PedroAid: A Web Portal for Appointment, Inquiry, and Legal Document Request for San Pedro City Legal Office

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Chapter 1

THE PROBLEM AND ITS SETTING

Introduction

In the ever-expanding digital era, technology has a significant impact on how companies and organizations interact with their clients. The creation and adoption of cutting-edge technologies have become essential for providing services that are seamless, efficient, and user-friendly, within a thriving digital ecosystem. By the end of 1990s, many governments had started to build and implement government Web portals, as an important part of e-government initiatives, to provide government services to their citizens (Jiang, & Ji, 2014).

E-government initiatives have been launched in many countries. A year later, Bush signed the E-Gov Act, which promised a leaner, more efficient federal government by, among other things, making it easier for citizens to interact with agencies online (CIO, 2004). Computerization in the Philippine government dates back to 1971 when the National Computer Center (NCC) was established by Executive Order 322 (Lallana, E. C., Soriano, E. S., & Pascual, P. J., 2002). The drivers for e-government are numerous, and include greater efficiency, broader access to government services, improved levels of service, government reform, greater transparency, reduction in corruption and citizen empowerment (Schware and Deane, 2003). Ultimately, e-government seeks to centralize and make a cohesive and seamless set of government services available to users.

By the end of 1990s, many governments had started to build and implement government web portals, as an important part of e-government initiatives, to provide government services to their citizens (Xiao Jiang, & Ji, S. 2014). A portal offers a broad array of resources and services to web users, such as e-mail, search engines, forums, and online shopping malls (Webopedia, 2010).

The Legal Office of the City of San Pedro, Laguna, plays an important role in addressing and assisting with a variety of legal issues in the community. Its numerous responsibilities include providing important services that contribute to the city's people's well-being and stability. Through its free legal counseling, the office serves as a dependable source of information and advice for those experiencing legal challenges, providing clarity on complex issues and assisting San Pedro citizens in navigating the legal system. Furthermore, the capacity of the office to allow document signing, notably through notary services, is critical in ensuring the legitimacy and authenticity of various legal transactions, encouraging transparency and trust in legal proceedings.

Prior to using technologies, conventional methods for scheduling appointments, requesting documents, and answering inquiries typically required manual interaction, which caused delays and inefficiencies. Clients may become enraged because of these difficulties, and legal office may find it challenging to meet citizens' needs for rapid service within the community. The creation of portals with different functionalities offers an exciting solution to these constraints, integrating seamlessly with other digital entities.

The primary focus of the in-depth discussion the researchers present in this study is the creation of a multifunctional portal with an appointment system, a document request feature, and inquiry handling supported by chatbot technology. This integration within the legal office can speeds up the delivery of services and increases client satisfaction. By releasing personnel from routine tasks and allowing them to focus on more challenging and worthwhile tasks, automation increases output and makes better use of resources.

Adding a portal with a facility for an appointment system, document request and question handling helped by chatbot constitutes a quantum leap in user experience and administrative efficacy within the digital ecosystem. This complete solution streamlines discussions, simplifies document processing, and provides rapid assistance through intelligent chatbot technology. Adopting this cutting-edge technology helps the Legal

Office of San Pedro City, Laguna, to stand out by streamlining internal processes and delivering better customer service within the community. This integrated portal has the power to redefine the digital landscape and set new standards for user-centric technology by altering how users engage with services and information, contributing to the overall growth and evolution of the digital ecosystem.

Theoretical Framework

The researchers employed numerous theories to support the research as it examined aspects and procedures that may be used for system development. The ideas were approached in such a way that the reader could understand the features.

Data Privacy Act 2012

The "Data Privacy Act of 2012," or Republic Act (RA) 10173, was enacted to monitor and assure compliance by organizations undertaking Privacy Impact Assessments. The law aims to protect the "personal information" of users and individuals described as information, whether logged in a material form or not, from which the personality of an individual is obvious or can be practically and directly determined by the entity holding the information, or when joint with other information would directly and certainly classify an individual that is subjected to processing, which is defined as an operation or a set of operations penetrating a computer system.

Records Management

The study of "Records Management Theory: A Historical Overview" by Sue McKemmish is a study that provides a comprehensive overview of the history of records management theory. She discusses the different theories of records management that have been developed over time, and it argues that a holistic approach to records management is needed. The legal theory of records management is then discussed in the study. This theory, which was created in the mid-20th century, focuses on the legal

requirements for the production, preservation, and disposal of records. The legal perspective emphasizes the significance of maintaining records that comply with existing laws and regulations. According to the study, a comprehensive approach to records management is required since traditional functional and legal theories do not sufficiently meet the demands of organizations today.

Scheduling Algorithm

In the book “Scheduling Theory for Computer Systems” by Andrew S. Tanenbaum, he introduced the basic concepts of scheduling, such as tasks, resources, and deadlines. It also discusses the different types of scheduling problems, such as batch scheduling, real-time scheduling, and multiprocessor scheduling. Scheduling theories are a set of mathematical models and algorithms that are used to allocate resources to tasks in computer systems. These theories are used to improve the performance of computer systems by ensuring that tasks are executed in a timely manner and that resources are used efficiently. There are many different scheduling theories, each with its own strengths and weaknesses. Some of the most common scheduling theories include FCFS, SJF, and RR.

First-come, first-served (FCFS) scheduling: This is the most basic scheduling theory, and it simply hands out tasks to resources in the order in which they arrive.

Shortest-job-first (SJF) scheduling: In this scheduling theory, tasks are assigned to resources in the order of their estimated execution time.

Round-robin (RR) scheduling: This scheduling theory distributes tasks to resources in a round-robin method, allowing each job to run for a set length of time before moving on to the next task.

Scheduling theories are an important part of computer systems and they are used to improve system performance in a number of ways. You may choose the best scheduling

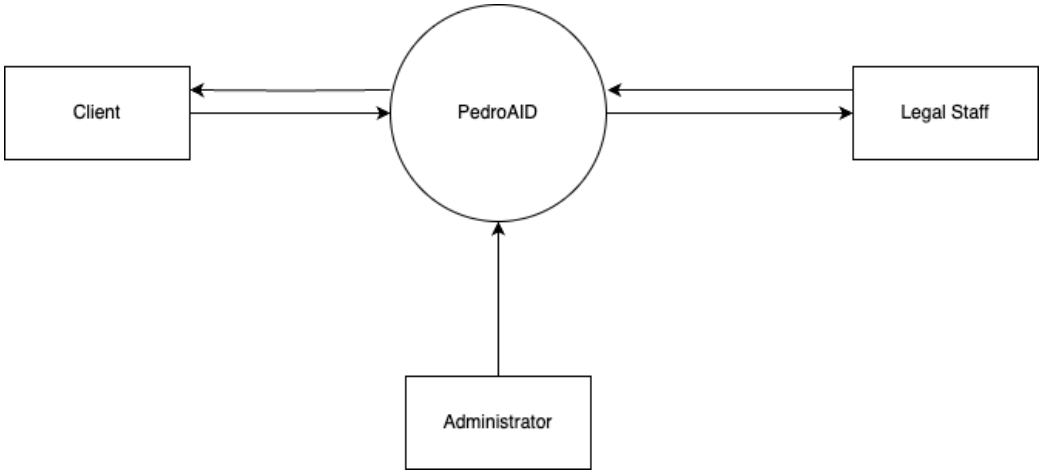
theory for your unique application by studying the different scheduling theories and their strengths and weaknesses.

Chatbot System

Alan Turing notably described what we now call a "chatbot" as part of his imitation game in 1950, most known as the "Turing Test". A chatbot system is a computer program or artificial intelligence (AI) application that mimics human speech and communicates with users over a chat interface. Using natural language processing (NLP) techniques, it understands user input and delivers relevant responses.

Conceptual Framework

The portal intends to revolutionize how the Legal Office of San Pedro City, Laguna, communicates with clients and performs administrative activities inside the digital ecosystem.



Statement of the Problem

This section outlines the objective of the study which is to design and develop a web portal intended to display city ordinances and streamline the services of the Legal

Office within the City of San Pedro, Laguna. Furthermore, the research also aims to further analyze the following concerns:

1. What are the common challenges encountered by the San Pedro City Legal Office in providing legal services?
2. What are the impacts of the web portal to the San Pedro City Legal Office's operations and workload management in terms of;
   2.1. Efficiency;
   2.2. Effectiveness?
3. What is the satisfaction level of the users on the web portal of the San Pedro City Legal Office in terms of the ISO 9126 Software Quality Metrics?

Scope and Limitations

The study will focus on developing a web portal that features an appointment system, a document request function, and inquiry handling enhanced by chatbot technology for the Legal Office of San Pedro City Laguna. The system gives service and provides information through the following modules:

Role-Based System:

Legal Staff - This account is intended for Legal Office Staff; this module provides:

- Staff Login - a secure and personalized login system for authorized staff members of the Legal Office.
- Appointment Management – for facilitation of the scheduling and organization of appointments between clients and the Legal Office.
- Document Request Management - for facilitation of requests submitted for signing/validating of specific legal documents.

- Inquiry Management – this handles and tracks inquiries from citizens seeking legal information or assistance.

Administrator - Account for Administrators. The module provides:

- Staff Management - The ability to manage staff accounts (create, edit, delete) and access permissions.
- City Ordinance Management – Admin can add, edit, or delete city ordinances that will be displayed on the web page.
- Configure chatbot behavior, update frequently asked questions, and manage other portal settings.

Client – Client-side provides this features:

- City Ordinances – offers easy access to a comprehensive repository of city ordinances and regulations. Users can conveniently browse, search, and download pdf files for specific ordinances, promoting transparency and awareness of local laws.
- Legal Counseling Appointment - for scheduling legal counseling sessions through the web portal.
- Legal Document Request - allows clients to effortlessly request specific legal documents, such as permits, licenses, or certificates, directly through the portal.
- Inquiry - feature offers a user-friendly interface for clients to submit inquiries or seek clarification on legal queries.

Furthermore, the researchers would like to emphasize the following limitations of the study:

- The system only relies on the use of the internet.

- Can access thru different browsers like Google Chrome, Mozilla, Opera Mini, etc.
- Only assigned personnel of the legal office can access the Accounts for the Legal Staff and Admin.
- Only assigned tickets based on roles can be assigned in the Legal Staff account.
- It will be an email-based transaction for users.

Significance of the Study

The study will benefit, but not limited to, the following:

Legal Officers, the Legal Office Portal will aid Legal officers in effectively managing their tasks, monitoring appointment schedules, and arranging legal documents. The chatbot AI feature will also help them control many queries, giving immediate responses to clients.

Government Office, the system can support the government office in publicizing legal information, resolutions, and ordinances. The Legal Portal will contribute to transparency and help citizens to understand and practice their legal rights and obligations by providing current and precise information.

Community, the Legal Office Portal will help the community, particularly individuals who are underprivileged and live in remote areas, access legal information and services. The system's accessibility will be available to any location with an internet connection, ensuring that individuals can obtain legal information regardless of their geographical or financial circumstances.

Clients, the system can allow clients to submit essential documents electronically, arrange appointments, and inquire through the Legal Portal, resulting in time efficiency and reducing the necessity for frequent in-person visits to the legal office.

Other Researchers, this study can benefit other researchers by serving as a basis for future studies aiming to create an integrated portal encompassing an appointment system, a document request feature, and question handling facilitated by chatbot technology.

Definition of Terms

Web Portal. A website that serves as a single point of access to a variety of information, resources, and services from different sources. It is designed to provide users with a convenient and centralized platform to access content and perform various tasks.

Chatbot. A computer program or AI-powered application that is designed to simulate human conversation through text or voice interactions.

Artificial Intelligence (AI). Branch of computer science that focuses on developing machines, systems, or software that can perform tasks that typically require human intelligence.

Digital Ecosystem. A dynamic and interconnected network of various digital entities, including organizations, individuals, applications, services, devices, and data sources, all interacting with each other within a digital environment.

CHAPTER 2

REVIEW OF LITERATURE AND STUDY

This chapter reviewed prior research, theories, and literature that served as a guide for the development of the study about implementing a multifunction portal that incorporates an online scheduling system, document requests, and inquiry handling.

Digital Ecosystem

We refer to digital ecosystems as the digital equivalent of biological ecosystems, considered robust, self-organizing, and scalable frameworks that can automatically handle complex, dynamic issues (Briscoe, n.d.). The complex network of interconnected digital entities, platforms, technologies, and people that collaborate to define the digital environment is called the "digital ecosystem." It encompasses online activities, including mobile apps, e-commerce websites, social networking platforms, and cloud computing services. With the help of stakeholders, systems, and an enabling environment, the digital ecosystem enables individuals and groups to receive benefits, interact with one another, and pursue economic possibilities (*DIGITAL ECOSYSTEM FRAMEWORK DIGITAL ECOSYSTEM*, n.d.). The interactions between the various components of this dynamic ecosystem foster communication, collaboration, and knowledge exchange. Digital ecosystems are used by businesses to expand their networks, develop partnerships, and provide customers with value-added services. These initiatives and services can boost diversity, promote shared wealth, boost freedom and openness, and inspire original thought (*DIGITAL ECOSYSTEM FRAMEWORK DIGITAL ECOSYSTEM*, n.d.).

