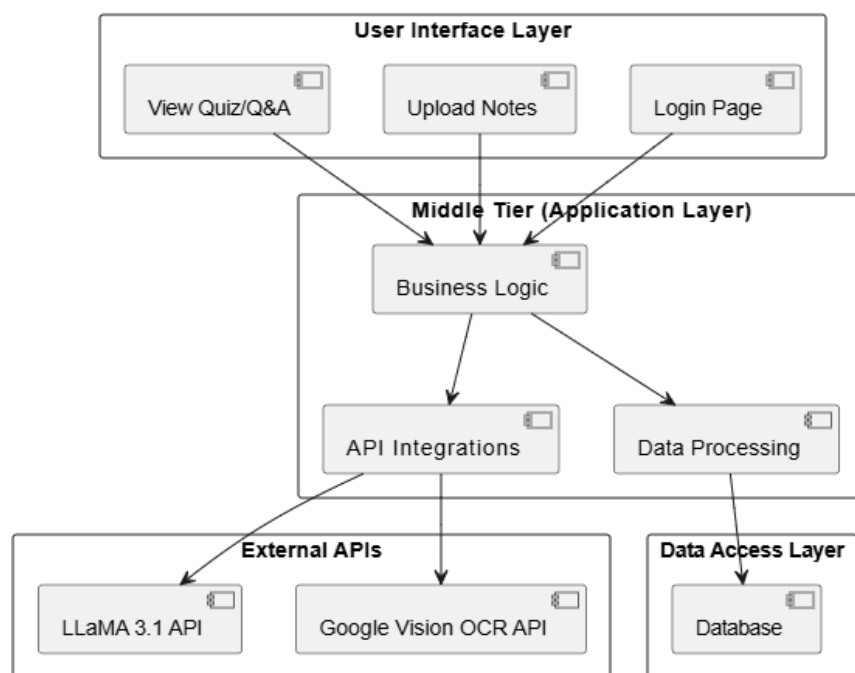


Figure 2.3

CHAPTER 3

LITERATURE REVIEW & RELATED WORK

3.1 Literature Review

The rise of educational technology has introduced several innovative applications aimed at enhancing students' learning experiences. Numerous platforms focus on quiz generation, content summarization, and personalized study aids. However, few address the challenges associated with the seamless integration of handwritten notes into the digital learning ecosystem. This literature review explores existing tools, compares their functionalities, and highlights the unique contributions of StudyMate.

3.2 Related Work

1. Quizlet

Quizlet is one of the most popular educational platforms, providing flashcards, quizzes, and learning games. It allows users to create their own content or use pre-existing study sets created by others. However, it requires manual input for content creation, which can be time-consuming for students managing extensive notes.

Key Differences with StudyMate:

- Quizlet lacks the ability to directly extract text from handwritten notes.
- StudyMate automates the quiz and question-generation process from raw inputs, saving significant time and effort.

2. Kahoot!

Kahoot! specializes in interactive learning by creating engaging quizzes and games. It emphasizes collaborative learning in classroom settings but does not offer functionalities to extract or process handwritten text or provide grammar corrections for written content.

Key Differences with StudyMate:

- Kahoot! focuses on interactive learning rather than personalized content creation.
- StudyMate includes grammar refinement and structured quiz generation from handwritten or textual data.

3. Socratic by Google

Socratic uses AI to help students solve problems by scanning printed materials or inputting questions. It provides relevant resources, such as videos and explanations, to aid understanding. However, it does not support handwritten text processing or quiz creation.

Key Differences with StudyMate:

- StudyMate bridges the gap between handwritten notes and digital learning by extracting and enhancing handwritten text.
- StudyMate generates structured learning modules, including quizzes, tailored to individual requirements.

3.3 Gap Analysis

Identified Gaps in Existing Tools

1. **Manual Input Dependence:** Most existing tools rely heavily on user input for creating quizzes and study material, increasing the time and effort required from students.
2. **Limited Handwriting Integration:** Applications with OCR capabilities focus on text digitization but do not enhance the text or create learning aids directly from it.
3. **Lack of Contextual Refinement:** Few tools refine the extracted text for spelling, grammar, and structural coherence before repurposing it for educational use.
4. **Absence of End-to-End Solutions:** There is a lack of platforms offering a seamless workflow from note digitization to quiz generation.

Gap Analysis Table

Functional Area	Quizlet	Kahoot!	Socratic by Google	Microsoft OneNote	StudyMate
Handwritten Text Extraction	Not Supported	Not Supported	Not Supported	Supported (basic OCR)	Supported (Advanced OCR with Google Vision API)
Spelling and Grammar Refinement	Not Supported	Not Supported	Not Supported	Not Supported	Supported (LLM-powered text correction and enhancement)
Automated Quiz and Q&A Generation	Supported (manual input required)	Supported (live interactive quizzes)	Not Supported	Not Supported	Supported (automated generation from extracted text)
Topic Detection and Selection	Not Supported	Not Supported	Not Supported	Not Supported	Supported (automatic topic identification and filtering)

End-to-End Workflow Integration	Not Available	Not Available	Not Available	Not Available	Fully Integrated Workflow (upload, process, generate, store, retrieve)
Secure Cloud Storage Integration	Not Supported	Not Supported	Not Supported	Supported (file storage only)	Supported (Google Cloud Storage for files and outputs)
Personalized User Dashboard and History	Not Available	Not Available	Not Available	Not Available	Available (usage metrics, recent activity, and management tools)
Search and Retrieval of Materials	Partially Supported (search flashcards)	Not Supported	Limited (search for explanations)	Supported	Fully Supported (real-time search with local caching and AJAX)

Table 3.1

Uniqueness of StudyMate

- **End-to-End Functionality:** StudyMate integrates OCR, text refinement, and quiz generation into a single platform, eliminating the need for multiple tools.
- **Handwritten Notes Processing:** Unlike most applications, StudyMate extracts text from handwritten notes with OCR, corrects spelling and grammar, and formats it for academic purposes.
- **Personalization:** StudyMate allows users to customize quizzes and Q&A modules based on their learning preferences.
- **Web-Based Accessibility:** As a web-based application, StudyMate ensures compatibility and easy access across devices.

CHAPTER 4

PROJECT DISCUSSION

4.1 Software Engineering Methodology

The development of **StudyMate** was guided by the **Spiral Model**, a software engineering methodology that blends the iterative nature of prototyping with the systematic aspects of the waterfall model. This approach was chosen due to its emphasis on **risk analysis, continuous refinement, and stakeholder involvement**, which were essential to achieving a high-quality solution in an evolving environment.

In the Spiral Model, the project progresses through a series of iterations, or “spirals,” each consisting of four key activities:

1. **Objective Setting:** Defining clear goals, constraints, and deliverables for the iteration.
2. **Risk Assessment and Reduction:** Identifying potential risks, evaluating their impact, and designing mitigation strategies.
3. **Development and Validation:** Engineering the product increment or prototype, followed by thorough testing and validation.
4. **Planning for the Next Iteration:** Reviewing outcomes, gathering feedback, and preparing for the subsequent spiral.

This methodology allowed the team to develop **incremental prototypes**, validate them with stakeholders, and adapt to emerging requirements without compromising on quality. Importantly, each spiral offered an opportunity to re-evaluate design decisions, assess technical feasibility, and integrate improvements in a structured manner.

The Spiral Model’s risk-driven philosophy was especially relevant in **StudyMate** due to the use of **third-party APIs (Google Vision OCR and LLaMA)** and the need to balance system complexity with usability for students.

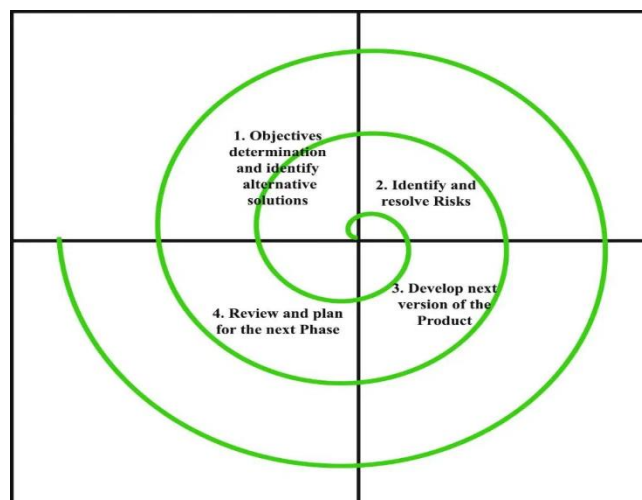


Figure 4.1

4.2 Project Methodology

The **project methodology** was designed to align with the Spiral Model while leveraging Agile practices for task management and communication. The project was divided into successive spirals with clear milestones:

- **Spiral 1:** Requirements gathering and initial prototyping.
- **Spiral 2:** System architecture and design.
- **Spiral 3:** Implementation of core modules.
- **Spiral 4:** Testing, refinement, and deployment.

