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PawStay- Smart Pet Homestay and Caretaker Management System

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Abstract: ***PawStay–Smart Pet Homestay and Caretaker Management System is a web-based application developed using ASP.NET C#on the .NET Framework 4.5 to provide a secure and efficient platform for managing pet care services. The system follows a three- role architecture consisting of Admin, Caretaker, and User (Pet Owner), ensuring organized workflow management and controlled access. A secure registration and authentication mechanism is implemented, where users and caretakers must undergo administrative approval. To enhance security, an OTP-basedverification system using SMTP email services is integrated, ensuring that only verified users can access the platform and perform sensitive operations.***
Once authenticated, users can manage profiles, add pet details, search for caretakers, and request bookingsbased on flexible time durations such as daily, weekly, or monthly. Caretakers can accept or reject requests, after which users can proceed with payment through adummy paymentgateway.Thesystemalsosupportsreal- time booking tracking and status updates.
Additional features include date-wise task updates by caretakers, direct chat communication, and a rating system.TheAdminmoduleenablesmonitoring,approval control, and report generation, making the system reliable, transparent, and user-friendly.
Keywords: ASP.NET, C#, .NET Framework 4.5, Web Application, Pet Care Management System, Pet Homestay, Caretaker Services, OTP Authentication, SMTP Email Verification, Role-Based Access Control, Online Booking System, Payment Integration, Real-Time Tracking, Chat System, Admin Dashboard.

I. INTRODUCTION

With the rapid growth of digital technology and increasing pet ownership, the demand for reliable and structured pet care services has significantly increased. Pet owners often face challenges in finding trustworthy caretakers for short- term or long-term care during travel, work commitments, or emergencies. Traditional methods of booking pet caretakers lack transparency, proper monitoring, secure payment systems,andstructuredcommunication.Toaddressthese challenges, PawStay – Smart Pet Homestay and Caretaker Management System is developed as a comprehensive web- based solution[1].

PawStay is implemented using ASP.NET C# on the .NET Framework 4.5, providing a secure, scalable, and role-based platform for managing pet homestay services. The system is designed with three primary roles: Admin, Caretaker, and User (Pet Owner). Each role has specific functionalities to ensure smooth workflow and accountability. The Admin manages approvals, monitors system activities, andgenerates reports. Caretakers manage services, respond to booking requests, update booking statuses, and view ratings. Users can register, manage pet details, search for caretakers, send booking requests, make payments, and provide feedback[2].

To ensure enhanced security and prevent unauthorized access, the system integrates OTP (One-Time Password) verification through SMTP-based email services. During registration and authentication processes, an OTP is sent to the user's registered email address, and access is granted only after successful verification. Additionally, account activation requires administrative approval, adding an extra layer of security and validation[3].

The booking module is a core component of the system. Users can book caretakers for specific dates and time periods, weekly durations, or monthly plans by selecting a start date. Caretakers have the authority to approve or reject booking requests. Once approved, users proceed with payment through a dummy payment gateway integrated into the system. After payment confirmation, caretakers can update booking progress date-wise, marking tasks as completed or canceled along with remarks. The system also enables direct chat communication between users and approved caretakers to facilitate coordination[4].

Additional features include a database-driven chatbot containing predefined process-related questions andanswers, a static diet plan module for pets such as birds,cats, and dogs, and a rating and review system to maintain service quality and transparency[5].

Overall, PawStay aims to digitize and simplify the pet homestay and caretaker management process by providing a secure, transparent, and user-friendly platform. The system enhances trust between pet owners and caretakers while ensuring efficient booking management, communication,and service monitoring[6].

II. LITERATUREANALYSIS

Current research efforts in synthetic voice identification concentrate on strengthening detection reliability byadopting a wide range of analytical strategies. In 2024, Muhammad Usama Tanveer Gujjar and colleagues introduced a detection framework that integrates cepstral- based speech descriptors with probabilistic feature transformation and ensemble-based decision mechanisms, resulting in improved classification performance. Theirstudy also pointed toward future enhancements aimed at increasing system scalability and resistance to newly evolving artificial voice generation methods.