Definition Of Portal

A portal is a system that acts as a central location for accessing many Web resources. It compiles information from several sources and presents it all in one place,

making it easier for multiple users to access information (Rosario et al., n.d.). A web portal is a comprehensive entry point to various data, services, and resources by acting as a centralized online platform. Web portals—often created for convenience—combine data from several sources to give users a streamlined way to access news, entertainment, communication tools, and other services. A web portal is an ideal example of how technology can combine several parts into a single functional area that imitates the comforts of the physical world in the digital sphere via the seamless integration of various functionalities. A portal is a collection of tools and features available to users. Portals provide the following benefits to the user: aggregate (the user can go to a single location for all content and applications), personalization (the user can get content that is tailored to their needs and interests), organization: (the user can arrange the content and applications to understand the information better), and integration: (the user can work with various applications and content sources in a unified manner) (*МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РФ*, n.d.). Generally speaking, a portal allows millions of web users to access the vast assortment of data, services, and applications available on different websites.

Application Of A Web Portal

Web portals are regarded as a knowledge management system since they give users access to integrated applications and databases. They also serve as a business intelligence tool that aids decision-making and occasionally encourages task innovation (Al-Debei & Jalal, 2012). Web portals strive to remove the need to hop between numerous websites and applications by offering a single-entry point to various services and content. They are frequently used in fields where combining information and functionality is essential, such as education, healthcare, government, and business. Modern web portals frequently use responsive design due to technological advancements to provide smooth

access across various devices, including desktop computers, tablets, and smartphones. Online portals are often necessary to improve user experience, provide effective information sharing, and foster digital connectivity inside particular businesses or industries.

Online Scheduling System

An online scheduling system is a technical advancement that has fundamentally altered the way we manage our time and responsibilities. This online tool combines efficiency and ease to make scheduling tasks, meetings, and appointments simpler. An online appointment scheduling system allows a user or visitor to enter a website and arrange appointments quickly and effortlessly using online software. An online scheduling system is a web-based, paperless tool with excellent usability and flexibility that allows users to make appointments within available appointment times as per their preferences (Rylan et al., n.d.). This system allows users to check availability, select suitable time slots, and even sync appointments with their calendars, reducing the likelihood of multiple bookings. This strategy ensures that important events are always remembered by sending automatic reminders, enhancing punctuality and overall effectiveness. Users can make reservations using a smartphone, computer, or other device in various ways through cutting-edge platforms like this, considerably boosting the booking capacity. Web-based technology is also needed to streamline the appointment procedure to eliminate some human errors brought on by the manual scheduling process (Abu et al., 2022). Online scheduling tools show how well the technology works to ease complex scheduling issues and enhance time management.

Document Request System

Computers and smartphones have improved accessibility and efficiency, making them indispensable tools in today's fast-paced culture for communication, information access, and many other tasks (Taruc et al., 2023). Particularly, in the context of document requesting system. A document request system is now a crucial tool for expediting and simplifying the acquisition of essential documents. This system enables people, groups, and institutions to effectively gather necessary documents by centralizing and digitizing the document request process. Users can submit their document requests using an intuitive interface, providing essential information, such as the type of document, the reason, and the urgency.

A customer request is where the document process begins (Mae Enriquez, 2016). Automated alerts and status updates inform requesters of the progress of their requests, enhancing transparency and lowering uncertainties. This digital platform speeds up the approval and processing procedures while reducing the hassle of traditional documentation. Overall, the process for requesting papers is an excellent illustration of how technology can be utilized to improve public access to essential data and streamline administrative processes.

Inquiry Handling Using Chatbot

A specialized customer care center frequently records client inquiries using unstructured narrative language. Depending on the size of the business and its clientele, the number of client inquiries could range from a few thousand to millions. Analyzing this many consumer inquiries would be time-consuming, expensive, and error-prone (Jetley et al., n.d.). Resolving queries is essential for efficient customer connection, and relationship management. It involves handling client inquiries, problems, and requests methodically

and promptly using a variety of communication channels. Organizations depend on efficient inquiry handling procedures to respond to client inquiries quickly, deliver correct information, and address problems. By demonstrating a dedication to providing outstanding service, this approach not only increases customer pleasure but also strengthens brand loyalty and trustworthiness. A well-structured inquiry handling system combines skilled staff and defined procedures and frequently employs technology to track, categorize, and prioritize questions effectively. Doing this guarantees that every client feels appreciated, receives prompt responses, and has a significant encounter that builds a lasting and fruitful relationship.

On the other hand, human employees tend to make mistakes since they perform numerous tasks. As a result of developments in artificial intelligence (AI), which are systems created to interface with human users using natural language, conversational software agents (CAs), such as chatbots, have increasingly supplanted human chat service agents (Adam et al., 2021). Managing inquiries with chatbots is a cutting-edge tactic for consumer engagement that displays how technology and customer service are intertwined. The automated system's 24-hour operation, which provides quick responses and shorter wait times, increases customer satisfaction. The literature on chatbot-assisted inquiry management covers how to create, employ, and optimize these digital assistants. Focusing on how these technologies enable chatbots to comprehend a wide range of customer inquiries and offer impressively accurate responses, it analyzes sentiment analysis, machine learning strategies, and natural language processing. Nowadays, conversational software agents, commonly referred to as chatbots frequently replace human chat service representatives (Adam et al., 2021).

Artificial Intelligence

The field of computer science known as "artificial intelligence" is primarily concerned with building intelligent machines that behave and respond much like people, where artificial denotes something that is "not real" and intelligence denotes "the capacity for thought, the generation of novel ideas, perception, and learning" (Verma, 2018). Recently, computers have developed artificial intelligence (AI) systems to provide services that give satisfaction to people and are based on human comprehension. A linguistic intelligence technology that enables smooth user-to-user contact and unlimited information access in any language is the main technological component of these AI systems (Park et al., 2022). In other terms, AI is the development of computer systems that can do activities that often require human intelligence. AI also referred to as machine intelligence, it is the intelligence displayed by computers as opposed to the natural intelligence exhibited by people such as "learning" and "problem-solving" (Baum, n.d.). AI systems are designed to analyze and assess data, spot patterns, and then draw conclusions or take actions based on that knowledge, they can quickly scan large amounts of data and find intricate patterns that people might overlook. AI is becoming more and more popular as a field of research in computer science because it has significantly benefited human living in so many ways. AI has dramatically improved the performance of businesses, services, and other industries during the last 20 years, including education (Verma, 2018).

Natural Language Processing

The branch of artificial intelligence known as "natural language processing" (NLP) deals with both computer interpretation and human language (“Advances in Computer Science,” 2020). It comprises the development of algorithms and models that enable computers to understand, interpret, and produce human language meaningfully and

effectively. NLP may be used to improve spoken and written communication in all human languages. Web search, email spam filtering, computerized speech or text translation, document summarization, and grammar checking are more examples of technologies that use NLP.

Chatbot

Chatbots were once a hotly contested academic topic. A chatbot is a piece of computer software or artificial intelligence that participates in written or voice discussions (Park et al., 2022b). A chatbot is made to have conversational exchanges with users, typically over text. Artificial intelligence (AI) and natural language processing (NLP) techniques are used by chatbots to comprehend user input and respond appropriately. There are a lot of claimed benefits for chatbots. They provide prompt, dependable responses and solutions, which is their key advantage. These characteristics make chatbots useful in several situations, and their use in business, e-commerce, and healthcare has grown swiftly (Huang, 2021). These days, chatbots are practically ubiquitous. Modern chatbots are frequently referred to as "virtual assistants"; some can communicate with you via text messages or audio inputs like Apple Siri or Amazon Alexa. In today's world, chatbots could reach a larger audience and could be more efficient than people. They might also acquire the ability to gather information at the same time. They significantly reduce operating costs for customer service departments. As AI and machine learning advance, it may become impossible for someone to distinguish if he/she is talking between a chatbot and a live agent. (Adamopoulou & Moussiades, 2020)

The Rise Of Chatbots

In 1950, Alan Turing proposed the Turing Test, or "Can machines think?" It was at this time that the idea of a chatbot became well-known. A chatbot named Eliza was developed

in 1966 with the goal of acting as a user's virtual psychotherapist. Eliza responded to user utterances by asking questions (Adamopoulou & Moussiades, 2020). Other well-known early chatbots include ALICE (created by Wallace in 2009) and PARRY (created by Colby in 1975). It is believed that PARRY is an upgrade over ELIZA since it has a personality and a better-governing structure than ELIZA. With the creation of ALICE, the history of chatbots advanced. It was the first online chatbot and earned the prize for the best human-like system. While ELIZA only has 200 keywords and rules, ALICE patterns match against 41,000 templates while creating answers (Huang, 2021). With the launch of SmarterChild in 2001, chatbot technology underwent a huge advancement. The instant messaging program SmarterChild was able to assist users with simple tasks by using data from databases (Molnar & Szuts, 2018). The next step was the creation of virtual personal assistants like Apple Siri, and IBM Watson (Huang, 2021).

There are several significant achievements for chatbots, but most crucially, because of current advancements in AI, machine learning, and natural language understanding, chatbots are always getting better. They are used to create personalized experiences and automate repetitive operations in a variety of industries, including customer service, e-commerce, healthcare, and more.

The Use of Chatbot

A chatbot is a tool that uses natural language processing that allows users to hold a conversation with the computer. In a chatbot, the user types a text in a language that the computer can comprehend, such as English, and the computer will also respond in English (Shinde et al., 2021). In today's digital environment, chatbots have grown significantly. Language learning is one of the many modern applications that make use of chatbots. It has been found that when people are trying to learn something new, they go to virtual friends because it is far more favorable, they converse openly without concern

for social stigma (Shinde et al., 2021). Answering engines are another name for chatbots. Because the knowledge has already been pre-programmed, this application runs in a straightforward manner (Elakkiya et al., 2022). Furthermore, chatbots have improved productivity and efficiency.

Synthesis:

In today's digital era, users can easily access various services and data through a centralized online platform called a web portal. It serves as a virtual gateway by providing users with a straightforward way to connect with features, including document requests, appointment scheduling, and real-time inquiries. Those are all features of the portal that the proponents will make; it allows users to expedite interactions, traverse complex processes, and receive fast support in a single, integrated environment.

The web portal platform combines three essential elements to provide a productive experience. The document request functionality allows users to ask and track document requests online, eliminating the need for time-consuming paperwork and manual processing. The integrated online scheduling system will enable users to plan appointments conveniently by choosing from available time slots that fit their schedules. Eliminating the need for phone calls and email interaction facilitates communication between users and workers. The website also has an intelligent chatbot for handling questions to enhance user connection. This AI-powered assistant is available around-the-clock to instantly address user questions and deliver prompt solutions.

Using the web portal, clients can quickly request papers, monitor their status, schedule appointments at their convenience, and receive timely, accurate answers to their inquiries, all of which reduce administrative burdens and save time.

Combining these features could lay the groundwork for a more straightforward, practical, and engaging link between users and services, enhancing the overall experience for both clients and staff.

Chapter 3

METHODOLOGY

Research Design

To meet the objectives of this research, a Developmental-Quantitative Design was employed to develop a Web Portal for the City Legal Office of San Pedro City, Laguna. The Developmental-Quantitative Design combines both the developmental aspects of designing and developing the web portal and the quantitative approach, wherein data was collected through a survey questionnaire. Participants' responses were then evaluated and analyzed using relevant statistical metrics.

Research Instrument

A survey questionnaire was utilized as a data-gathering tool in this study. This tool shall elicit information in response to the research statement of the problem. The end-users and Legal Office are the respondents who gave feedback on the level of acceptability of the system.

Table 1

Numerical Values and Interpretation of Value in Likert Scale

Numerical Value	Response	Description
5	Strongly Agree	The respondent strongly agrees with the statement presented.
4	Agree	The respondent has a positive stance on the statement but may not hold an extremely strong opinion.
3	Neutral	The respondent does not strongly agree or disagree with the statement and

		remains neutral on the matter.
2	Disagree	The respondent disagrees with the statement or question but may not hold an extremely firm opposing view.
1	Strongly Disagree	The respondent strongly disagrees with the statement presented.

Table 1 presents the Likert scale, a widely used survey response scale to measure attitudes, opinions, and perceptions. The scale comprises five numeric values ranging from 1 to 5, each associated with specific response options and corresponding descriptions. The numeric value "5" stands for "Strongly Agree," reflecting a strong positive response and a firm and positive opinion on the matter. The numeric value "4" signifies "Agree," suggesting a positive stance without an extremely strong opinion. "3" denotes "Neutral," representing an indifferent or neutral response where the individual neither strongly agrees nor disagrees with the statement or question. On the other hand, "2" corresponds to "Disagree," implying a negative stance without an extremely strong opposing view. Finally, the lowest numeric value "1" represents "Strongly Disagree," indicating a strong negative response and a firm contrary opinion.