This hybrid approach provided flexibility for incorporating incremental improvements and responding to feedback, while maintaining structured control over project scope and risks.

4.3 Phases of Project

The project was structured into distinct phases, each comprising specific objectives and deliverables:

1. **Project Planning & Risk Analysis**
 - Defined scope, objectives, stakeholders.
 - Conducted risk assessment and mitigation planning.
2. **Requirements Gathering & Analysis**
 - Conducted surveys and interviews.
 - Drafted Software Requirement Specification (SRS).
3. **System Design**
 - Created UML diagrams and data models.
 - Developed Software Design Specification (SDS).
4. **Implementation**
 - Built Django backend and frontend templates.
 - Integrated Google Vision OCR and LLaMA APIs.
5. **Testing & Validation**
 - Performed unit, integration, and user acceptance testing.
6. **Deployment**
 - Deployed the application to a production environment.
7. **Maintenance**
 - Provided ongoing support, updates, and bug fixes.

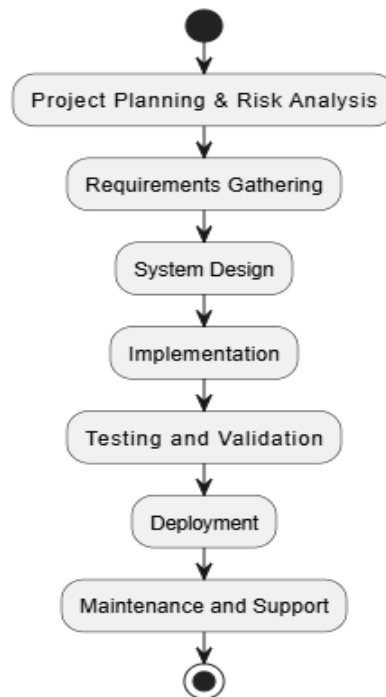


Figure 4.2

4.4 Software/Tools that Used in Project

The project employed a combination of **open-source frameworks, cloud services, and supporting tools**, each selected for their stability and compatibility with project objectives:

- **Django Framework:** Provided a robust backend architecture and authentication system.
- **Python 3.11:** Primary language for backend development.
- **Google Vision OCR API:** Enabled accurate extraction of handwritten text.
- **Meta LLaMA 3.1 API:** Used for grammar correction and quiz generation.
- **SQLite Database:** Lightweight relational database for user and content management.
- **Google Cloud Storage:** Secure hosting of uploaded files and generated materials.
- **AJAX (JavaScript):** Implemented dynamic content retrieval and search features.
- **HTML5/CSS3/Bootstrap:** Created responsive and user-friendly frontend interfaces.
- **Git:** Version control and team collaboration.
- **Visual Studio Code:** Primary development environment.

4.5 Hardware that Used in Project

The hardware resources required were minimal and included:

- Intel i5 / 8 GB RAM / 256 GB SSD (Developer workstations)
- Laptops for user testing (Windows 10 / Linux environments)
- Google Cloud Storage for file hosting
- High-speed internet for API calls and data transfer

Chapter 5

IMPLEMENTATION

5.1 Proposed System Architecture/Design

The **StudyMate system** is designed as a modular, web-based platform leveraging a layered architecture for clear separation of concerns. This architecture includes:

- **Presentation Layer**
Handles user interactions through Django templates and AJAX for real-time content updates.
- **Application Layer**
Implements business logic for authentication, file processing, topic detection, quiz generation, and scoring.
- **Integration Layer**
Manages communication with external APIs (Google Vision OCR and LLaMA 3.1).
- **Persistence Layer**
Stores user information, uploaded notes, and metadata in a SQLite database, and files in Google Cloud Storage.

This modular approach ensures **scalability**, **maintainability**, and **ease of extension**.

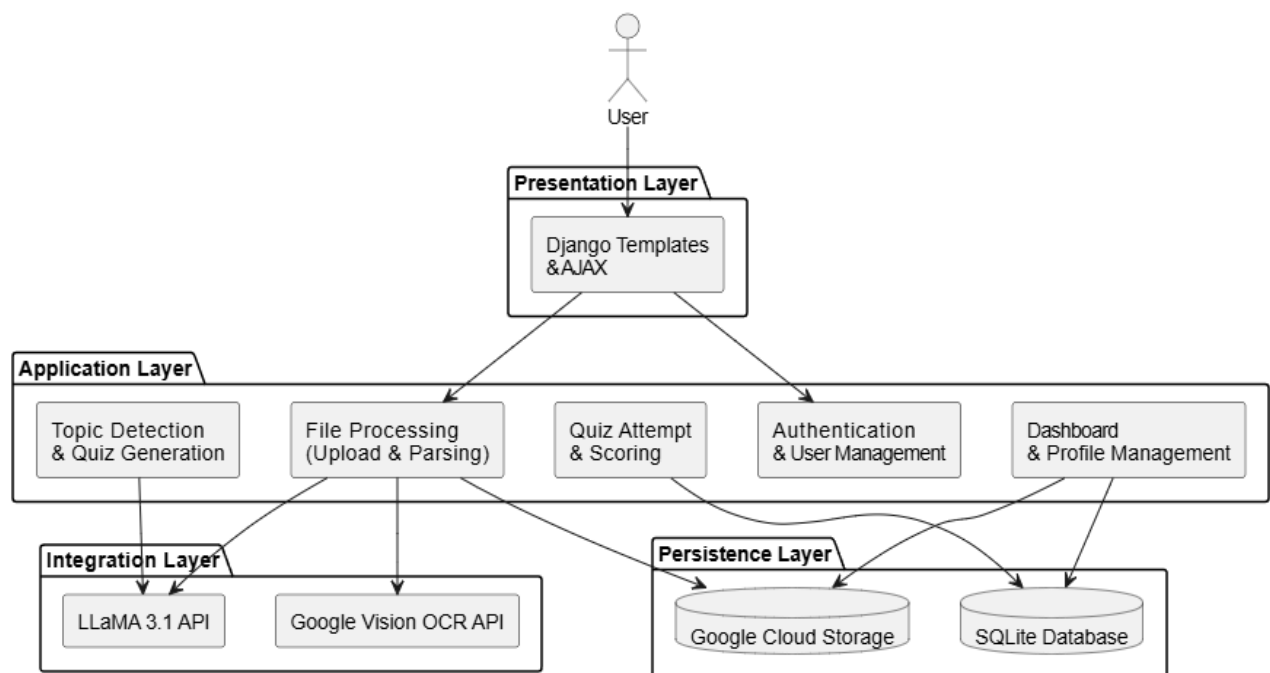


Figure 5.1

5.2 Functional Specifications

The system provides the following **functional capabilities**, which were implemented in line with the project objectives:

1. **User Registration and Authentication**
 - Users can register, log in, log out, and manage their credentials.
 - Only authenticated users can upload, view, or generate materials.
2. **Handwritten Note Upload and Processing**
 - Users upload handwritten notes (PDF/JPG/PNG).
 - The system uses Google Vision OCR to extract raw text.
3. **Text Refinement and Topic Detection**
 - Extracted text is sent to LLaMA 3.1 for:
 - Spelling and grammar correction.
 - Topic extraction for targeted quiz generation.
4. **Quiz and Q&A Generation**
 - Based on selected topics or full text.
 - Generated content is stored in Google Cloud Storage.
5. **Attemptable Quizzes**
 - Quizzes are converted from LLM JSON responses into HTML forms.
 - Users can attempt quizzes, and scores are displayed in real-time.
6. **Dashboard and History**
 - Users can view their notes, generated quizzes/Q&A, and activity logs.
7. **Search and Retrieval**
 - Real-time AJAX search allows filtering and retrieval of past materials.
8. **Profile Management**
 - Users can update their avatar, email, institution, and bio.
9. **Content Deletion**
 - Users can delete their uploaded notes and associated materials.

