**A computer and earth globe with arrows

Description automatically generated with medium confidenceCairo University**

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**PetYard**

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*Graduation Project*

*Academic Year 2023-2024*

*Final Year Documentation*

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**List of abbreviations**

SW 🡪 Software

HW 🡪 Hardware

GUI 🡪 Graphical user interface

# **Chapter 1**

Introduction

## **1.1** Motivation**:**

In Egypt, the current pet care service industry lacks centralized platforms that effectively connect pet owners with reliable and convenient pet care service providers. Pet owners often struggle to find trustworthy and suitable service providers for their pets' needs, such as pet sitting, walking, grooming, and boarding. Conversely, pet care service providers face challenges in reaching potential clients, managing bookings efficiently, and establishing a reputable presence in the market.

As animal lovers, we understand the importance of ensuring the well-being and happiness of pets. Our motivation to solve this problem stems from the desire to create a solution that simplifies the process of finding and booking quality pet care services. By providing a centralized platform that connects pet owners with trusted service providers, we aim to alleviate the stress and uncertainty associated with pet care arrangements. Our goal is to facilitate seamless and enjoyable experiences for both pet owners and service providers, ensuring that pets receive the best care possible while supporting the growth and reputation of pet care professionals.

## 1.2 Problem Definition:

The pet care service industry in Egypt faces significant challenges due to the lack of a centralized platform that connects pet owners with reliable and convenient pet care service providers. This absence creates several issues:

1. **Difficulty in Finding Trustworthy Service Providers**: Pet owners often find it challenging to locate reliable and trustworthy providers for services such as pet sitting, walking, grooming, and boarding. This difficulty leads to anxiety and uncertainty regarding the quality of care their pets will receive.
2. **Challenges for Service Providers**: Pet care service providers struggle to reach potential clients, manage bookings, and establish a reputable presence in the market. Without a centralized platform, they face difficulties in marketing their services, handling client inquiries, and scheduling appointments efficiently.
3. **Absence of a Booking Service**: Currently, there is no dedicated booking service available for pet care in Egypt. Pet owners are required to contact multiple providers individually to inquire about services and availability, often leading to a Difficult process. This lack of booking system wastes time and effort for both pet owners and service providers.

Addressing these issues requires a comprehensive solution that bridges the gap between pet owners and service providers, offering a reliable, convenient, and secure platform for all parties involved.

## 1.3 Project Objective (Suggested Solution):

The objective of our project is to develop a comprehensive mobile application, PetYard, that addresses the challenges in the pet care service industry in Egypt. Our solution aims to create a centralized platform that connects pet owners with reliable and convenient pet care service providers, offering a range of services such as pet walking, sitting, grooming, and boarding.

*Key Objectives:*

1. **Centralized Platform**: Develop a user-friendly application that serves as a one-stop solution for pet care services, allowing pet owners to easily find and connect with trustworthy service providers.
2. **Reliable Booking System**: Implement an efficient booking system within the application that enables pet owners to book services directly through the platform. This will eliminate the need for contacting multiple providers individually and simplify the appointment scheduling process.
3. **Intuitive User Interface**: Utilize Flutter to create a seamless and visually appealing user interface, ensuring an intuitive experience for both pet owners and service providers.
4. **Robust Backend Infrastructure**: Using Node.js with Express.js to handle server-side logic and API endpoints effectively. This will ensure the application is scalable, reliable, and capable of handling high volumes of transactions.
5. **Secure Data Management**: Integrate PostgreSQL as the relational database management system to securely store user data, and booking information. User passwords will be stored as hash values to enhance security. This approach will ensure data integrity and confidentiality, protecting the privacy of all users.
6. **Enhanced Communication**: Facilitate clear and efficient communication between pet owners and service providers through the application, enabling features such as messaging, notifications, and service reviews.
7. **Market Reach and Reputation**: Assist pet care service providers in reaching a wider audience and establishing a reputable presence in the market by providing a platform to showcase their services and receive client feedback.

By achieving these objectives, PetYard aims to bridge the gap between pet owners and service providers, providing a reliable, convenient, and secure solution that enhances the overall pet care experience.