Table 2

Corresponding Scale Range for the Likert Scale

Score	**Corresponding Remark**
4.6 – 5.0	Strongly Agree

3.6 – 4.5	Agree
2.6 – 3.5	Neutral
1.6 – 2.5	Disagree
1.0 – 1.5	Strongly Disagree

Table 2 shows the score and its corresponding remark based on the Likert Scale. 4.6 to 5.0 means Strongly Agree, 3.6 to 4.5 means Agree, 2.6 to 3.5 means Neutral, 1.6 to 2.5 means Disagree, and lastly, 1.0 to 1.5 means Strongly Disagree.

Data Generation Procedure

To assess the effectiveness of the San Pedro City Legal Office Portal, the researchers conducted a survey targeting the end-users and staff of the legal office which utilized the portal. This survey method allowed the researchers to gather valuable insights and responses to address the research questions posed in the study.

By gathering data from these stakeholders, the researchers aimed to understand how well the portal met their needs and expectations. The data obtained from the survey served as the foundation for this research. Through a rigorous analysis process, the researchers evaluated the survey responses and drew meaningful conclusions about the strengths and weaknesses of the San Pedro City Legal Office Portal. The findings from the data analysis played a vital role in informing the improvements and enhancements needed for the portal's optimization.

Ethical Consideration

In order to perform a responsible and respectful study and offer insightful contributions to the academic community, the researchers used ethical considerations. Before distributing the survey questionnaire, the researchers made sure that participants were completely aware of the study's goals, methods, and any risks. Participants were also given the assurance that their answers would be kept private and only utilized within the parameters of this study for academic reasons. The researchers removed or anonymized any identifying information in order to safeguard the participants' identities and personal data. To respect the participants' autonomy, participants were given the choice to participate or withdraw at any time without being questioned in any way.

To minimize potential harm or discomfort to the participants, the researchers carefully designed the questions and survey procedures to avoid sensitive or distressing topics. In case any participant expressed distress during the study, appropriate support and resources were made available.

By taking into account these ethical issues, the study seeks to preserve the highest standards of research integrity, offer valuable input to the academic community, and protect the welfare and autonomy of its participants.

Data Case Analysis

To give interpretation to the data collected, the following statistical formulas were used. Frequency and Percentage were utilized to quantify the responses of the respondents of the study.

P = $\frac{f}{n}$ **x 100** Wherein: **P** = percentage

f = frequency

n = total number of the respondents

f = $\frac{n}{N}$ Wherein: **n** = total number of response

N = total number of the respondents

The usefulness, functionality, usability, ease of use, and reliability of the developed system were evaluated using Weighted Mean. The following is the formula for calculating the Weighted Mean:

Mean = $\sum \frac{fx}{n}$ Wherein: **f** = frequency

x = corresponding rank of the verbal interpretation

n = total number of responses

Software Development

Table 3

Tools and Languages Used

Interface Design	Figma
Prototyping	Figma
Programming Language	• HTML • CSS • JS • PHP • SQL
Integrated Development Environment	Visual Studio Code
Framework (Back End)	PHP Laravel

Database	MySQL

Table 3 shows the tools and language used to developed the web portal for San Pedro City Legal Office. The system designing and prototyping occurred in Figma. It was built using frameworks Laravel (PHP Framework) and Vue.js (JavaScript Framework), languages like HTML, CSS, and SQL in MySQL and VS Code.

Development Process

Figure 1. Agile Scrum Development Process

The software development process for the developed system was guided by Scrum Methodology. Scrum is a well-known Agile development methodology that follows iterative and incremental practices in project management. The Scrum model begins with the creation of a product backlog as the first stage. Subsequently, the second stage involves sprint planning and the creation of a sprint backlog. In the Scrum methodology, each sprint begins with a detailed Sprint Planning meeting, which can last up to four hours. During the sprint, the Scrum team works on the project and holds daily meetings, usually

lasting fifteen minutes, to discuss progress and challenges. The software is developed in increments during these sprints, with each sprint typically lasting two to four weeks. After each sprint, performance testing is conducted, and stakeholders participate in a review meeting to assess teamwork. The fifth stage involves retrospective and future sprint planning. The Scrum backlog contains customer requirements, and daily burn-down charts track the remaining work.

System Specifications

This section includes the technical specifications, mainly focusing on the hardware requirements and their corresponding specifications, which were employed during the system's creation and will be utilized in the implementation stage.

Table 4

Hardware Requirements and Specifications

Hardware	**Specification**
Device	• Desktop Computer • Laptop
Operating System	• Windows • MacOS
Processor	A dual-core processor or higher, with a clock speed of at least 1.6 GHz
Random Access Memory (RAM)	At least 4 GB memory card
Read-Only Memory (ROM)	At least 10 GB of unused space inside the storage

Screen Resolution	Any screen resolution above 1024x768 pixels
Internet Connection	A connection with at least 10 Mbps or higher
Browser	• Microsoft Edge • Google Chrome • Apple Safari

Software Requirements Specifications

This section provides an in-depth description of the various components that make up the developed system, along with the roles responsible for utilizing the system's features. The section also explores the use case diagrams and entity-relationship diagrams in greater detail.