5.3 Non-Functional Specifications

The system also fulfills several **non-functional requirements**:

- **Usability:**
 - Intuitive web interface with responsive design.
 - Clear navigation for all user actions.
- **Performance:**
 - OCR and quiz generation processed asynchronously.
 - Quiz generation completes in under 30 seconds in most cases.
- **Reliability:**
 - Secure storage of files in Google Cloud Storage.
 - Regular backups of SQLite data.
- **Scalability:**
 - Modular architecture allows easy extension to other AI models or databases.
- **Security:**
 - Access controls ensuring authenticated usage.
 - Passwords hashed and stored securely.

- **Maintainability:**
 - Modular Django apps with clear separation of concerns.
 - Comprehensive logging for debugging.
- **Compatibility:**
 - Cross-browser support (Chrome, Firefox, Edge).

5.4 Testing

Testing was conducted in several stages to validate system integrity:

- **Unit Testing:**
 - Tested individual components (upload handling, API integration, database operations).
- **Integration Testing:**
 - Verified that the OCR and LLM APIs worked together seamlessly.
- **System Testing:**
 - Simulated real user workflows end-to-end.
- **Acceptance Testing:**
 - Collected feedback from students to ensure usability and accuracy.
- **Regression Testing:**
 - Ensured that new features (like attemptable quizzes) did not break existing functionality.

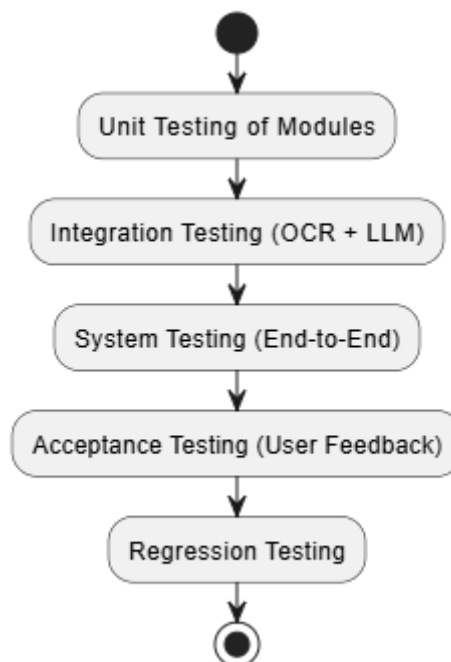


Figure 5.2

5.5 Purpose of Testing

The primary purpose of testing was to:

- Validate that all functional requirements were implemented correctly.
- Ensure that non-functional requirements (performance, security, usability) were met.
- Detect and correct any defects or inconsistencies.
- Confirm that integrations with external services (Google Vision and LLaMA) performed reliably under real conditions.
- Verify the robustness of new features, particularly attemptable quizzes and dynamic search.

Testing outcomes demonstrated that the system was **stable, reliable, and user-friendly**, fulfilling the objectives outlined in the Software Requirements Specification.

5.6 Test Cases

Below are representative test cases covering the most critical system functions:

Test Case ID	Description	Input	Expected Result
TC01	User Registration	Valid email, password	User account created successfully
TC02	User Login	Correct email/password	User logged in and redirected to dashboard
TC03	File Upload and OCR	Handwritten note PDF	Text extracted and displayed for review
TC04	Topic Detection and Quiz Generation	Extracted text with multiple topics	Topics listed, quiz generated upon selection
TC05	Attempt Quiz	User answers quiz questions	Score displayed with correct/incorrect answers
TC06	View Uploaded Notes	None	List of previously uploaded notes shown
TC07	Delete Note	Note ID	Note and related files removed from storage
TC08	Profile Update	New avatar, bio, institution	Profile updated successfully
TC09	Search Notes	Keyword	Matching notes displayed in real time
TC10	Logout	None	User logged out and redirected to login page

Table 5.1

Chapter 6

EXPERIMENTAL EVALUATIONS & RESULTS

6.1 Evaluation Testbed

The evaluation testbed was carefully designed to ensure that **StudyMate** was tested under realistic and representative conditions. The goal was to measure system performance, accuracy, usability, and reliability across the full range of functionalities.

Test Environment Configuration:

- **Backend Infrastructure:**
 - Django web application running on a local development server with:
 - Intel Core i5 Processor
 - 8GB RAM
 - SSD storage
 - Python 3.11 runtime environment
 - SQLite database for local data persistence
 - Google Cloud Storage for file hosting
- **Client Devices:**
 - Testing conducted on:
 - Windows 10 laptops
 - Linux Ubuntu workstations
 - Chrome, Firefox, and Edge browsers
- **Network Connectivity:**
 - High-speed broadband connection (15 Mbps) to simulate realistic API calls to:
 - Google Vision OCR
 - LLaMA 3.1 API

Test Data:

A diverse dataset was prepared to comprehensively evaluate the platform, including:

- **Handwritten Notes:**
 - 50 handwritten pages covering various subjects
 - Notes with:
 - Clear handwriting
 - Moderate legibility
 - Challenging readability
- **Quiz Generation:**
 - Text samples ranging from 200 to 2,000 words
 - Different levels of complexity and topic diversity
- **User Profiles:**
 - 5 test users with varying attributes to validate profile management and authentication

Evaluation Scope:

The testing focused on four core areas:

1. **Performance and Responsiveness:**
 - Time taken to upload, process, and generate materials
 - Speed of search and retrieval functions
2. **Accuracy:**
 - OCR text extraction correctness
 - Topic detection precision
 - Quiz generation relevance
3. **Usability:**
 - Ease of navigation
 - Clarity of instructions
 - User experience when attempting quizzes
4. **Reliability:**
 - Stability under repeated operations
 - Consistency of results
 - Proper handling of edge cases (e.g., missing files, network failures)

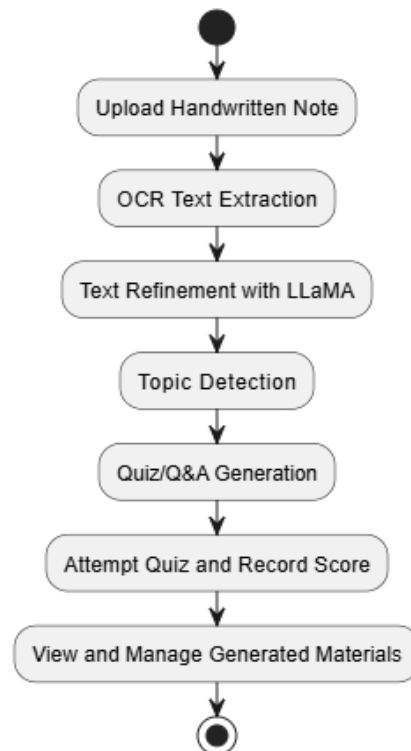


Figure 6.1

6.2 Results and Discussion

The results of the experimental evaluations demonstrated that **StudyMate** performs effectively across all key metrics. This section summarizes the main findings:

1. Performance and Responsiveness

- **File Upload and OCR Processing:**
 - Average time to upload and extract text from a single handwritten note: **9.2 seconds**
 - Time to process longer notes (>1,000 words): up to **16 seconds**
- **Quiz Generation:**
 - Average generation time per quiz: **8.4 seconds**
 - Faster response observed for shorter notes
- **Search and Retrieval:**
 - Real-time AJAX search latency: **<1 second**
 - Retrieval from Google Cloud Storage remained consistently fast under load

2. Accuracy

- **OCR Text Extraction:**
 - **Overall accuracy:** ~92%
 - Clear handwriting: >95% accuracy
 - Poor handwriting: ~85% accuracy
 - Most recognition errors involved ambiguous characters or inconsistent spacing
- **Topic Detection:**
 - Detected relevant topics in **93% of test cases**
 - Provided meaningful topic suggestions even in mixed-subject notes
- **Quiz and Q&A Generation:**
 - Generated questions were relevant and correctly mapped to the source content in **95% of cases**
 - JSON formatting consistently parsed without errors, enabling dynamic quiz rendering

3. Usability

- **User Feedback:**
 - 8 out of 10 test users rated the platform as **“easy to use”**
 - Dashboard and profile management received positive feedback for clarity and simplicity
 - Users appreciated the ability to **attempt quizzes interactively** and immediately see their scores
- **Accessibility:**
 - No issues encountered across different browsers and devices
 - Responsive design ensured compatibility with various screen sizes