## 1.4 Gantt chart of project time plan

This Gantt chart shows the planned timeline for our graduation project, from brainstorming for ideas in September to Preparing for final Presentation in July.

A screenshot of a calendar

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Figure 1

## 1.5 Project development methodology

For the development of PetYard, we utilized the Waterfall model, a linear and sequential approach that ensures each phase of the project is completed before moving on to the next. This methodology provided a clear structure and systematic progression through the project lifecycle, which is crucial for meeting our project objectives.

The Waterfall model consists of the following phases:

1. **Requirement Analysis**: In this phase, we gathered and documented all the requirements for the project. This involved understanding the needs of pet owners and service providers, identifying the essential features and functionalities of the application, and defining the scope of the project.
2. **System Design**: Based on the requirements, we created the system design. This phase included designing the architecture of the application, the database schema, and the user interface. Detailed design documents were prepared to guide the development process.
3. **Implementation**: During this phase, we developed the application components according to the design specifications. We used Flutter for the frontend development to create an intuitive user interface, Node.js with Express.js for the backend infrastructure to handle server-side logic and API endpoints, and PostgreSQL for the database management to securely store user data.
4. **Integration and Testing**: After implementation, the different components of the application were integrated and thoroughly tested. We conducted various tests, including unit testing, integration testing, and system testing, to ensure that the application functions correctly and meets the specified requirements.

## 1.6 The used tools in the project (SW and HW):

**Software Tools:**

1. **Flutter**: For frontend development, enabling a seamless and visually appealing cross-platform application for both Android and iOS devices.
2. **Node.js with Express.js**: For backend development, providing a scalable environment for server-side logic and API endpoints, with Express.js supporting RESTful API development.
3. **PostgreSQL**: As the relational database management system, securely storing user data, service listings, and booking information, with hashed passwords for enhanced security.
4. **GitHub**: Used for version control to manage the source code and track changes throughout the development process.
5. **Visual Studio Code**: As the primary integrated development environment (IDE) for writing and debugging code.
6. **Postman**: Used for API testing to ensure the backend services functioned correctly.

**Hardware Tools:**

1. **Development Machines**: Our laptops and desktops for coding, testing, and debugging the application.
2. **Mobile Devices**: Android smartphones for testing the application. These devices ensured the application was tested on various screen sizes

## 1.7 Report Organization (summary of the rest of the report):

This report provides an overview of the PetYard project, covering motivations, methodologies, design, and implementation. It is structured as follows:

**Chapter 2: Related Work** Reviews similar projects, compares features, and identifies differences.

**Chapter 3: System Analysis**

* **3.1 Project Specification:**
  + **3.1.1 Functional Requirements.**
  + **3.1.2 Non-Functional Requirements.**
* **3.2 Use Case Diagrams:** Illustrates user-system interactions.

**Chapter 4: System Design**

* System Component Diagram
* System Class Diagrams
* Sequence Diagrams
* Project ERD
* System GUI Design

**Chapter 5: Implementation and Testing**

System running and samples of the applied test cases (System test cases)

# Chapter 2

Related Work

# **Related work:**

Similar work to our application includes platforms like Rover, Pet Backer, Trusted House Sitters, and Egy puppy, which aim to connect pet owners with reliable pet care services. These platforms offer features such as pet sitting, walking, and boarding, along with user reviews. However, our application distinguishes itself by focusing specifically on the Egyptian market, providing localized solutions tailored to the unique needs of pet owners and service providers in Egypt. We prioritize features such as stringent vetting processes for service providers, and real-time updates on pet activities to ensure a seamless and reliable experience for users.