Use Case Diagram

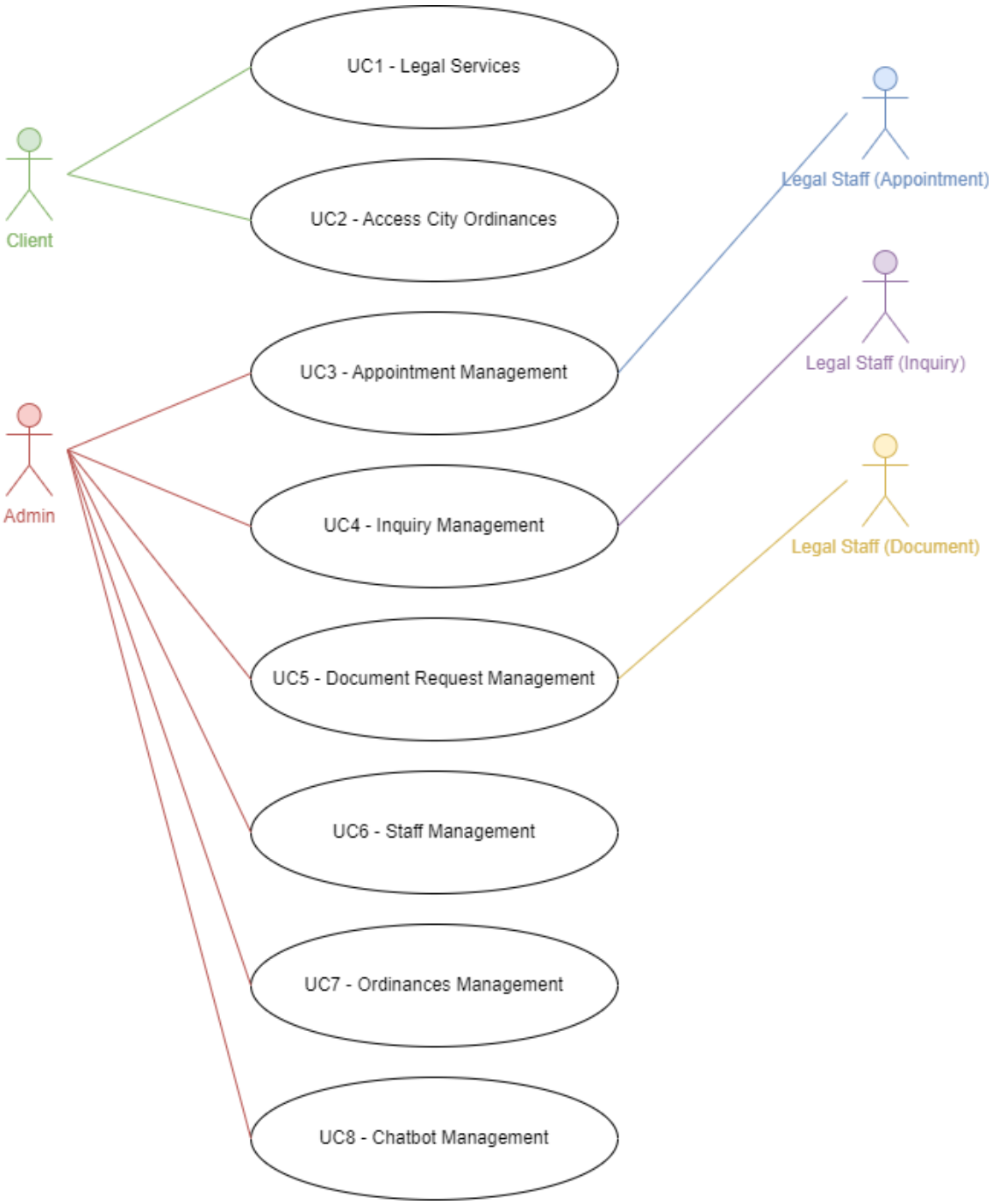


Figure 2. Legal Office Web Portal

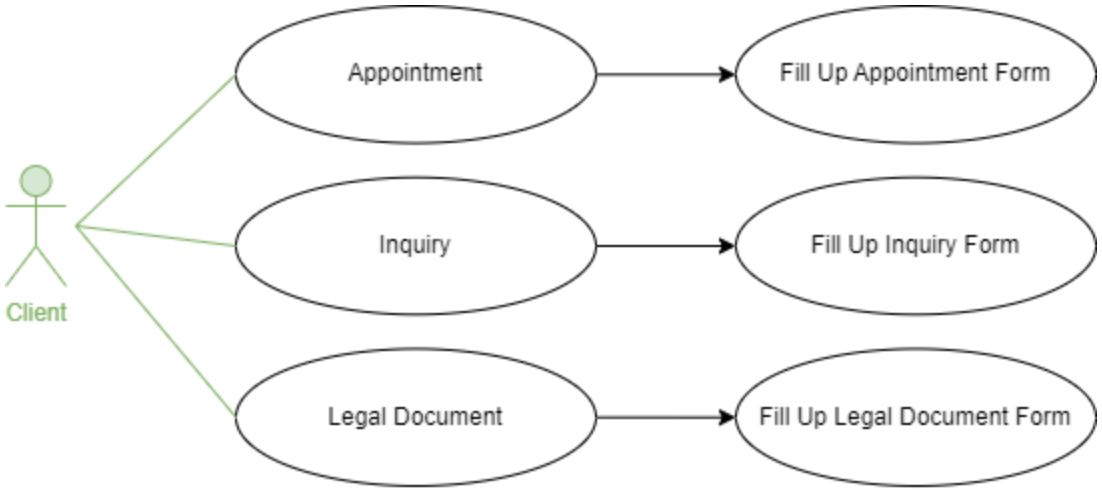


Figure 3. Legal Services

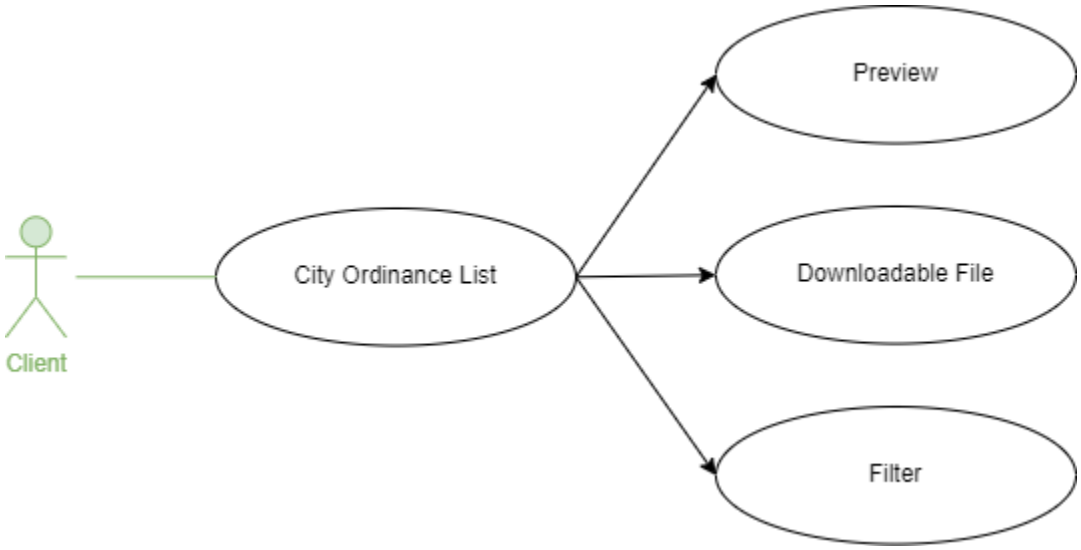


Figure 4. Access City Ordinances

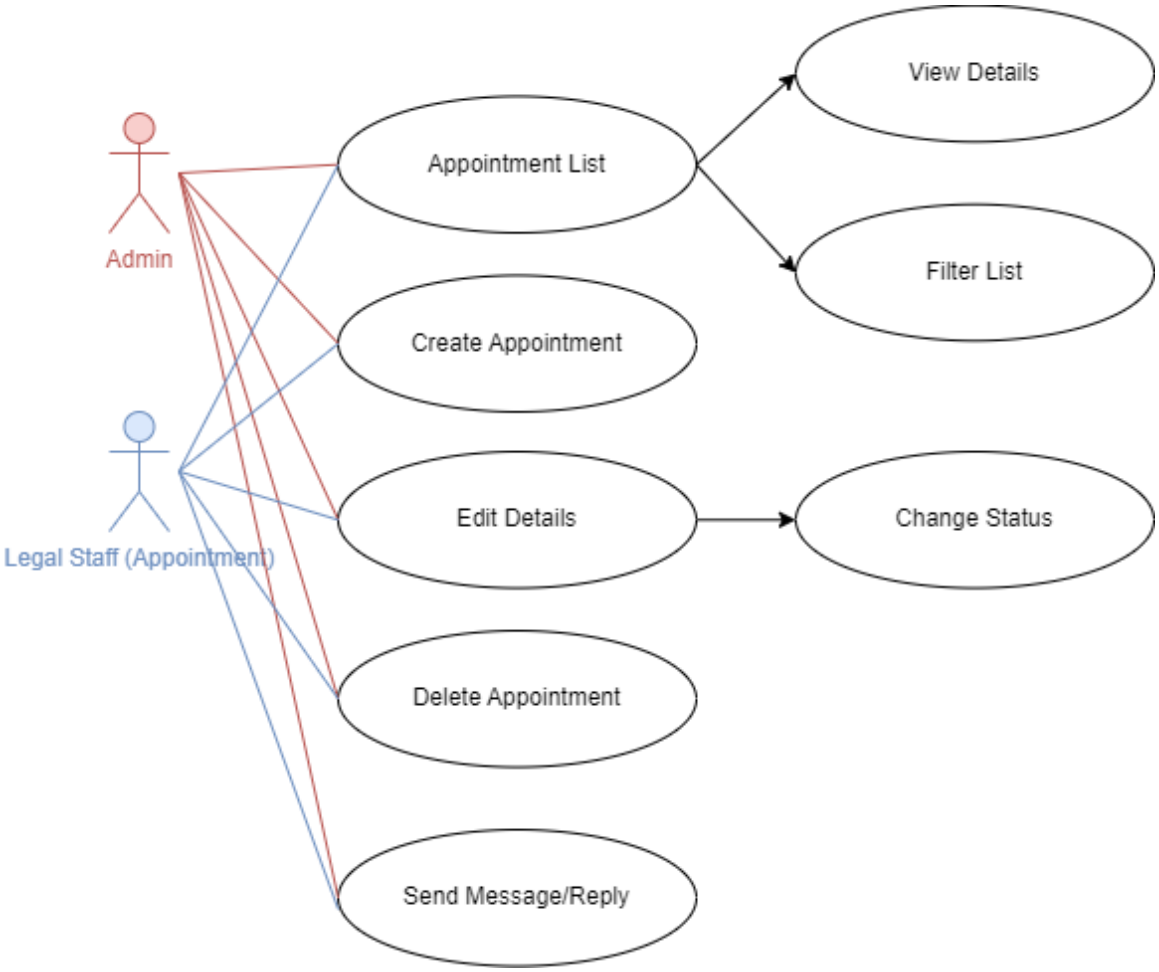


Figure 5. Appointment Management

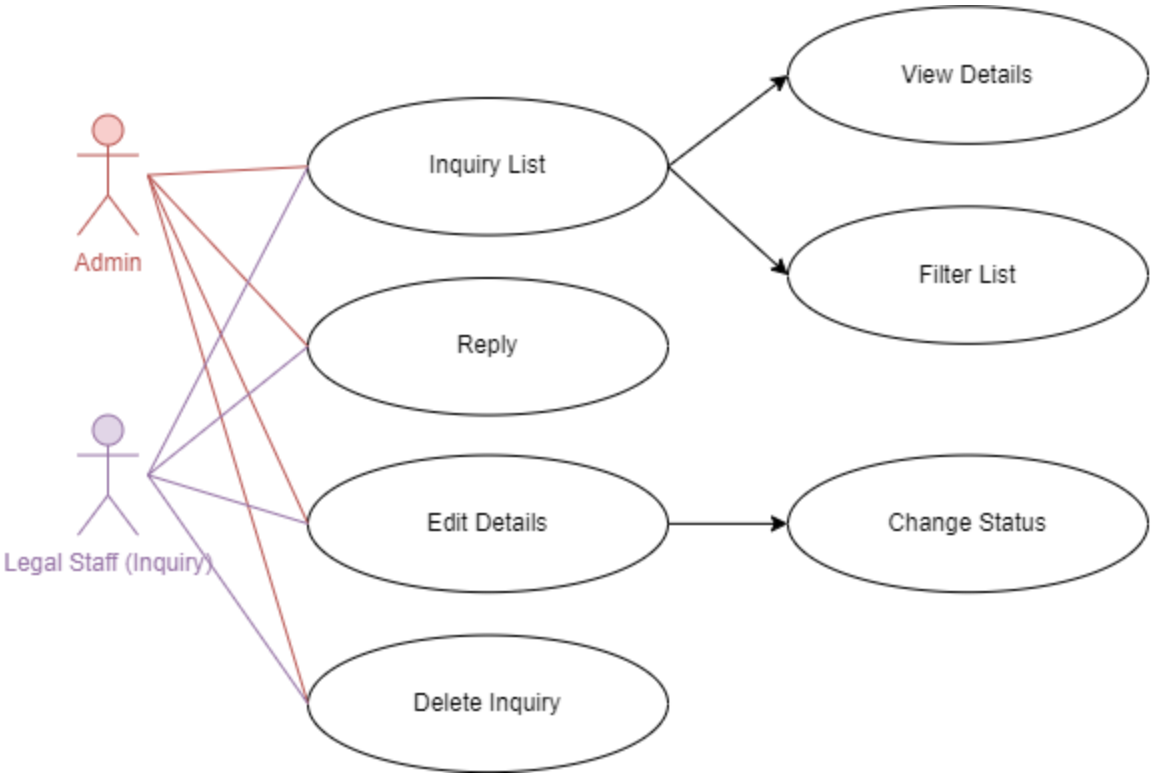


Figure 6. Inquiry Management

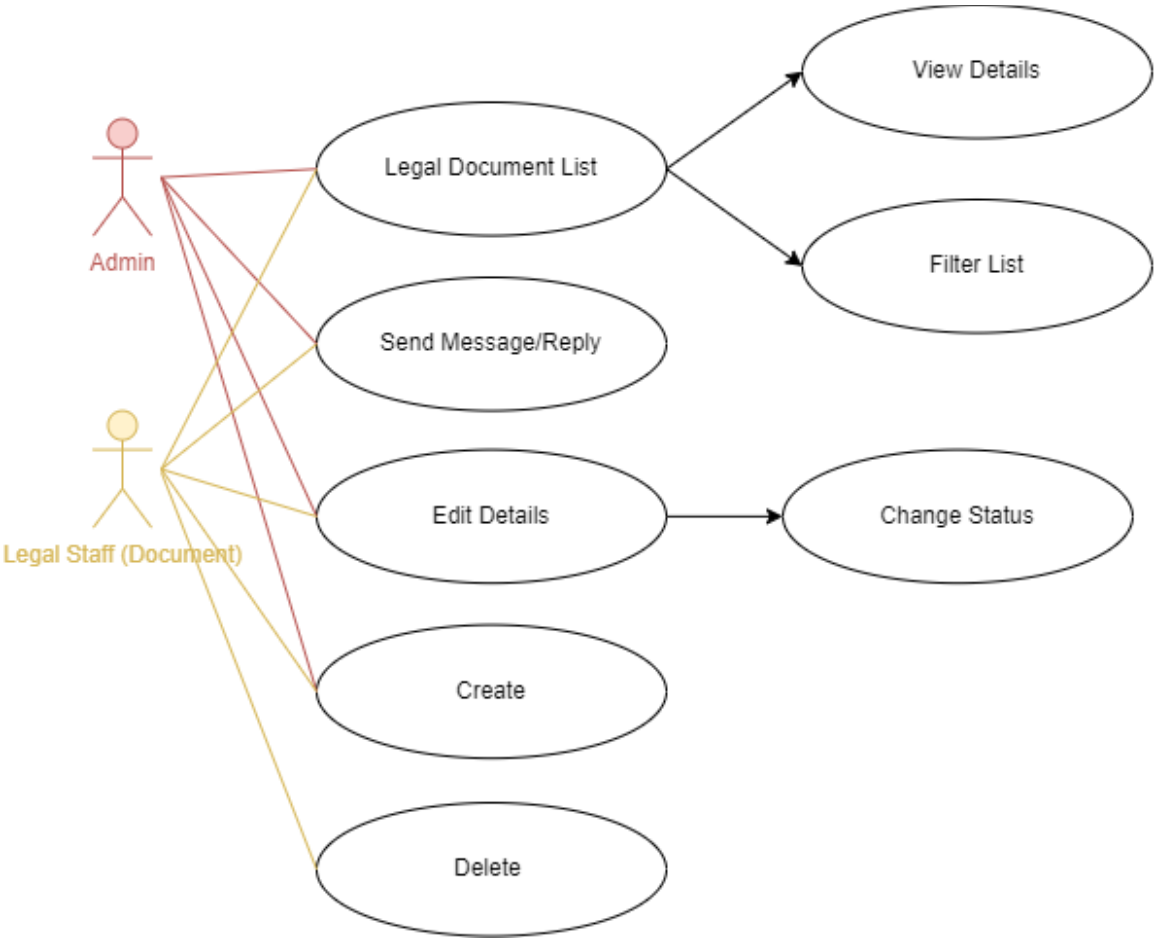


Figure 7. Document Request Management

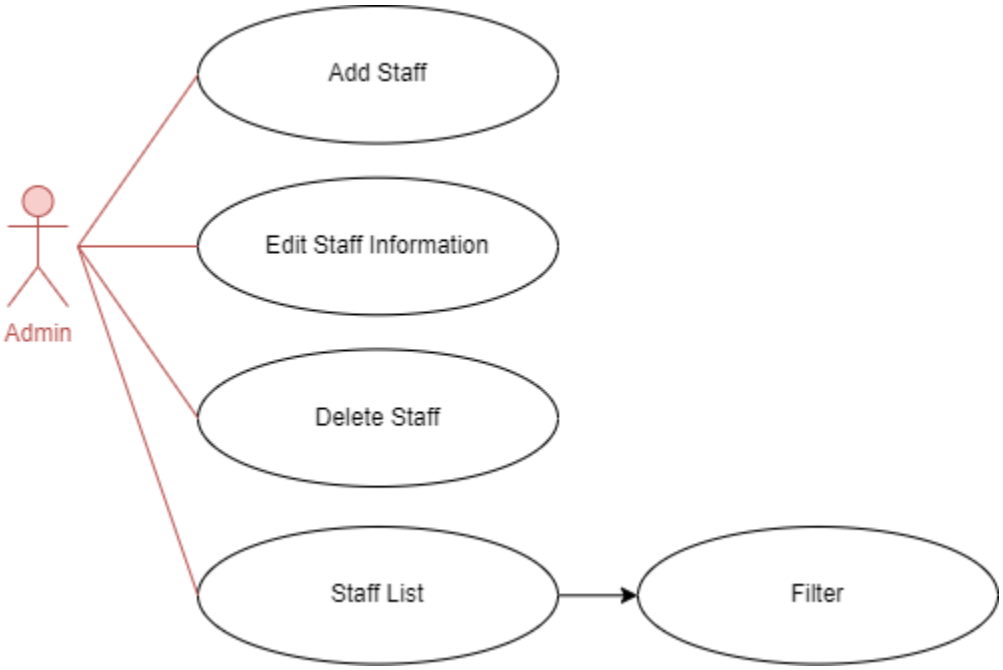


Figure 8. Staff Management

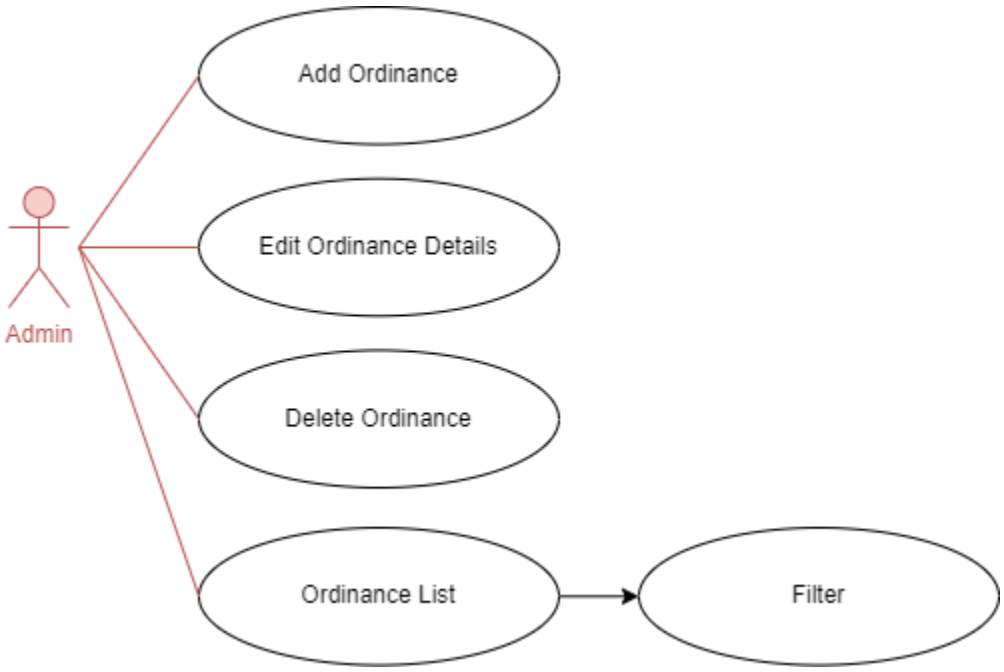


Figure 9. Ordinance Management

Entity-Relationship Diagram

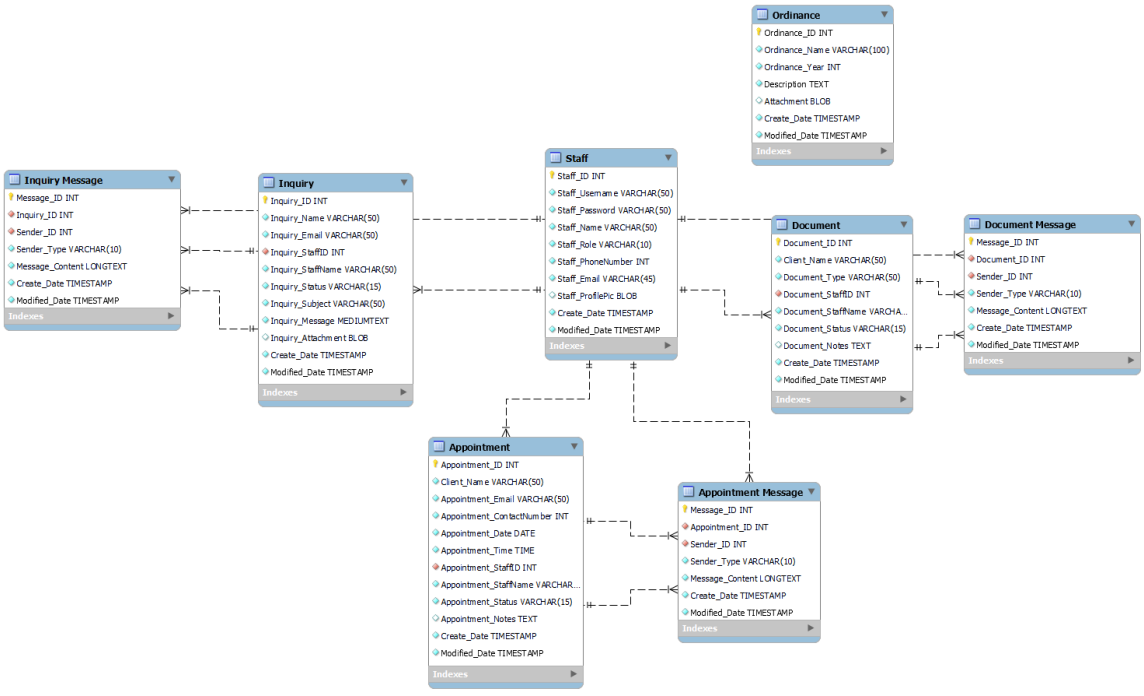


Figure 10. Overview of Entity-Relationship Diagram

The Entity-Relationship Diagram (ERD) presented here illustrates the structure and relationships of a comprehensive system designed to manage inquiries, appointments, documents, messages, staff, and ordinances. The ERD embodies the fundamental entities and their associations, providing a clear and organized representation of the underlying data model.

The "Inquiry Message" table captures details about messages sent in the context of inquiries. Each record in this table holds information about the message ID, inquiry ID, sender ID, sender type, message content, create date, modified date. It serves as a communication bridge between individuals seeking information and the legal staff members responsible for responding to inquiries.

The "Inquiry" table stores information pertaining to inquiries made by individuals. It includes fields such as the inquirer's identity, inquiry topic, create date, modified date, and status of resolution. The table establishes a connection between inquiries and the subsequent communication exchange through the "Inquiry Message" table.

The "Staff" table encompasses details about staff members responsible for addressing inquiries, managing appointments, and overseeing documents. Staff records contain attributes such as their usernames, passwords, names, roles, contact information, profile picture, create date, and modified date.

The "Ordinance" table consolidates data regarding ordinances or regulations that may be referenced in inquiries or documents. Each record includes relevant details like the ordinance title, description, effective date, and attachment for the full context file.

The "Document" table encompasses information about various document requests managed within the system. This table may store attributes like client name, document type, name of the staff, status of the document requested, and additional notes.

The "Document Message" table tracks messages exchanged in relation to documents. It records message ID, inquiry ID, sender ID, sender type, message content, create date, modified date**.**

The "Appointment" table maintains records of scheduled appointments. It includes information about client name, contact information, appointment date & time, staff name & ID, and any additional notes.

The "Appointment Message" table records messages related to appointments. It logs message ID, inquiry ID, sender ID, sender type, message content, create date, modified date. This table enables efficient communication between clients before and after scheduled appointments.