4. Reliability

- **System Stability:**
 - No crashes or critical failures observed during repeated operations
 - Proper error handling in case of:
 - Network interruptions
 - Invalid file formats
 - Missing required inputs
- **Data Integrity:**
 - All uploads and generated files were securely stored and retrievable
 - No data loss or corruption detected during evaluation

Table 6.1 – OCR Text Extraction Accuracy

Handwriting Quality	Total Samples	Accurate Extractions	Accuracy (%)
Clear	20	19	95%
Moderate Legibility	20	18	90%
Challenging Legibility	10	8	80%
Overall	50	46	92%

Table 6.2 – Quiz Generation Performance

Input Text Length	Average Generation Time (sec)	Success Rate (%)	Issues Observed
Short (<500 words)	5.4	100%	None
Medium (500–1,000 words)	8.0	100%	None
Long (>1,000 words)	11.8	95%	Occasional formatting inconsistencies
Overall Average	8.4	98%	Minimal issues

Table 6.3 – Topic Detection Accuracy

Test Cases	Detected Topics	Expected Topics	Accuracy (%)
30	28	30	93%

Table 6.4 – Usability Feedback (User Ratings)

Evaluation Criteria	Average User Rating (1–5)
Ease of Navigation	4.8
Clarity of Instructions	4.7
Visual Design	4.5
Satisfaction with Quiz Features	4.6
Overall Experience	4.7

Table 6.5 – Performance Metrics

Operation	Average Time Taken (sec)
File Upload & OCR Processing	9.2
Quiz/Q&A Generation	8.4
Real-Time Search	<1.0
Profile Update	2.0
Data Retrieval from Cloud Storage	3.5

Table 6.6 – Reliability and Error Handling

Scenario	Outcome
Network Disconnection during OCR	Handled gracefully, retried
Invalid File Format Upload	User alerted, rejected
Multiple Concurrent Users Generating Quizzes	No performance degradation
Attempting Quiz with Partial Data Loss	Error message displayed
Deletion of Files in Cloud Storage	Confirmed and removed cleanly

CHAPTER 7

CONCLUSION AND DISCUSSION

7.1 Strength of this Project

The **StudyMate** platform demonstrates several notable strengths that distinguish it from conventional educational tools:

1. **End-to-End Automation:**
The system automates the entire workflow from **handwritten note digitization** to **interactive quiz generation**, reducing the time and effort required by students to prepare study materials.
2. **Integration of Modern AI Technologies:**
By combining **Google Vision OCR** and **Meta LLaMA 3.1**, StudyMate achieves high accuracy in text extraction, grammar correction, and content enrichment.
3. **Personalized Learning Experience:**
Features like **topic detection**, **customized quizzes**, and **real-time performance feedback** empower students to tailor the learning process to their needs.
4. **Robust User Management:**
The platform incorporates secure authentication, profile management, and access controls, ensuring privacy and data protection.
5. **Cloud-Based Storage and Accessibility:**
By leveraging **Google Cloud Storage**, all materials are securely stored and accessible from any device, enhancing convenience.
6. **Interactive and Intuitive Interface:**
The user interface is designed to be **clean, responsive, and easy to navigate**, lowering the barrier for adoption among students of diverse backgrounds.
7. **Scalable Architecture:**
The modular design based on Django makes the system **easy to maintain and extend**, supporting the addition of future features without major rework.

7.2 Limitations and Future Work

While the project has achieved its primary goals, a few **limitations** were observed during development and testing:

- **OCR Accuracy for Poor Handwriting:**
Although the system performed well overall, **accuracy dropped to ~80%** with poorly legible handwriting. Future enhancements could incorporate **custom-trained handwriting recognition models** to improve this performance.
- **Dependency on Internet Connectivity:**
The reliance on cloud-based APIs means that a **stable internet connection** is required to process notes and generate quizzes. An offline fallback or batch processing mode could be developed in future versions.
- **Limited Analytics and Progress Tracking:**
While usage metrics and scores are displayed, more advanced analytics (e.g., tracking

improvement over time or recommending areas for revision) could further enhance the user experience.

- **Scalability Constraints of SQLite:**

Although SQLite was suitable for the scope of this project, migrating to **PostgreSQL** or another enterprise-grade database would be necessary if user volume scales significantly.

- **Interface Customization:**

Currently, customization options for quiz formats and appearance are limited. Future iterations may include **theme support and advanced configuration settings**.

Planned Future Work:

1. Integrate additional OCR engines to improve recognition reliability.
2. Expand the dashboard with advanced analytics and visual progress charts.
3. Enable offline mode with local processing of notes.
4. Support collaborative features for teachers and study groups.
5. Enhance accessibility support for visually impaired users.
6. Implement multilingual support for non-English content.

7.3 Reasons for Failure – If Any

StudyMate did **not encounter any critical failures** during development or testing. All key milestones were completed within the project timeline.

However, a few **minor issues** were identified and resolved:

- **Third-party API Latency:**

Occasional delays were observed when generating quizzes, especially with large inputs. These were mitigated by implementing **asynchronous processing and loading indicators** to improve the user experience.

- **Edge-Case Data Handling:**

During early testing, some files with unsupported formats (e.g., encrypted PDFs) caused errors. The system was updated to include **file type validation and error messages**.

- **User Session Timeouts:**

Prolonged inactivity sometimes led to session expiration, requiring users to re-login. This was addressed by adjusting session timeout settings and providing clear notifications.

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APPENDICES

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A1A. PROJECT PROPOSAL AND VISION DOCUMENT

Below is the link of the Proposal and Vision Document:

https://github.com/abzaidi/studyMate/tree/documents/documents/project_proposal

A1B. COPY OF PROPOSAL EVALUATION COMMENTS BY JURY

 **Hamdard University**
Faculty of Engineering Sciences and Technology

FYP -PE-2024

Department of Computing

FINAL YEAR PROJECT - PROPOSAL EVALUATION

Project Title: StudyMate - AI-Powered Advanced Quiz Creator
Project ID: _____ Project Track: Product based
Project Domain: AI - NLP Evaluation Date: 09-July-2024
Supervisor Name: Mr. Osama Ahmed Co-Supervisor Name: Mr. Wajid Pasha

Project Member(s):

S. No.	Name	CMS ID
1.	S.M. Abubakar Zaidi	1600-2021
2.	Hanzala Siddiqe	2577-2021
3.		
4.		

For Evaluators only:

Evaluation Parameters	Please select the appropriate option E: Excellent G: Good S: Just Satisfactory N: Not Satisfactory			
	Evaluator #1	Evaluator #2	Evaluator #3	Evaluator #4
Subject Knowledge	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input checked="" type="checkbox"/> S <input type="checkbox"/> N
Problem Statement	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input checked="" type="checkbox"/> S <input type="checkbox"/> N
Organization & Content of Presentation	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input checked="" type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input checked="" type="checkbox"/> S <input type="checkbox"/> N
Project Scope Defined	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input checked="" type="checkbox"/> S <input type="checkbox"/> N
Methodology	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input checked="" type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input checked="" type="checkbox"/> S <input type="checkbox"/> N
Language & Grammar	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input checked="" type="checkbox"/> S <input type="checkbox"/> N
Attire, Delivery and Presentation Skills	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input checked="" type="checkbox"/> S <input type="checkbox"/> N
Work Division	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N
Name & Sign of Evaluator:	Dr. Adeel	Mr. Amir	Mr. Wajid	Dr. Khuram

Suggestions of evaluators:

- Project Name should change
- Topic based selection of question using teacher's choice.

For FYP Committee only:

Result Summary

On basis of evaluations, recommended action decided in FYP committee meeting:

☒ Approved ☐ Approved (with Revision) ☐ Re-Evaluate

Date: _____ Name and Sign of Convener FYP Committee: _____

A2. REQUIREMENT SPECIFICATIONS

Below is the link of the Software Requirements Specification Document:

https://github.com/abzaidi/studyMate/tree/documents/documents/software_requirement_specification

A3. DESIGN SPECIFICATIONS

Below is the link of the Software Design Specification Document:

https://github.com/abzaidi/studyMate/tree/documents/documents/software_design_specification

A4. OTHER TECHNICAL DETAIL DOCUMENTS

Test Cases Document

Software Test Plan

The following table describes the test plan and schedule for each screen/module of StudyMate.

