Chapter 1:- Introduction

1.1 Background

Traditional methods for managing lost and found items in large organizations such as malls, hotels, and airports are often manual, decentralized, and inefficient. These systems typically rely on paper logs or uncoordinated spreadsheets, leading to slow matching times, poor recovery rates, and a high administrative workload.

The **ReClaim** project addresses these systemic challenges by developing a modern Software as a Service (SaaS) platform. ReClaim leverages Artificial Intelligence (AI) to automate the critical function of item matching, transforming the process from a manual administrative task into an efficient, digitized service. The system provides a centralized, secure portal for businesses to manage their entire lost and found operations, significantly enhancing recovery rates and staff productivity.

1.2 Objectives

The primary objectives of the **ReClaim** project are to deliver a reliable, secure, and intelligent Lost & Found management solution:

- **Centralize Management:** Provide a secure, single platform for businesses to log and manage all lost and found activities.
- **Automate Matching:** Implement an AI-Based Item Matching system to automatically link lost item reports with found item entries, significantly reducing manual effort.
- **Enhance User Experience:** Offer clear, easy-to-use forms for staff to log items quickly and an intuitive admin dashboard for oversight.
- **Improve Communication:** Develop an automated Notifications System to alert owners when a potential match is found.
- **Enable Reporting:** Generate detailed Reports & Analytics for tracking item recovery rates, log history, and overall system performance.

1.3 Purpose

The purpose of **ReClaim** is to overcome the inherent weaknesses of conventional lost and found systems, which are prone to errors, lack of transparency, and slow turnaround times. ReClaim achieves this by:

- **Providing Real-Time Logging:** Staff can instantly log items with details and photos, eliminating paperwork.
- **Ensuring Efficiency:** The AI core performs matches instantly, dramatically reducing the time required to link a lost item to a found item.
- **Saving Time and Reducing Workload:** Automation minimizes manual tracking and cross-referencing for business staff.
- **Improving Security and Transparency:** Every item entry is stored securely with timestamps, and access is managed through robust Staff User Management.

In essence, the system ensures accurate, reliable, and secure Lost & Found management using modern AI technologies and a centralized SaaS architecture.

1.4 Scope

Included in Scope (Initial Development)

- **Business Registration:** Setup, authentication, and unique ID generation for client businesses and the primary admin account.
- **Staff User Management:** Registration, role/permission setup, and modification functions for staff users.
- **Lost/Found Item Logging:** Dedicated forms, photo upload system, data validation, and database storage for both lost and found items.
- **AI Matching Core:** Model training, matching logic, and result UI for automated item comparison.
- **Notifications System:** Email/SMS template setup and logic for auto-triggering match notifications.
- **Reporting & Analytics:** Access logs, filtering system (date/category), graphs, and export options (CSV/PDF).

Not Included (Future Work)

- Advanced biometric authentication or 3D anti-spoofing detection.
- Integration with RFID, IoT hardware, or client ERP systems.
- Mobile application development.
- Integration with third-party payment systems.

Chapter 2:- System Planning

2.1 Survey of Technologies

To build ReClaim as a modern, scalable SaaS (Software as a Service) platform, a detailed survey of currently relevant web and AI development technologies was conducted. The primary goal was to identify tools that can support the complex requirements of AI-Based Item Matching, secure User Management, and a scalable architecture.

Technology	Purpose	Reason for Selection
Python / TensorFlow / PyTorch	AI/ML Core Logic	Python is the standard language for AI/ML development. TensorFlow/PyTorch provides robust libraries for image recognition and matching algorithms required by the AI core.
FastAPI	Backend Server & API	Provides a scalable, high-performance runtime environment for handling API requests and managing heavy server-side logic (e.g., AI model interaction).
Html/Tailwind CSS	Frontend Interface	Tailwind CSS enables rapid, utility-first styling, leading to faster UI development, especially for complex dashboards (Admin, Staff). It ensures a clean, consistent design system and built-in responsiveness, which is essential for a modern SaaS platform used across various devices.
PostgreSQL	Database	Relational Database is preferred for the complex, secure relationships required between Business Admins, Staff Users, Lost Items, Found Items, and Notification Logs.
JWT (JSON Web Token)	Authentication & Security	Industry standard for secure, lightweight, and stateless user session handling, crucial for a secure multi-tenant SaaS.

2.2 Fact Finding Techniques

To solidify the requirements and functional needs of **ReClaim**, various fact-finding methods were utilized. These techniques focused on validating user processes and guiding the system design, particularly around item logging and staff workflows.

Technique	Purpose	Outcome
Informal Interviews	Discussions with hotel managers and mall security staff.	Identified the critical need for a "Link Item to Business ID" feature and robust Role & Permission setup to prevent unauthorized access.
Existing System Analysis	Reviewing current manual logs, spreadsheets, and basic L&F systems.	Highlighted the significant time wasted on manual matching, validating the necessity of the AI-Based Item Matching module.
Observation	Studying staff workflow for logging items and notifying owners.	Confirmed the need for a simple, quick form design and automated Email/SMS notifications to enhance speed.
Document Study	Researching data security policies and privacy regulations.	Helped define the requirements for secure data fields and informed the Security/privacy analysis subtask in Phase 1.

2.3 Feasibility Study

A feasibility evaluation was performed to determine if the ReClaim system can be realistically developed within the allocated project timeline, skills, and resources.

A. Technical Feasibility

The project relies on established, well-documented technologies (e.g., Python, FastAPI, PostgreSQL) that are widely supported by the developer community. The integration of the AI core requires specialized skills but utilizes standard, accessible frameworks (TensorFlow/PyTorch). The technical execution is feasible with the necessary expertise.

B. Economic Feasibility

No external hosting, paid APIs, or hardware costs are required. Development runs locally on the student's laptop. Hence, total cost is zero, making the system highly cost-effective.

C. Operational Feasibility

The system provides intuitive, role-based dashboards for administrators and staff, secure login, and clear logging procedures. Its primary function automated matching directly solves a major operational bottleneck. The system is therefore operationally viable and expected to be well-adopted by end-users.

D. Time Feasibility

- Available Development Period: The project timeline is set from Thursday, November 27, 2025, to Sunday, January 25, 2026.
- Total Duration: 33 days (based on the provided schedule).

The features selected are prioritized to deliver the core AI and User Management functionality within this timeline, ensuring time feasibility. Complex features are placed outside the initial scope to ensure timely delivery of the core product.

2.4 Stakeholders of the System

Stakeholder	Role / Interest
Super Admin	Highest-level access. Has full control over the SaaS platform's global settings, licensing, and management of client Business Administrators.
Business Admin	Client-level management. Manages their specific business operations, configures settings (e.g., notification preferences), reviews analytics, and manages the staff user accounts for their location.
Staff User	Day-to-day operations. Logs lost items, logs found items, uses the AI matching results and processes item recovery/return.
End User / Customer	Beneficiary. The regular customer or item owner who receives match notifications and uses the system's services to retrieve their lost property.
Developers	Builds and maintains the ReClaim system, implements the AI matching model , and ensures the platform's security and stability.
Evaluators	Assesses the technical execution, implementation quality, and effectiveness of the ReClaim solution and documentation.