Software Design Specification

This section outlines how the database was created to support the creation of the privacy effect assessment tool. The database schema, data dictionary, system architecture and data flow diagrams, are all covered in this section.

Database Schema

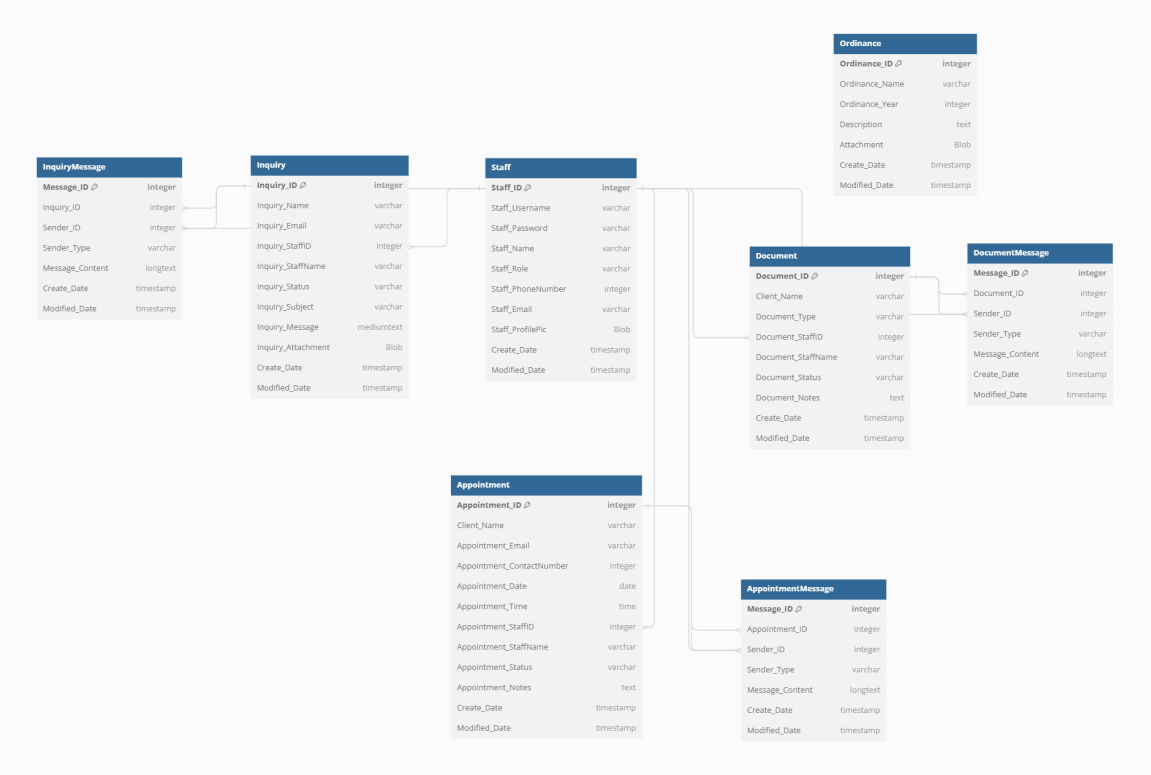


Figure 11. Overview of Database Schema

The database schema outlined above represents a robust and interconnected system designed to facilitate efficient management of inquiries, appointments, documents, messages, staff, and ordinances. This schema is composed of distinct tables, each with specialized attributes, establishing a structured foundation for storing and retrieving information.

Data Dictionary

Table 5

Staff Management Data Dictionary

Staff				
Column	**Type**	**Length**	**Description**	**Example**
Staff_ID	Integer		Primary Key for Staff	1

Staff_Username	Varchar	50	Username of Staff	Administrator
Staff_Password	Varchar	50	Password of Staff	Admin123
Staff_Name	Varchar	50	Name of Staff	Admin
Staff_Role	Varchar	10	Role of Staff	Admin/Appointment/Inquiry/ Document
Staff_PhoneNumber	Integer		Contact Number	09123456789
Staff_Email	Varchar	45	Email of Staff	admin@gmail.com
Staff_ProfilePic	Blob		Profile Picture	
Create_Date	Timestamp		Date & Time Created	2023-08-03 10:39:37
Modified_Date	Timestamp		Date & Time Modified	2023-08-04 11:30:47

Table 6

Ordinance Management Data Dictionary

Ordinance				
Column	**Type**	**Length**	**Description**	**Example**
Ordinance_ID	Integer		Primary Key for Ordinance	1
Ordinance_Name	Varchar	100	Ordinance Name	City Ordinance No. 2020-30
Ordinance _Year	Integer		Year of Ordinance	2020
Description	Text		Description of the Ordinance	AN ORDINANCE ADOPTING THE "NEW NORMAL" TO PREVENT AND CONTROL COVID-

				19 IN THE CITY OF SAN PEDRO, LAGUNA
Attachment	Blob		PDF File of the Ordinance	City Ordinance No. 2020-30.pdf
Create_Date	Timestamp		Date & Time Created	2023-08-03 10:39:37
Modified_Date	Timestamp		Date & Time Modified	2023-08-04 11:30:47

Table 7

Appointment Management Data Dictionary

Appointment				
Column	**Type**	**Length**	**Description**	**Example**
Appointment_ID	Integer		Primary Key for Appointment	1
Client_Name	Varchar	50	Client's Name	Juan Dela Cruz
Appointment_Email	Varchar	50	Client's Email	juandelacruz@gmail.com
Appointment_ContactNumber	Integer		Client's Contact Number	09123456789
Appointment_Date	Date		Appointment Date	2023-08-03
Appointment_Time	Time		Appointment Time	10:39:37
Appointment_StaffID	Integer		Staff ID	1
Appointment_StaffName	Varchar	50	Staff Name	Administrator
Appointment_Status	Varchar	15	Appointment Status	Completed
Appointment_Notes	Text		Notes	My concern is about …
Create_Date	Timestamp		Date & Time Created	2023-08-03 10:39:37
Modified_Date	Timestamp		Date & Time Modified	2023-08-04 11:30:47

Table 8

Appointment Message Data Dictionary

Appointment Message				
Column	**Type**	**Length**	**Description**	**Example**
Message_ID	Integer		Primary Key for Message	1
Appointment_ID	Integer		Appointment's ID	1
Sender_ID	Integer		Sender's ID	1
Sender_Type	Varchar	10	Sender's Type/Role	Client/Staff/Admin
Message_Content	Longtext		Message	Hi! Your appointment…
Create_Date	Timestamp		Date & Time Created	2023-08-03 10:39:37
Modified_Date	Timestamp		Date & Time Modified	2023-08-04 11:30:47