S. No	Description	Test Engineer	Start Date	End Date
1	Login Screen	Abubakar	01-Jul-2025	01-Jul-2025
2	Registration Screen	Abubakar	01-Jul-2025	01-Jul-2025
3	Dashboard Screen	Hanzala	02-Jul-2025	02-Jul-2025
4	Note Upload Screen	Hanzala	02-Jul-2025	02-Jul-2025
5	Extracted Content Detail	Abubakar	03-Jul-2025	03-Jul-2025
6	Quiz Generation Screen	Abubakar	03-Jul-2025	03-Jul-2025
7	Quiz Attempt Screen	Hanzala	04-Jul-2025	04-Jul-2025
8	User Profile Screen	Hanzala	04-Jul-2025	04-Jul-2025
9	My Uploaded Content Screen	Abubakar	05-Jul-2025	05-Jul-2025
10	Search and Retrieval	Abubakar	05-Jul-2025	05-Jul-2025

Test Case 1

Project Name: StudyMate

Iteration No: 1

Module Name: Login Screen

Date: 30-Jun-2025

Test Case ID: TC-LOGIN-SCREEN

Test Engineer: Abubakar

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Open the login page	-	Login form displays correctly	Login form loaded as expected	Pass
2	Enter email	Valid	Input fields	Data entered	Pass

	and password	credentials	accept data	successfully	
3	Click the Login button	-	User is redirected to dashboard	User redirected to dashboard	Pass
4	Verify dashboard welcome message	-	Welcome message shows user's name	Welcome message displayed	Pass

Test Case 2

Project Name: StudyMate

Iteration No: 1

Module Name: Registration Screen

Date: 30-Jun-2025

Test Case ID: TC-REGISTRATION-SCREEN

Test Engineer: Abubakar

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Open the registration page	-	Registration form loads	Form loaded successfully	Pass
2	Fill in registration details	Valid name, email, password	Fields accept data	Data accepted	Pass
3	Submit the form	-	User account created	Account created successfully	Pass
4	Attempt login with new credentials	New email/password	User logs in successfully	Login successful	Pass

Test Case 3

Project Name: StudyMate

Iteration No: 1

Module Name: Dashboard Screen

Date: 30-Jun-2025

Test Case ID: TC-DASHBOARD-SCREEN

Test Engineer: Hanzala

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
-------	-------	------------	-----------------	---------------	-----------

1	Log in to application	Valid credentials	Dashboard loads	Dashboard loaded	Pass
2	Verify summary statistics	-	Counts of notes, quizzes, Q&A displayed	Statistics displayed correctly	Pass
3	Click recent activity items	-	Detailed content view opens	Detail view opened	Pass

Test Case 4

Project Name: StudyMate

Iteration No: 1

Module Name: Note Upload Screen

Date: 30-Jun-2025

Test Case ID: TC-NOTE-UPLOAD-SCREEN

Test Engineer: Hanzala

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Navigate to note upload	-	Upload page loads	Upload page displayed	Pass
2	Select handwritten note file	Valid PDF/image	File selected	File selection successful	Pass
3	Click Upload	-	OCR processing starts	Processing initiated	Pass
4	Verify extracted text output	-	Extracted text displayed	Text displayed	Pass

Test Case 5

Project Name: StudyMate

Iteration No: 1

Module Name: Extracted Content Detail

Date: 30-Jun-2025

Test Case ID: TC-EXTRACTED-CONTENT-DETAIL

Test Engineer: Abubakar

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Open a	-	Extracted	Text	Pass

	processed note		text displays	displayed	
2	Click Generate Quiz	-	Quiz is generated	Quiz generated	Pass
3	Click Generate Q&A	-	Q&A pairs generated	Q&A generated	Pass

Test Case 6

Project Name: StudyMate

Iteration No: 1

Module Name: Quiz Generation Screen

Date: 30-Jun-2025

Test Case ID: TC-QUIZ-GENERATION-SCREEN

Test Engineer: Abubakar

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Access quiz generation page	-	Page loads with input area	Page loaded	Pass
2	Paste or confirm text	Sample text	Text accepted	Text accepted	Pass
3	Select topic or full text	Selected topic	Topic highlighted	Topic selected	Pass
4	Click Generate Quiz	-	Quiz displayed	Quiz displayed	Pass

Test Case 7

Project Name: StudyMate

Iteration No: 1

Module Name: Quiz Attempt Screen

Date: 30-Jun-2025

Test Case ID: TC-QUIZ-ATTEMPT-SCREEN

Test Engineer: Hanzala

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Open quiz attempt page	-	Quiz displayed	Quiz displayed	Pass
2	Answer all	Selected	Answers	Answers	Pass

	questions	answers	recorded	saved	
3	Submit quiz	-	Score shown	Score displayed	Pass

Test Case 8

Project Name: StudyMate

Iteration No: 1

Module Name: User Profile Screen

Date: 30-Jun-2025

Test Case ID: TC-USER-PROFILE-SCREEN

Test Engineer: Hanzala

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Access profile page	-	Profile information displays	Profile displayed	Pass
2	Update profile fields	New name, bio, institution	Fields accept data	Data accepted	Pass
3	Upload new avatar	Valid image	Avatar updates	Avatar updated	Pass
4	Save changes	-	Confirmation displayed	Changes saved	Pass

Test Case 9

Project Name: StudyMate

Iteration No: 1

Module Name: My Uploaded Content Screen

Date: 30-Jun-2025

Test Case ID: TC-MY-UPLOADED-CONTENT-SCREEN

Test Engineer: Abubakar

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Access uploaded content page	-	List of uploads displayed	Uploads displayed	Pass
2	Search for note	Keyword	Filtered results shown	Search worked	Pass
3	Click to view note	-	Detailed view displays	Detail view displayed	Pass

4	Delete note	a -	Note removed	Note deleted	Pass
----------	----------------	-----	-----------------	--------------	------

Test Case 10

Project Name: StudyMate

Iteration No: 1

Module Name: Search and Retrieval

Date: 30-Jun-2025

Test Case ID: TC-SEARCH-AND-RETRIEVAL

Test Engineer: Abubakar

Test Case Description: Detailed testing of this module

S. No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Open content listing	-	All items displayed	Items displayed	Pass
2	Enter search keyword	Keyword	Matching results shown	Results displayed	Pass
3	Clear search	-	Full list reloads	List reloaded	Pass

UI/UX Detail Document

1. Introduction

This document provides a comprehensive overview of the User Interface (UI) and User Experience (UX) design considerations for the **StudyMate** web application. It describes the design principles, layout decisions, and interaction patterns implemented to ensure the application is intuitive, efficient, and accessible to target users, primarily students and educators.

2. Purpose

The purpose of this document is to:

- Define the visual and interaction design guidelines applied throughout the platform.
- Present wireframes and mockups for each key screen.
- Provide detailed descriptions of components, workflows, and navigational structures.
- Establish a reference for developers and stakeholders during implementation and future enhancements.

3. Audience

This document is intended for:

- UI/UX Designers responsible for refining or expanding the interface.
- Frontend Developers implementing the visual and interaction layers.
- Project Stakeholders and Product Owners reviewing and approving the design.
- Quality Assurance teams verifying adherence to design specifications.

4. Design Objectives

The StudyMate application design aims to:

- Support a **clean and modern interface** that reduces cognitive load.
- Maintain consistent visual identity, branding, and styling.
- Ensure **responsive layouts** compatible with desktops and tablets.
- Provide clear navigation and affordances to improve usability.
- Emphasize accessibility by adhering to web standards (WCAG guidelines).
- Deliver an engaging user experience that encourages continued use.

5. Design Principles

The following principles guided UI/UX decisions:

Simplicity:

Interfaces are kept uncluttered, showing only essential options and information.

Consistency:

Elements such as buttons, forms, and icons follow a unified style guide.

Feedback:

All interactions (uploads, form submissions, quiz attempts) provide immediate visual or textual feedback.

Accessibility:

Colors, contrasts, and typography are chosen to accommodate diverse user needs.

Efficiency:

Navigation and workflows are optimized to minimize the number of steps required to complete key tasks.