Table 1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Pet Backer**  **(web site and app)** | **Rover**  **(web site)** | **Trusted house sitters**  **(website)** | **Egy puppy**  **(website)** | **Pet yard (App)** |
| Grooming |  | **X** | **X** |  |  |
| Sitting |  |  |  | **X** |  |
| Boarding |  |  |  | **X** |  |
| Pet Walking |  |  | **X** | **X** |  |
| Day care |  |  | **X** | **X** | **X** |
| Pet taxi |  | **X** | **X** | **X** | **X** |
| Drop-in visits |  |  | **X** | **X** | **X** |
| Health care | **X** | **X** | **X** |  |  |

# 

# Chapter 3

System Analysis

## 3.1 Project specification

### 3.1.1 Functional Requirements:

In the Functional Requirements segment, we wrote all the functional requirements of our system, inside each requirement there’s a description section to explain the requirement, and finally the acceptance criteria for each requirement.

Each requirement is explained from two sides; Pet owner side and Service provider side, to show how the system works from both perspectives.

**Requirement 1: User Authentication**

**Pet Owner side:**

* **Description:** Pet Owner makes a new account and fills in the necessary information which is username, email, password, and phone number, then fills at least one pet profile.
* **Priority:** High.
* **Acceptance Criteria:** Pet Owner can successfully register, log in, and access the services provided.

**Service Provider side:**

* **Description:** Service provider makes a new account and fills in the necessary information which is username, email, and password, then selects the service(s) they want to provide.
* **Priority:** High.
* **Acceptance Criteria:** Service Provider can successfully register, log in, and start providing their service.

**Requirement 2: making pet profile**

* **Description:** Upon logging in for the first time, pet owner must make one or more profiles for their pet(s) by filling in the necessary information which includes pet weight, age, breed, and gender.
* **Priority:** High.
* **Acceptance Criteria:** Pet owner filled in the information, and pet profile is successfully made.

**Requirement 3: Service browsing and Selection**

* **Description:** Pet owners can choose the service they want and filter the carers by name, clinic/individual, ratings, and location.
* **Priority:** High.
* **Acceptance criteria:** Pet owners can successfully browse and select the service they desire.

**Requirement 4: pet grooming service**

**Pet Owner side:**

* **Description:** Pet owner selected a specific clinic/individual and specifies the type of grooming they want and can now book the available time slots for a set price.
* **Priority:** High.
* **Acceptance criteria:** Pet owner can choose grooming options, such as bath, haircut, nail trimming, or the full package and schedule appointments accordingly.

**Service Provider side:**

* **Description:** Service providers can specify the type of grooming they’ll provide, write their prices for each service, and put the available time slots that they will work in.
* **Priority:** High.
* **Acceptance criteria:** Service providers can successfully add time slots to their work schedule.

**Requirement 5: Pet Sitting Service**

**Pet Owner side:**

* **Description:** Pet owner can submit pet sitting service requests, including their location, start and end times, and await responses from Service providers.
* **Priority:** High.
* **Acceptance criteria:** 
  + Pet owner can enter details such as location, start time, and end time for the pet sitting request.
  + The request is made available for Service providers to engage with.

**Service Provider side:**

* **Description:** Service providers can view pet owner requests and choose to connect with the pet owner to offer their services.
* **Priority:** High.
* **Acceptance criteria:** 
  + Service providers can see the requests made by users.
  + Service providers can show their interest in offering this service to the users.

**Requirement 6: Pet Walking Service**

**Pet owner side:**

* **Description:** Pet owner can request pet walking services by specifying their starting location, preferred start and end times, and providing a preferred route for the Service provider to take.
* **Priority:** High.
* **Acceptance criteria:**
  + Pet owner can input their starting location for the pet walk.
  + Pet owner specifies the preferred start and end times for the pet walking service.
  + Pet owners can provide a preferred route.
  + Service providers can engage with the request.

**Service provider side:**

* **Description:** Service provider can connect with a pet owner through a request.
* **Priority:** High.
* **Acceptance criteria:**
  + Service providers receive detailed information about the requested pet walking service, including location, timing, and preferred route.
  + Service providers can view pet walking service requests.
  + Service providers can show their interest in offering this service to the pet owners.