Table 9

Inquiry Management Data Dictionary

Inquiry				
Column	**Type**	**Length**	**Description**	**Example**
Inquiry_ID	Integer		Primary Key for Inquiry	1
Inquiry_Name	Varchar	50	Client's Name	Juan Dela Cruz
Inquiry_Email	Varchar	50	Client's Email	juandelacruz@gmail.com
Inquiry_StaffID	Integer		Staff ID	1
Inquiry_StaffName	Varchar	50	Staff Name	Administrator
Inquiry_Status	Varchar	15	Inquiry Status	Completed
Inquiry_Subject	Varchar	50	Subject of Inquiry	Notary
Inquiry_Message	Mediumtext		Message/Inquiry	How can I get notary?
Inquiry_Attachment	Blob		Attachment Files	Notary.jpg
Create_Date	Timestamp		Date & Time Created	2023-08-03 10:39:37
Modified_Date	Timestamp		Date & Time Modified	2023-08-04 11:30:47

Table 10

Inquiry Message Data Dictionary

Inquiry Message				
Column	**Type**	**Length**	**Description**	**Example**
Message_ID	Integer		Primary Key for Message	1
Inquiry_ID	Integer		Inquiry's ID	1
Sender_ID	Integer		Sender's ID	1
Sender_Type	Varchar	10	Sender's Type/Role	Client/Staff/Admin
Message_Content	Longtext		Message	Hi! Your appointment…
Create_Date	Timestamp		Date & Time Created	2023-08-03 10:39:37
Modified_Date	Timestamp		Date & Time Modified	2023-08-04 11:30:47

Table 11

Document Management Data Dictionary

Document				
Column	**Type**	**Length**	**Description**	**Example**
Document_ID	Integer		Primary Key for Document	1
Client_Name	Varchar	50	Client's Name	Juan Dela Cruz
Document_Type	Varchar	50	Type of Document	Affidavit
Document_StaffID	Integer		Staff ID	1
Document_StaffName	Varchar	50	Staff Name	Administrator
Document_Status	Varchar	15	Document Status	Completed
Document_Notes	Text		Notes	I want to request for …
Create_Date	Timestamp		Date & Time Created	2023-08-03 10:39:37
Modified_Date	Timestamp		Date & Time Modified	2023-08-04 11:30:47

Table 12

Document Message Data Dictionary

Document Message				
Column	**Type**	**Length**	**Description**	**Example**
Message_ID	Integer		Primary Key for Message	1
Document_ID	Integer		Document's ID	1
Sender_ID	Integer		Sender's ID	1
Sender_Type	Varchar	10	Sender's Type/Role	Client/Staff/Admin

Message_Content	Longtext		Message	Hi! Your appointment…
Create_Date	Timestamp		Date & Time Created	2023-08-03 10:39:37
Modified_Date	Timestamp		Date & Time Modified	2023-08-04 11:30:47

System Architecture

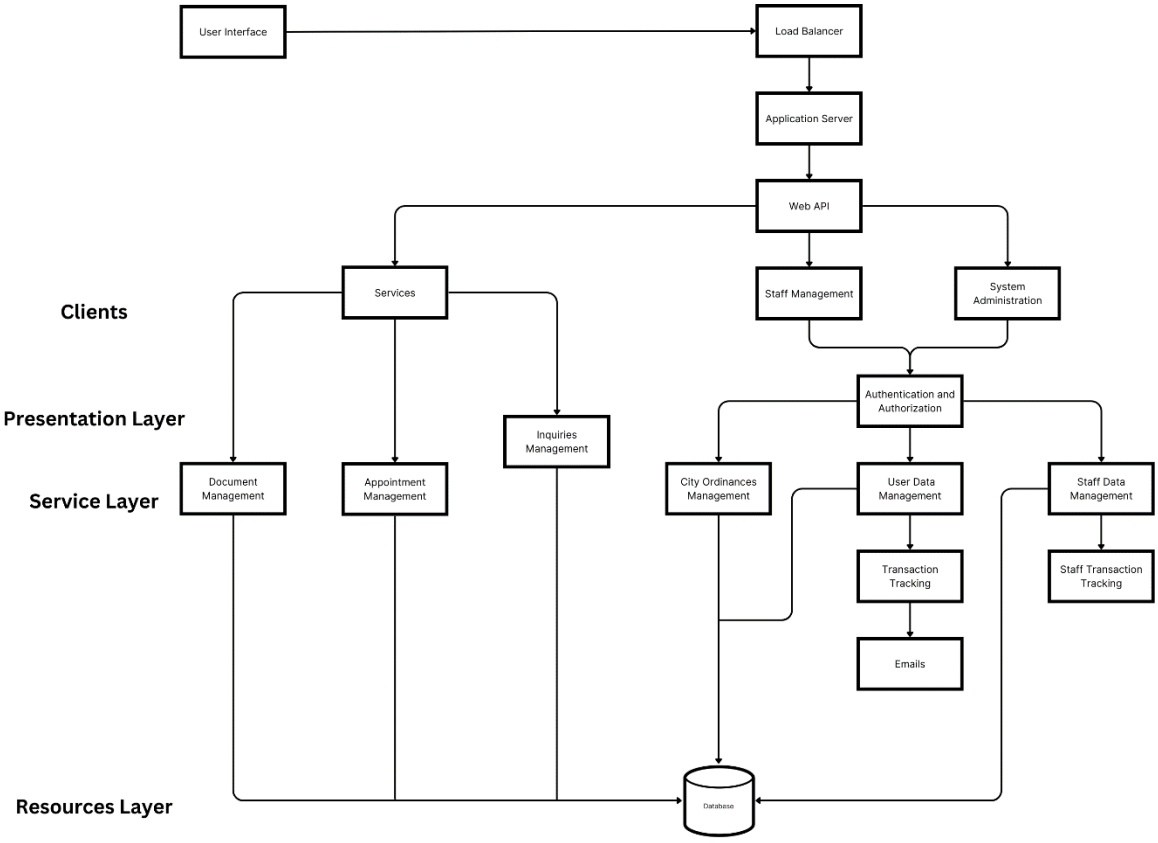


Figure 12. **Overview of System Architecture**

The system architecture presented here outlines a robust and scalable framework that efficiently manages user interactions, application processing, and data flow. This architecture is designed to provide a seamless experience for clients accessing various services and functionalities within the system.

The entire system architecture ensures a smooth and coherent flow of data and interactions. User requests are efficiently distributed by the load balancer to application servers, which process the requests through the web API. Clients, including staff members and system administrators, interact with the system via the web API, allowing them to access, manage the necessary functionalities and services then save its data in the database.