6. Visual Identity

The visual identity of StudyMate includes:

- **Primary Color Palette:** Soft blue and white for clarity and calmness.
- **Accent Colors:** Subtle highlights for interactive elements.
- **Typography:** Clean sans-serif fonts for readability.
- **Iconography:** Recognizable, minimalist icons supporting textual labels.

7. Information Architecture Overview

StudyMate's navigation is structured around primary modules:

- Dashboard
- Note Upload and Processing
- Quiz & Q&A Generation
- Quiz Attempt
- My Uploaded Content
- User Profile
- Search

8. Wireframes and Screens

Home Page

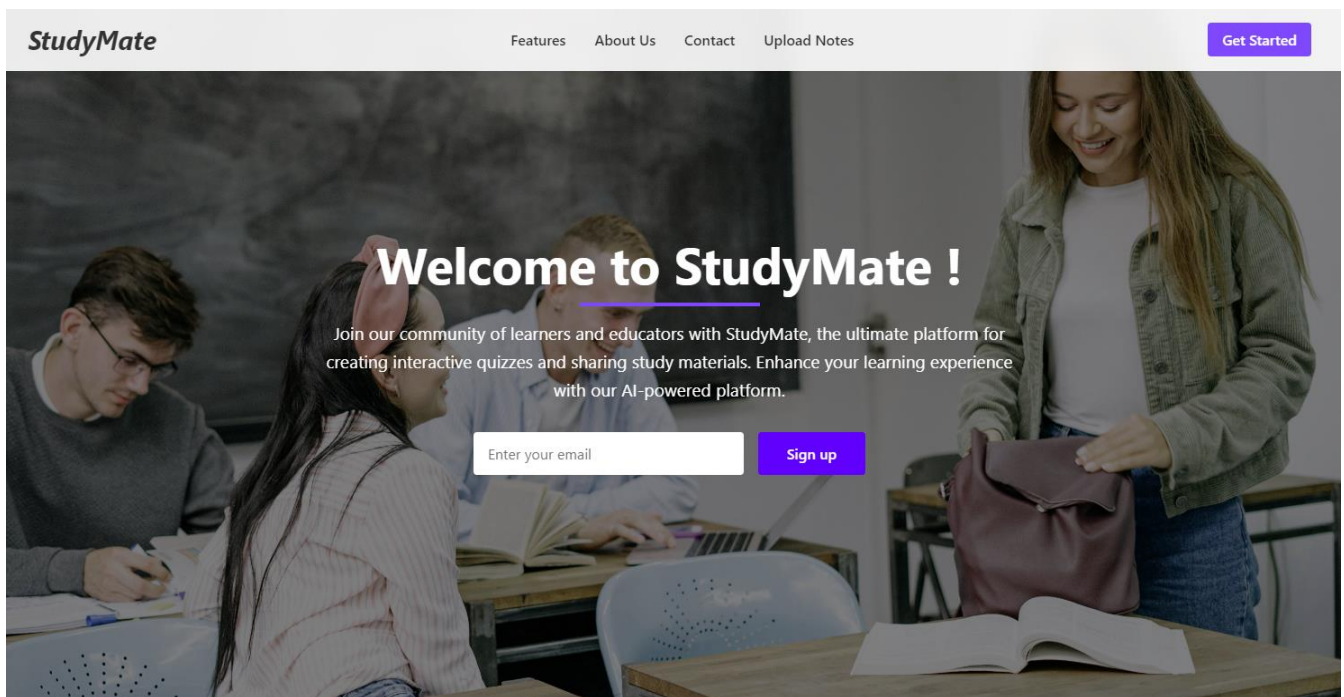
Purpose:

The Home Page serves as the entry point of the application, introducing users to the system and its core functionalities.

Elements and Functions:

Contains the application name/logo and navigation links (e.g., Home, Login, Register).

A visually engaging section with a welcome message, highlighting key features of the system like quiz generation and Q&A creation.



A features section highlighting the key features the application will provide.

A contact us section that the user can use to collaborate, give feedback and ask queries.

Explore Our Key Features

Discover how StudyMate can transform your learning experience with our innovative features. From creating personalized quizzes to uploading and sharing notes, our platform is designed to enhance your study sessions. Track your progress and engage with interactive tools that make learning both effective and enjoyable.



AI-Powered Quiz Creator

Our AI-Powered Quiz Creator allows you to generate quizzes based on your study materials. Enhance your learning with interactive features.

[Learn More](#)



Note Uploading Made Easy

Easily upload and share your notes with our drag and drop feature. Access a library of shared notes and collaborate with peers to enhance your study sessions.

[Learn More](#)



AI-Powered Q&A Creator

Create Q&A's for your exams. Stay motivated and see how far you've come in your learning journey.

[Learn More](#)

Get in Touch

We'd love to hear from you! Reach out anytime.

Name

Email

Message

☐ I accept the Terms

Submit

An about us section that includes the details of the developers.

Our Team

Meet the dedicated individuals behind StudyMate, committed to enhancing education.



Abubakar Zaidi

Team Leader

Abubakar has a background in technology and is passionate about creating tools that enhance learning.



Hanzala

Team Member

Hanzala is a software engineer with expertise in AI and machine learning, driving the technical development of StudyMate.



StudyMate

[Features](#)

[About Us](#)

[Contact](#)



Login Page

Purpose:

Allows registered users to authenticate themselves and access the system's features.

Elements and Functions:

- Input field for the user's unique identifier.
- Input field with masking for user passwords.
- Submits credentials for verification.
- Redirects users to a password recovery page.
- A shortcut for new users to create an account.



Login

Welcome back! Please enter your details.

Email

Password

☐ Remember me [Forgot password?](#)

Login

Don't have an account? [Sign up](#)

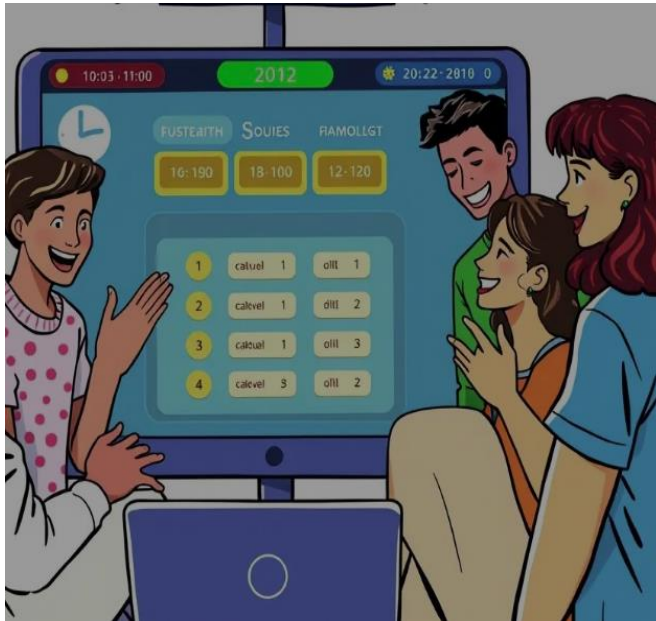
Sign Up Page

Purpose:

Allows new users to create an account by providing their details.

Elements and Functions:

- Name
- Email Address
- Password (with strength indicator)
- Submits user details to create an account.
- Redirects existing users back to the Login Page.



Sign Up

Create an account to get started.

Full Name

Email

Password

☐ Remember me [Forgot password?](#)

[Sign Up](#)

Already have an account? [Login](#)

Quiz/QnA Generation Page

Purpose:

Enables users to generate quizzes or Q&A based on provided handwritten notes or text input.

Elements and Functions:

- A drag-and-drop area or file chooser to upload handwritten notes or documents.
- Text box for users to show extracted text.
- Buttons to select between Quiz and Q&A generation.
- Processes the input or uploaded file and generates the desired output.
- Displays the generated quiz or Q&A along with options to save or download.

Effortlessly Upload Your Study Notes

Transform your study materials into interactive learning resources. Upload your notes and let our AI generate quizzes and Q&A pairs to enhance your learning experience.



Drag and drop your files here

or

Browse Files

Upload File

Cancel

Extracted text will appear here...

Generate Quiz


Generate Q&A

Dashboard Page

Purpose:
Provides users with a centralized overview of their activity, including uploaded notes, generated quizzes, Q&A statistics, and recent actions.