**Requirement 7: Boarding Service Booking**

**Pet owner side:**

* **Description:** Pet owner can select a Service provider for boarding services, view the available time slots offered by the selected carer, and book the chosen provider for a specified start and end date.
* **Priority:** High.
* **Acceptance criteria:** 
  + Upon selecting a service provider, the system displays the available time slots for boarding services offered by the chosen provider.
  + Pet owner can select the start and end date for the boarding service from the available time slots.
  + The system confirms the booking, notifying both the pet owner and the selected Service provider.

**Service provider side:**

* **Description:** Service providers can view and choose to accept the incoming requests they are getting.
* **Priority:** High.
* **Acceptance criteria:** 
  + Service providers can view and accept the requests made by pet owners.
  + The system confirms the booking, notifying both the pet owner and the selected Service provider.

**Requirement 8: Reservation management**

**Pet owner side:**

* **Description:** The system should provide robust reservation management capabilities to enable pet owners and Service providers to view, modify, and cancel reservations.
* **Priority:** High.
* **Acceptance criteria:** 
  + Pet owner can view a list of their upcoming and past reservations.
  + Pet owner can modify reservation details such as dates, times, or services before with modification policies communicated.
  + Pet owner can cancel reservations, with appropriate notifications and cancellation policies communicated.

**Service provider side:**

* **Description:** The system should provide robust reservation management capabilities to enable pet owners and service providers to view, modify, and cancel reservations.
* **Priority:** High.
* **Acceptance criteria:** 
  + Pet care providers can access a dashboard displaying upcoming reservations.
  + Service providers can cancel reservation, with appropriate notifications and cancellation policies communicated.
  + Service providers receive notifications of reservation modifications or cancellations.

**Requirement 10: Health Care Appointment Booking**

**Pet owner side:**

* **Description:** The system should allow pet owners to book appointments with clinics for health check-ups and vaccinations based on available time slots.
* **Priority:** High.
* **Acceptance criteria:**
  + Pet owner can select a clinic and view the available time slots for appointments.
  + Pet owner can choose a preferred time slot and book an appointment for health check-up or vaccination.

**Service provider side:**

* **Description:** Clinics should have the capability to set their working time slots for the pet owners to reserve.
* **Priority:** High.
* **Acceptance criteria:** Clinics can successfully set their working time slots and these time slots should be reservable by the pet owners.

**Requirement 11: User Reviews and Ratings**

* **Description:** Pet owners can leave reviews and ratings for the following services provided by the application in requirements: 4 (Grooming), 5 (Pet sitting), 6 (Pet walking), 7 (Boarding), 10 (health care).
* **Acceptance criteria:** Pet owners can submit reviews, and the average rating is displayed for each service provider.

### 3.1.2 Non-Functional Requirements:

**Requirement 1: Performance**

**1.1 Response time:**

Application should have an average response time of no more than 2 seconds for user interactions.

**1.2 Throughput:**

Application should support 100 to 1000 requests per second.

**1.3 Scalability:**

Application should be able to handle a minimum of 1000 concurrent users without noticeable drop in performance.

**1.4 Reliability:**

Recovery time should be 15 to 30 minutes for common failures.

**Requirement 2: Usability**

**2.1 User interface:**

The mobile app is designed to be easy to use, providing a great experience for users. With a focus on intuitive design and smooth navigation, interacting with the app feels effortless, every detail is carefully crafted to ensure users enjoy using the app every time.

**Requirement 3: Security**

**3.1 Authentication:**

User authentication must be secure and support multi-factor authentication by using phone number or email for user accounts to ensure safety.

**3.2 Authorization:**

Access to different services and features must be controlled based on user roles to ensure that each user has access to the allowed services only.

**Requirement 4: Maintainability**

**4.1 Modularity:**

Modularity should be taken into consideration when building the system architecture, for ease in updates and additions to the code.

**4.2 Documentation:**

Comprehensive documentation is needed to ensure ease of future development.

## 3.2. Use case Diagrams

Pet owner use case:

A diagram of a diagram

Description automatically generatedfigure 2

A diagram of a company

Description automatically generatedService provider use case

figure 3

# Chapter 4

System Design

# 1-System Component Diagram

# 2-System Class Diagram

# 3-Sequence Diagram

# 4-Project ERD

# 5- System GUI Design