Data Flow Diagram – Level 0

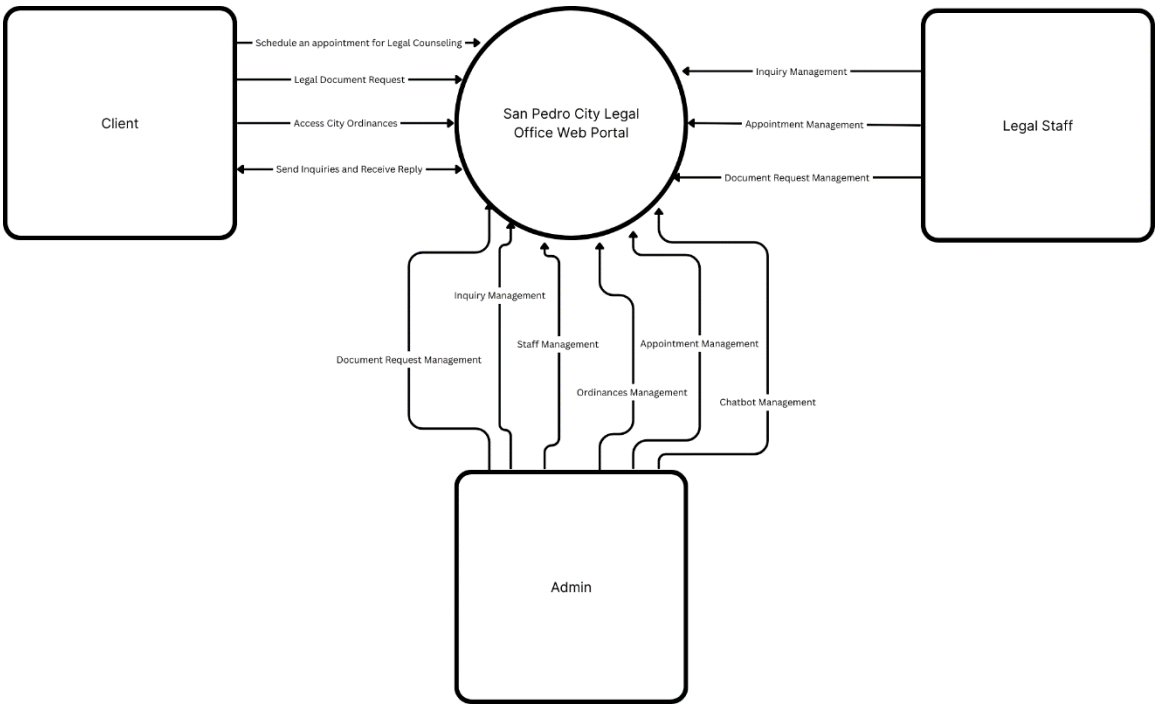


Figure 13. **Overview of DFD – Level 0**

Data Flow Diagram – Level 1

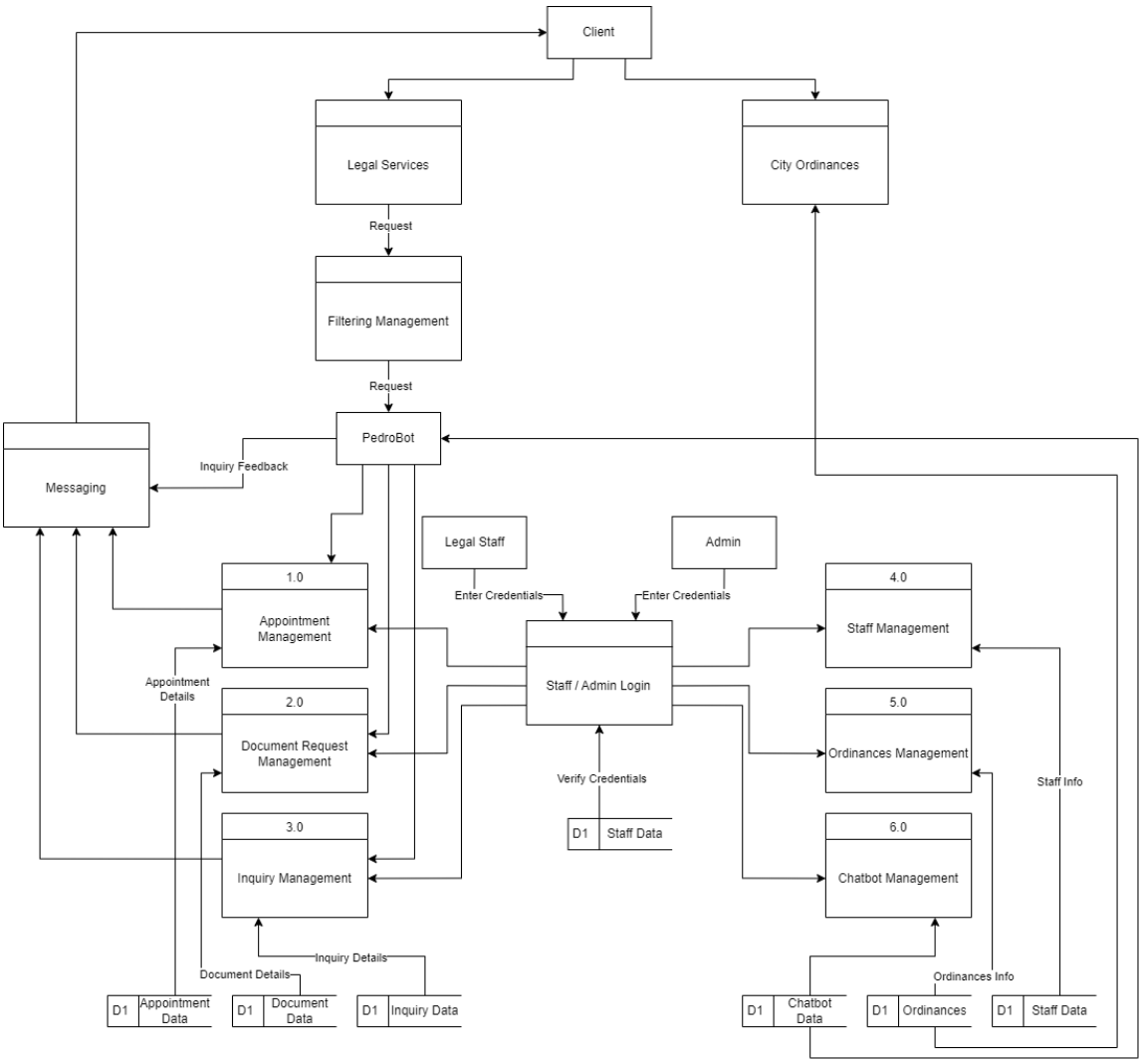


Figure 14. **Overview of DFD – Level 1**

Data Flow Diagram – Appointment Management

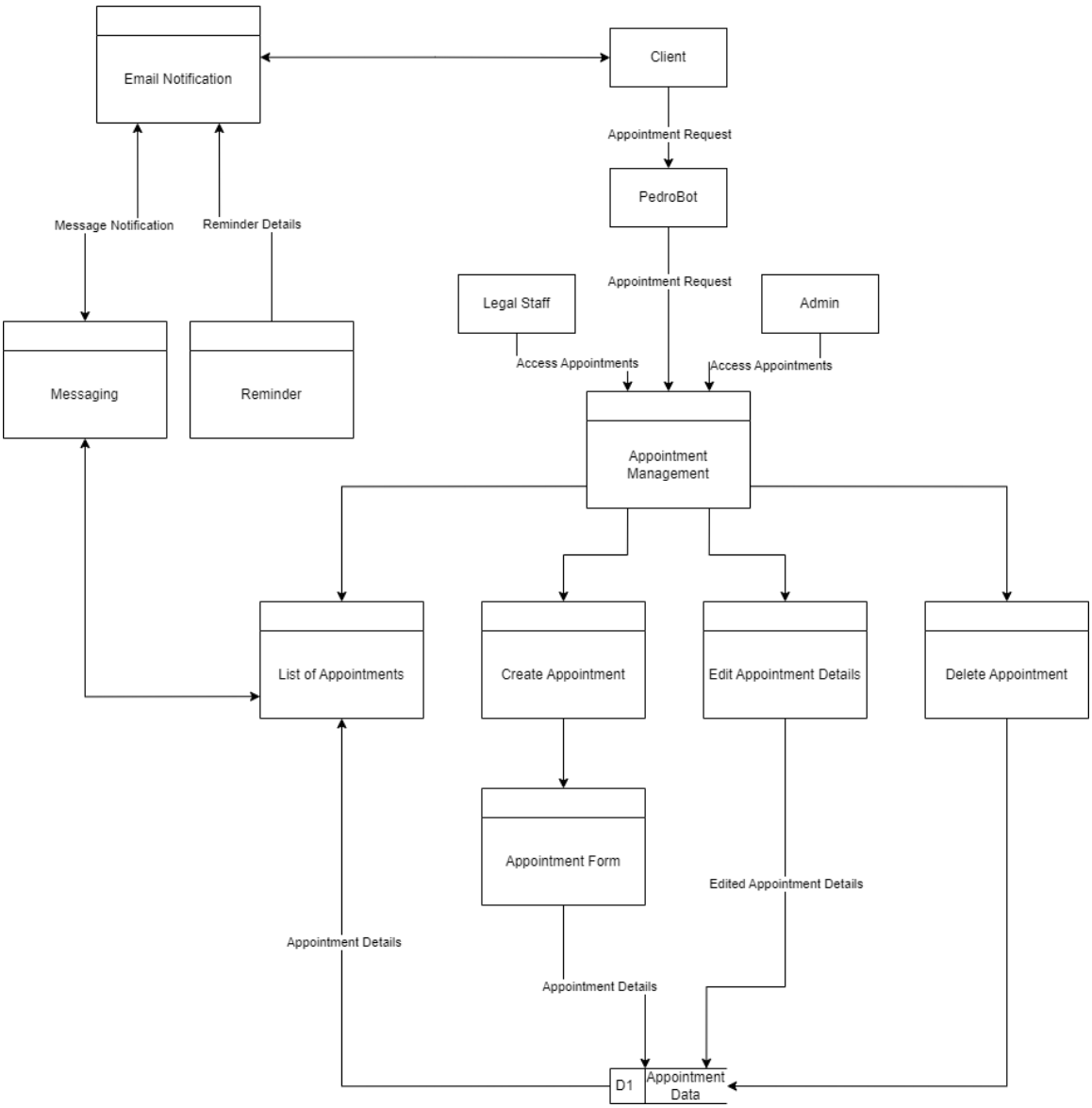


Figure 15. **Overview of Appointment Management Data Flow**

Data Flow Diagram – Document Request Management

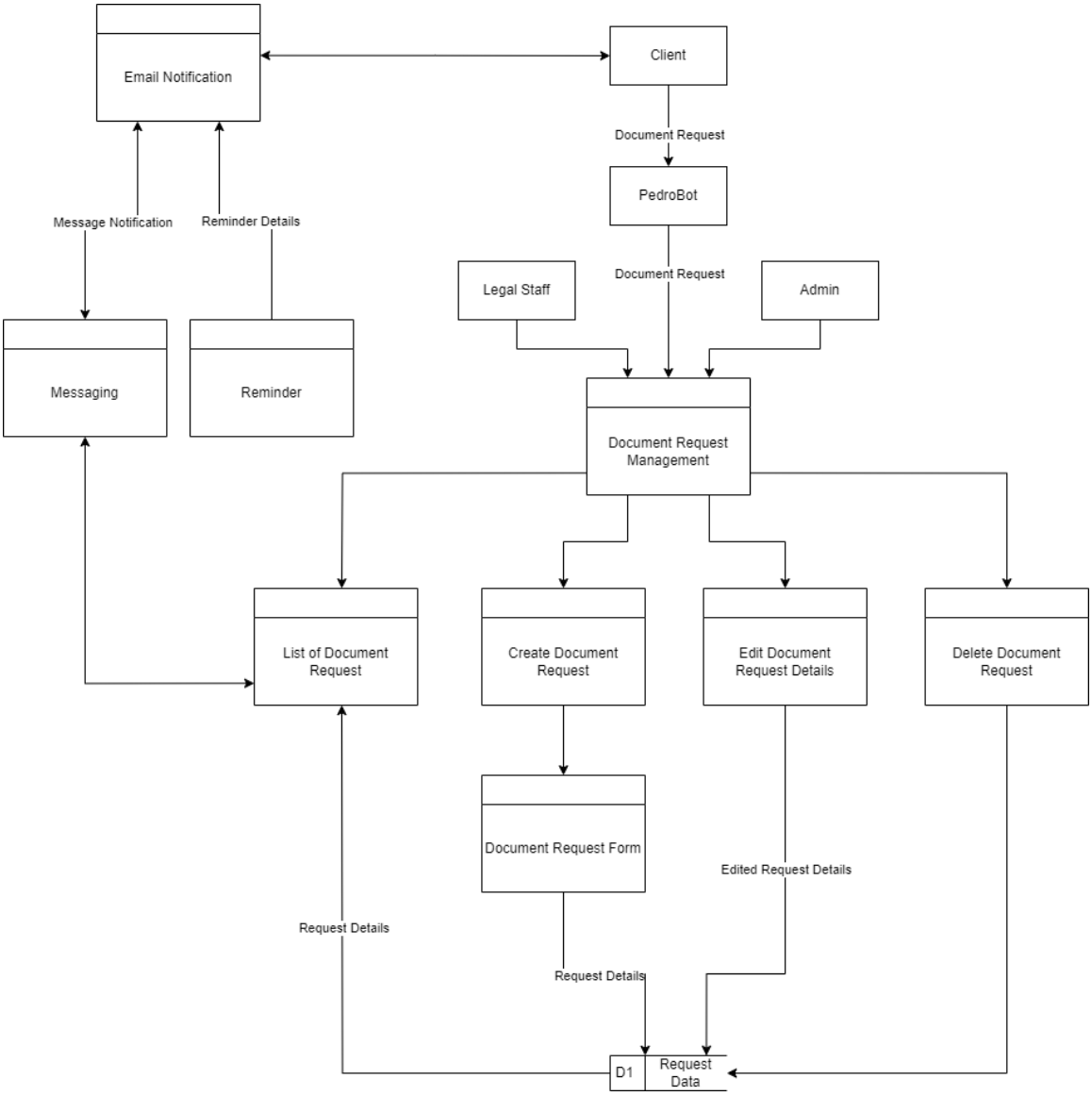


Figure 16. **Overview of Document Request Management Data Flow**

Data Flow Diagram – Inquiry Management

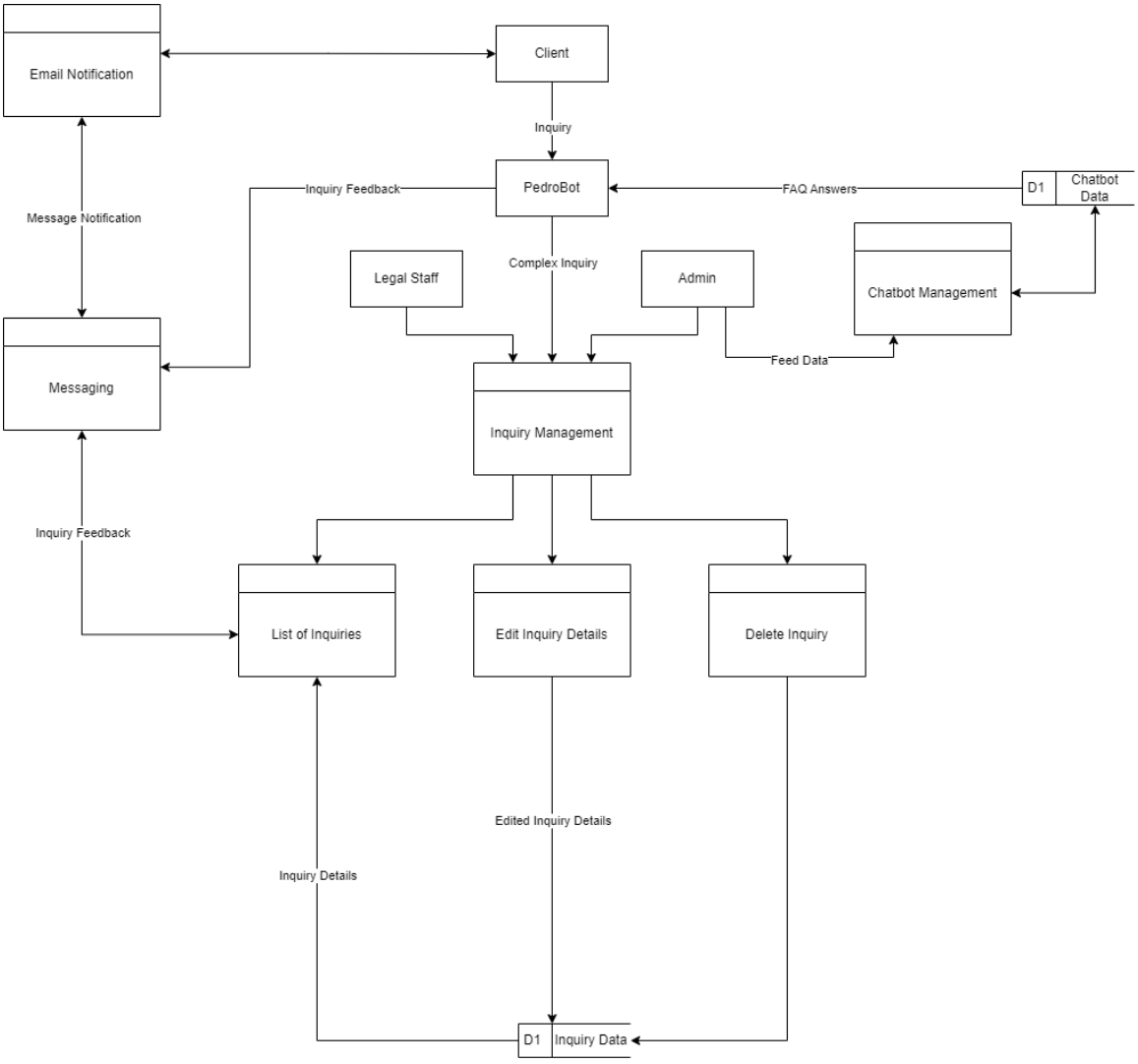


Figure 17. **Overview of Inquiry Management Data Flow**

Data Flow Diagram – Staff Management

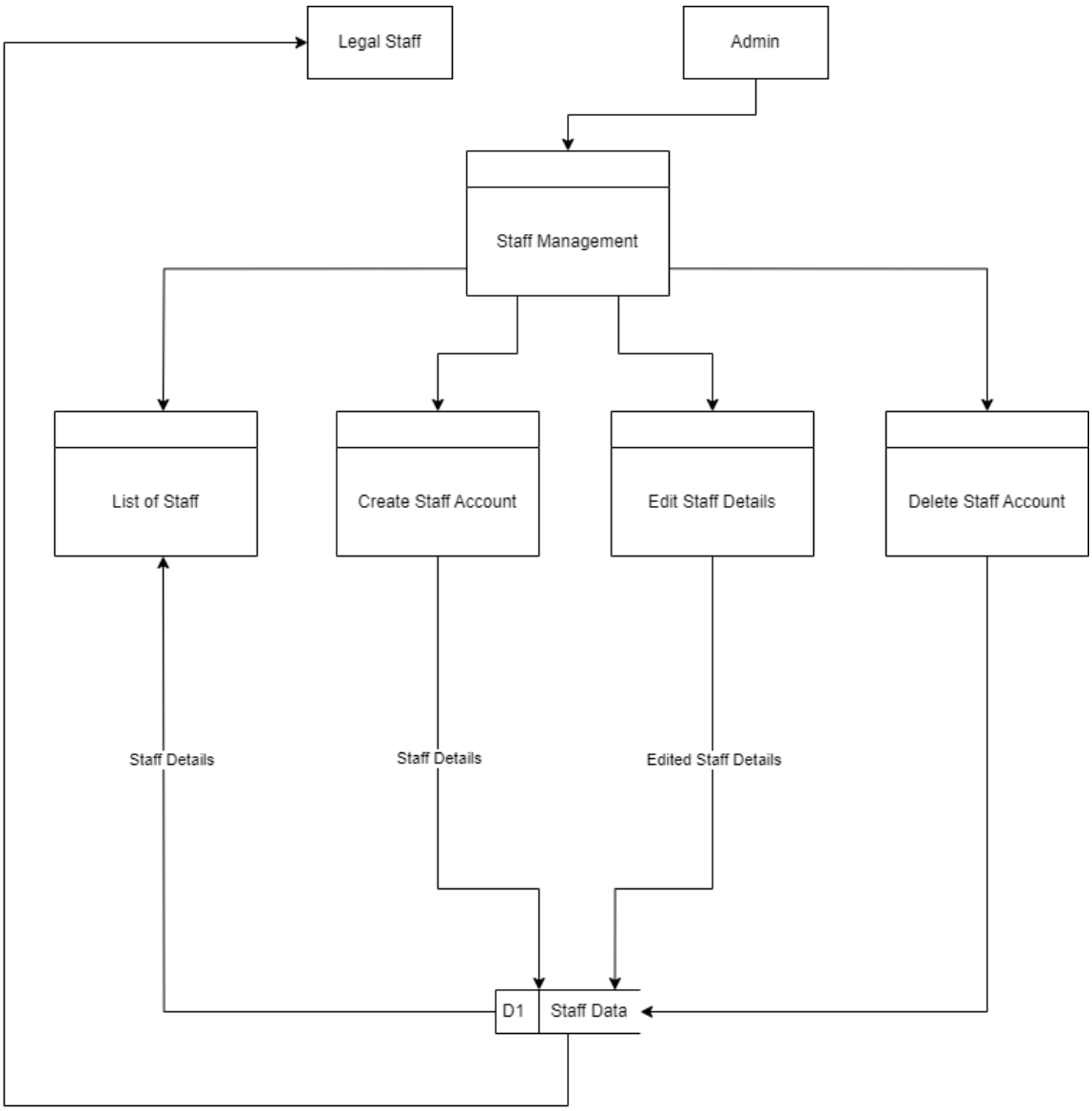


Figure 18. **Overview of Staff Management Data Flow**

Data Flow Diagram – Ordinance Management

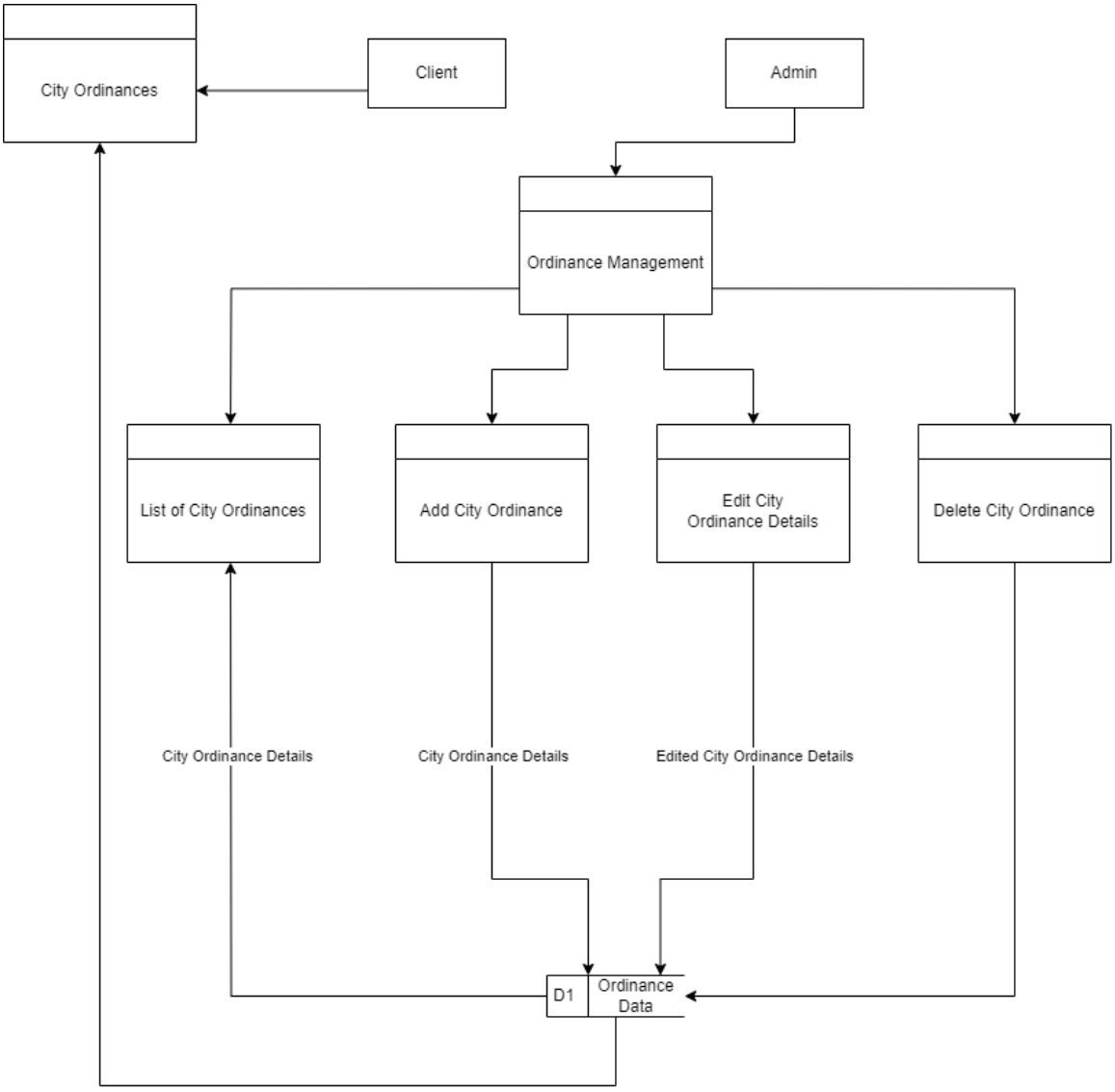


Figure 18. **Overview of Ordinance Management Data Flow**

Data Flow Diagram – Staff / Admin Login

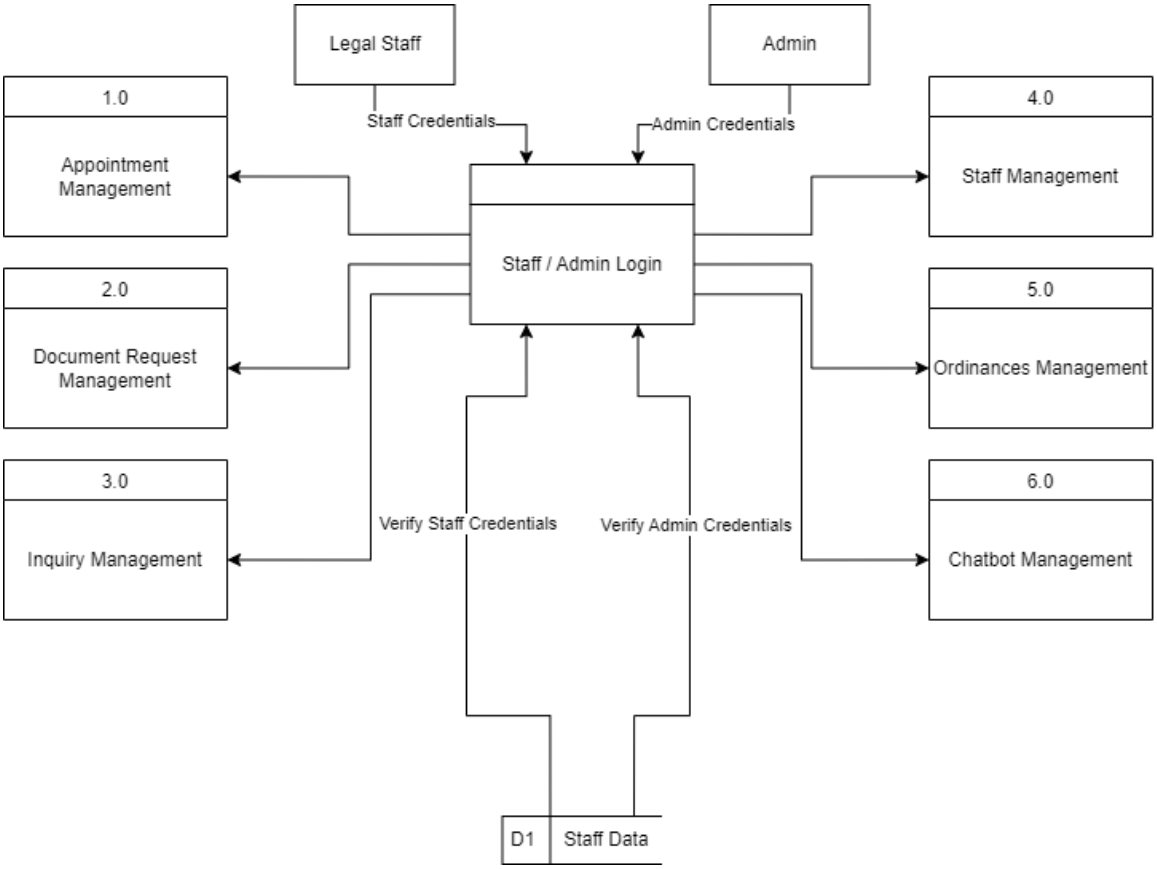


Figure 18. **Overview of Staff / Admin Login Management Data Flow**

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APPENDICES

Name (Optional): _____ Age: _____
Gender: _____

1. What are the common challenges encountered by the San Pedro City Legal Office in providing legal services? (Select all that apply)

   ____ High workload for legal staff
   ____ Inadequate technology infrastructure and tools
   ____ Lack of collaboration between the staff members
   ____ Limited budget allocation for legal services
   ____ Others: _____

2. **Please rate the efficiency and effectiveness of the web portal's impact on the workload management and business operations of the San Pedro City Legal Office.** Put a check mark (／) in the box next to the answer of your choice [1 - Very Negative Impact, 2 - Negative Impact, 3 - Neutral, 4 - Positive Impact, 5 - Very Positive Impact].

a. Efficiency	**5**	**4**	**3**	**2**	**1**
1. Improving overall effectiveness of managing legal documents and records					
2. Reduction in time spent on administrative tasks (e.g., record retrieval, filing)					
3. Faster communication and collaboration among legal staff through the web portal.					