- Elements and Functions:**
- A summary section displaying counts of notes uploaded, quizzes generated, and Q&As created.
 - A recent activity table showing the file name, date, and quick access to view details.
 - A sidebar navigation menu for easy access to all features (Dashboard, User Profile, Upload Notes, Uploaded Content).
 - Quick action buttons enabling users to upload notes, generate quizzes, create Q&A pairs, or view their progress.
 - User account controls for logging out and profile management.

StudyMate



Zaid Khan Sultan
zaid@gmail.com

Dashboard

User Profile

Upload Notes

Uploaded Content

Log Out

User Account

Study Dashboard

21
Notes Uploaded

17
Quizzes Generated

9
Q&As Generated

Recent Activity

Activity	File Name	Date	Actions
Note Uploaded	comp.jpg	June 28, 2025, 7:09 p.m.	View
Quiz Generated	comp.jpg	June 28, 2025, 7:09 p.m.	View
Q&A Generated	comp.jpg	June 28, 2025, 7:09 p.m.	View
Note Uploaded	comp.jpg	June 20, 2025, 4:47 p.m.	View
Quiz Generated	comp.jpg	June 20, 2025, 4:47 p.m.	View

Quick Actions

Upload Notes
Add new study materials

Generate Quiz
Create new quiz from notes

Create Q&A
Generate practice questions

View Progress
Track your study journey

StudyMate

Features

About Us

Contact

User Progress

f

in

tw

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Terms and Conditions

Privacy Policy

User Profile Page:

Purpose:

Allows users to manage their personal information, preferences, and account credentials.

Elements and Functions:


- An editable form displaying user details such as full name, email, educational institution, field of study, and bio.
- Upload button to change the profile picture with recommended size guidelines.
- Password update fields for setting a new password securely.
- Save Changes button to persist updated profile information.
- Cancel button to discard changes and return to the dashboard.

StudyMate

User Account ▾

User Profile

Manage your account information and preferences to customize your StudyMate experience.



Upload Photo
Recommended size: 200x200 pixels

Full Name

Zaid Khan Sultan

Email Address

zaid@gmail.com

Educational Institution

Bahria University

Field of Study

Computer Science ▾

Bio

Eager to learn.

New Password

Confirm New Password

Cancel

Save Changes

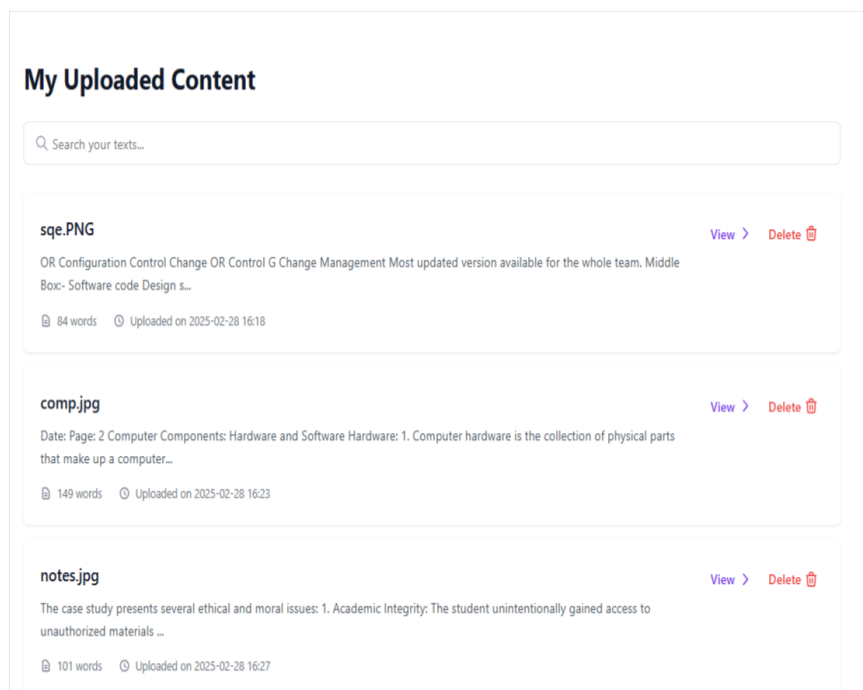
Uploaded Content Page:

Purpose:

Provides a searchable list of all notes the user has uploaded and processed, along with options to manage them.

Elements and Functions:

- A search bar to filter uploaded content by keywords or titles in real-time.
- A list displaying each uploaded file with a snippet of extracted text, word count, and upload date.
- Action buttons to view the detailed page for each file or delete it permanently.
- Clear icons and labels to improve usability and navigation.



Uploaded Content Detail Page:

Purpose:

Displays the full extracted text from a selected note and provides options to generate quizzes or Q&A content.

Elements and Functions:

- A text panel showing the extracted content with formatting preserved.
- Buttons to generate quizzes or Q&A pairs from the text.
- Options to view already generated quizzes and Q&A materials for the note.
- A link or button to navigate back to the main generation page if needed.
- Clear labels and instructions guiding the user through next steps.

comp.jpg

Review your extracted content and choose what you'd like to generate next. You can view your generated quizzes and Q&A pairs below.

Extracted Content

Date:

Page: 2

Any kind of computer consists of two main components: hardware and software.

HARDWARE:

1. Computer hardware is the collection of physical parts that make up a computer system.

Components of a computer such as the monitor, mouse, keyboard, computer data storage, hard drive, disk, and system units, as well as graphic cards, sound cards, motherboards, and chips, are all physical objects.

All of these components work together to enable a computer to function.

INPUT DEVICES:

Input devices, also known as Input/Output Devices (IoD), are devices that translate data into a form that can be understood by a computer.

Any peripheral input device can translate data from humans into a format that a computer can understand.

The most common input devices are:

Go to Generation Page

Show Generated Quizzes

Show Generated Q&As

Coding Standards Document

1. Introduction

This document defines the coding standards and conventions applied throughout the **StudyMate** project to ensure consistency, readability, and maintainability of the codebase. All contributors are expected to follow these guidelines during development.

2. Purpose

The purpose of these coding standards is to:

- Promote clear and consistent code.
- Reduce the risk of errors.
- Simplify onboarding of new developers.
- Support efficient code reviews and maintenance.

3. Programming Languages and Frameworks

The project uses:

- **Python 3.11 (Django Framework)**
- **HTML/CSS/JavaScript (Frontend Templates)**
- **AJAX for asynchronous interactions**

4. Naming Conventions

- **Python Modules & Packages:** Use lowercase with underscores (e.g., `quiz_generation.py`).
- **Classes:** Use PascalCase (e.g., `ExtractedTextProcessor`).
- **Functions and Methods:** Use lowercase with underscores (e.g., `generate_quiz()`).
- **Variables:** Use descriptive lowercase names with underscores (e.g., `user_email`).
- **Constants:** Use uppercase with underscores (e.g., `MAX_RETRIES`).
- **Templates and Static Files:** Use lowercase with hyphens (e.g., `user-profile.html`).

5. Code Formatting

- Indentation: **4 spaces per level** (no tabs).
- Line length: **Max 120 characters**.
- Use spaces around operators and after commas.
- Always include a newline at the end of files.
- Avoid trailing whitespace.

6. Comments and Documentation

- Each module and class must include a **docstring** describing its purpose.
- Functions must include a brief docstring explaining inputs and outputs.
- Inline comments should clarify **why** something is done, not **what**.
- Use `# TODO:` for planned improvements.

7. Error Handling

- Always use `try/except` blocks when interacting with external APIs or file operations.
- Log exceptions with appropriate messages.
- Never suppress exceptions silently.

8. Security Practices

- Never hard-code sensitive credentials or API keys in code.
- Use Django's built-in security features for user authentication and CSRF protection.
- Sanitize and validate all user inputs.

9. Version Control

- All code changes must be committed with **clear, descriptive messages**.
- Follow a feature-branch workflow.
- Merge only after code reviews and successful testing.

10. Code Review

- All code must be reviewed by at least one other team member.
- Reviews should focus on:
 - Code correctness and functionality.
 - Adherence to these coding standards.
 - Performance considerations.

Project Policy Document

1. Introduction

This document outlines the key policies governing the **StudyMate** project. These policies ensure effective collaboration, consistent practices, and high-quality deliverables throughout the project lifecycle.

2. Purpose

The purpose of this policy is to:

- Establish clear expectations for all team members.
- Define processes for development, communication, and issue resolution.
- Promote accountability and maintain project standards.