4. Enhanced ability to track and monitor ongoing requests and tasks.					
b. Effectiveness					
1. Better coordination between different San Pedro City Legal Office staff.					
2. Increased accuracy and reliability of information and data.					
3. Enhanced ability to meet deadlines.					
4. Overall improvement in providing legal services to clients and stakeholders					

3. **Please rate your satisfaction with the San Pedro City Legal Office web portal in terms of the following Metrics.** Put a check mark (／) in the box next to the

answer of your choice
[5- Strongly Agree, 4-Agree, 3-Moderately Agree, 2-Disagree, 1-Strongly Disagree].

a. Functionality	**5**	**4**	**3**	**2**	**1**
1. Does what is appropriate					
2. Has available all the functions required for its execution					
3. Precise in executing its functions					
b. Usability					
1. It is easy to understand the web portal					
2. It is easy to perform its function					
3. It is easy to learn how to use the web portal					
c. Maintainability					
1. It is easy to modify and adapt					
2. There is no risk when changes are made					
3. Changes in the system are easy to test					
d. Efficiency					
1. It significantly contributes to streamlining operations and tasks					
2. It effectively reduces the time required to perform administrative tasks.					
3. It enhances the ability to track and manage ongoing tasks and processes					
e. Portability					
1. It performs consistently across different devices and platforms					
2. I can easily access and use the web portal on various devices (e.g., desktop, tablet, mobile).					
3. The web portal's features and functionalities remain intact when accessed from different devices.					
f. Reliability					
1. It consistently performs its functions without errors or glitches.					
2. It is available and accessible whenever I need to use it.					
3. It maintains data integrity and security, protecting sensitive legal information.					

4. **How satisfied are you with your overall experience using the web portal?**
[5- Very Satisfied, 4-Satisfied, 3-Neutral, 2-Dissatisfied, 1-Very Dissatisfied].

5	**4**	**3**	**2**	**1**