3. Scope

This policy applies to:

- All project contributors, including developers, testers, and stakeholders.
- All activities related to design, development, testing, deployment, and maintenance.

4. Communication Policy

- All communication should be professional, clear, and documented.
- Primary channels:
 - Email for formal updates and decisions.
 - Instant messaging (e.g., Slack, WhatsApp) for daily coordination.
 - Weekly meetings for progress reviews.
- Major decisions must be recorded in meeting minutes or shared documents.

5. Code Management Policy

- All source code must be stored in the designated Git repository.
- Commits should be frequent and include descriptive messages.
- Feature development must occur in separate branches.
- Merges to the main branch require peer review and approval.

6. Testing Policy

- Each feature must be tested against defined test cases before marking as complete.

- Unit, integration, and system tests are mandatory.
- Test results must be documented and shared with the team.
- No code is considered complete until it passes all relevant tests.

7. Documentation Policy

- All modules and components must be documented.
- Documentation should be updated when changes occur.
- User guides and technical references must be maintained throughout the project.

8. Issue and Risk Management Policy

- All issues and risks should be logged in the issue tracking system.
- Issues must be assigned an owner and priority level.
- Critical issues must be escalated to the project manager immediately.

9. Security and Confidentiality Policy

- Sensitive data such as credentials, personal information, or proprietary files must be securely stored.
- Access to production environments is restricted to authorized personnel.
- Team members must not share confidential project information with external parties.

10. Compliance and Review

- All team members are expected to comply with these policies.
- The policies will be reviewed periodically and updated as necessary.
- Non-compliance may result in corrective action or removal from the project team.

User Manual Document

1. Introduction

Welcome to **StudyMate**, an AI-powered web application designed to help you convert handwritten notes into structured quizzes and Q&A content for effective exam preparation. This manual provides instructions for using the main features of the platform.

2. System Requirements

- Modern web browser (Chrome, Firefox, Edge)
- Internet connection
- Valid StudyMate account

3. Accessing the Application

1. Open your web browser.
2. Visit the StudyMate URL provided by your administrator.
3. Log in with your email and password.
4. If you don't have an account, click **Register** and complete the form.

4. Dashboard Overview

After logging in, you will see your **Dashboard**, which includes:

- Summary of uploaded notes, quizzes, and Q&A materials.
- Recent activity history.
- Quick action buttons to upload new notes or view your content.

5. Uploading Handwritten Notes

1. Go to **Upload Notes** from the sidebar.
2. Drag and drop your handwritten file (PDF, JPG, PNG) or click **Choose File**.
3. Click **Upload**.
4. Wait for the system to extract text using OCR. The extracted content will display automatically.

6. Generating Quizzes and Q&A

1. From the **Extracted Content Detail** page, review the text.
2. Select **Generate Quiz** or **Generate Q&A**.

3. Optionally, choose specific topics detected in your notes.
4. The generated material will appear below the text area.
5. Save or download the content as needed.

7. Attempting Quizzes

1. Navigate to **My Uploaded Content**.
2. Click **View** next to any note with generated quizzes.
3. Click **Attempt Quiz**.
4. Answer each question and click **Submit**.
5. Your score will display immediately.

8. Managing Your Profile

1. Go to **Profile** from the sidebar.
2. Edit your name, email, bio, or institution.
3. Upload a new avatar if desired.
4. Click **Save Changes**.

9. Searching and Viewing Notes

1. Open **My Uploaded Content**.
2. Use the search bar to filter your notes by keyword.
3. Click on any item to view details and generated materials.

10. Logging Out

- Click the **Logout** button in the sidebar to end your session securely.

11. Support

For help or technical assistance:

- Contact the StudyMate support team at **hanzilasiddiqui5@gmail.com**.
- Visit the online help center for FAQs and troubleshooting guides.

A5. FLYER & POSTER DESIGN



The flyer is a vertical poster with a purple and black background. At the top center is the Hamdard University logo, which consists of a green circular emblem with the university's name in Urdu and English. Below the logo, on the left, is a red triangular banner with the text 'F21' in white. In the center, there is a graphic of a blue and purple infinity symbol with a book icon inside it, and the word 'STUDYMATE' in white capital letters below it. On the right side, there is a red circular badge with the text 'SE' in white. Below the 'STUDYMATE' text, the following information is listed in white and red text:

PROJECT NAME
StudyMate AI Powered Quiz Creator

DESCRIPTION
StudyMate – AI-Powered Advanced Quiz Creator is a web-based platform that transforms handwritten notes into digital content using OCR and AI technologies. It automates quiz and Q&A generation, helping students and educators prepare efficiently while reducing manual efforts through a user-friendly interface.

PROJECT STATUS
SECOND EVALUATION

SUPERVISOR
MR. OSAMA AHMED KHAN

CO-SUPERVISOR
MR. WAQAS PASHA

TEAM MEMBERS
Abubakar Zaidi (1600-2021)
Hanzala Siddiqe (2577-2021)

COPY OF EVALUATION COMMENTS BY JURY FOR PROJECT – I END SEMESTER EVALUATION

Saeed Ahmed
Aamir Hussain
Aijaz Ali
Umer Farooq

Normal
Satisfactory
Acheive what you have write in project.
Need to add, Some Literature review, As student used pre-trained model for the evaluation of the system, need to design custom dataset and train their model instead using the pretrained model

A7. MEETINGS' MINUTES & Sign-Off Sheet

Below is the link to all the minutes of meetings for FYP-1 and FYP-2

<https://drive.google.com/drive/u/1/folders/1jj0e8tRTaFZ-nLx0eFTSwgdhyzipXTzn>

A8. DOCUMENT CHANGE RECORD

Date	Version	Author	Change Details
10/09/2024	1.0	Hanzala	Prepared Draft of Report
20/12/2024	1.1	Abubakar	Complete first 3 chapters
29/06/2025	2.0	Abubakar	Finalize document

A9. PROJECT PROGRESS

FYP-1

FYP Fortnightly Sign-Up Sheet

Course: ☒ FYP-1 ☐ FYP-2 Project Code: FYP-037/FL24 Project Name: StudyMate - AI Powered Quiz Creator
Group Members Names & Reg#: S.M Abubakar Zaidi Hanzala Siddique
Supervisor Name: M.A. Bisma Ahmed Khan Co-Supervisor's Name: M.A. Waqas Pasha

Meeting #	Date	Agenda (Brief Statement)	Attended By (Student's Name only)	Supervisor's Sign	Co-supervisor's Sign	FYP Officer's Sign
1	11-09-24	Discuss preparation and gathering of datasets	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
2	26-09-24	Choosing the best model to work on our dataset.	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
3	10-10-24	Generate quizzes based on text extracted	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
4	24-10-24	Creating frontend and start QnA for the project.	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
5	7-11-24	Discuss choosing the best backend framework	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
6	18-11-24	Discuss using Django as a backend framework	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
7	11-12-24	Integration of quiz & qna modules in django.	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
8	19-12-24	Integration of frontend templates to django webpages	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
9	14-01-25	Prepare documentation	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>

[Signature] 19/1/24
19/1/24
10/9/24
24/10/24
11/11/24
11/11/24

FYP-2

FYP Fortnightly Sign-off Sheet

Course: ☐ FYP-1 ☒ FYP-2 Project Code: FYP-037/FL24 Project Name: StudyMate - AI Powered Quiz Creator
Group Members Names & Reg#: S.M Abubakar Zaidi Hanzala Siddique
Supervisor Name: M.A. Bisma Ahmed Khan Co-Supervisor's Name: M.A. Waqas Pasha External Supervisor:

Meeting #	Date	Agenda (Brief Statement)	Attended By (Student's Name only)	Supervisor's Sign	Co-supervisor's Sign	FYP Officer's Sign
1	17/2/25	Implement user authentication and discuss next steps	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
2	26/2/25	Store notes and other content to google cloud.	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
3	12/3/25	Store generated materials along with notes.	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
4	7/4/25	Show flash messages whenever a user login/logout	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
5	14/4/25	Topic based material generation based on notes	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
6	29/4/25	Create dashboard and get LM response in JSON	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
7	12/5/25	Implement attempt quiz functionality and improve styling	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
8	17/5/25	Prepare documentation SRS, SDS, Report etc	Abubakar Zaidi Hanzala Siddique	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
9						