In a related study, L. A. Passos et al. (2024) explored the effectiveness of neural network–driven solutions, including convolutional and recurrent architectures, supported by mixedsupervisedlearningparadigms.Theirfindings stressed the importance of adaptable models and richer datasets to counter rapidly changing forms of manipulated multimedia content.

Further extending this line of research, Ganavi M. et al. (2025) presented a learning-based approach that combines harmonic pitch descriptors, cepstral features, and spectral- domain analysis to distinguish between authentic and fabricated speech signals. Future directions suggested by their work include deployment in real-time environmentsand deeper neural integration. Additionally, F. G. et al. (2024) investigated convolutional models trained on mel- scaled spectral representations across multiple datasets, emphasizing ongoing model optimization and proposing the incorporationofdistributedledgertechnologyandvoicetrait examination to strengthen verification mechanisms.

III. LITERATURE WORK

In the Proceedings of the 3rd International Conference on Financial Technology and Business Analysis, Ji Wang (2024) presented the study titled *"Smart Paws: AI-Powered Pet Wearables"*, which explores the integration of artificial intelligence in pet healthcare through a smart collar system. The research focused on developing and validating an AI- enabled wearable device capable of monitoring pet health, tracking daily activities, providing nutritional guidance, and ensuring safety through GPS and geo-fencing features.Using both quantitative and qualitative methods over a six- month observation period, the study demonstrated that continuous health monitoring significantly improved early detection of health issues and increased owner satisfaction. The findings also highlighted reduced anxiety among pet owners due to real-time safety tracking and improved interaction between pets and owners. However, the study acknowledged limitations such as reliance on self-reported feedback and the need for broader sample populations. This work contributes to the growing field of smart pet technologies by emphasizing AI-driven preventivehealthcare and safety management. While Smart Paws primarily focuses on wearable-based health monitoring, it provides foundational insights for platforms like PawStay, where integrating AI-driven monitoring, safety assurance, and intelligent service management could further enhancepet careecosystems**[1]**. Aqraldo et al.proposed the "Detepet Mobile Application for Pet Tracking," a GPS-based mobile solution designed to address the increasing number of missing pet cases. The system integrates a GPS-enabled necklace attached to pets, allowing owners to monitor their pets' real-time location through a connected mobile application. In addition to location tracking, the application incorporates health-related features such as heart rate monitoring, breathing rate detection, and step counting, thereby enhancing pet safety and well-being. The study also highlightstheroleofcommunitysupport,referencing networks such as the Jakarta Aid Animal Network, where users can share information about lost pets, adoption, and pet-related activities. The findings conclude that Detepet provides an effective technological solution to reduce pet loss anxiety and improve monitoring capabilities. This research contributes to the domain of smart pet management systems and supports the integration of GPS tracking and health monitoring features in modern pet care platforms like PawStay[2].

Varsha RL and Vidyanand S. Desai proposed an integrated smart pet care system aimed at addressing the limitations of fragmented urban pet care solutions. The study introduced a unified system combining a smart bed, automated feeder,and water dispenser, all controlled through a mobile application named "Aumora." Using ethnographic research, surveys, and secondary data analysis, the authors identified the need for a cohesive platform that supports feeding management, behavioral tracking, and emotional bonding, especially when owners are away. The prototype incorporated health-monitoringsensors, real-time behavioral alerts, and a user-friendly interface with multi-profilesupport and smart recommendations. Initial user testing demonstrated improved usability, enhanced pet wellbeing, andstrongeremotionalconnectionbetweenpetsandowners. The study concludes that integrating physical smart devices with intelligent software can significantly improve modern pet caregiving practices.

This research supports the development of comprehensive pet management platforms like PawStay by emphasizing integrated monitoring, automation, and emotionally intelligent care solutions[3].

Alapure et al. proposed an IoT-based smart monitoring systemdesignedtoimproveenvironmentalconditionswithin domestic animal shelters. The study emphasizes that factors such as temperature, humidity, air quality, and noise levels directly impact animal health and stress levels. The system integratessensorsincludingDHT22andMQ-135withan

ESP32 microcontroller to collect real-time environmental data, which is transmitted to a cloud-based platform (Firebase) for monitoring and visualization via web or mobile interfaces. The solution enables automated alerts when environmental parameters exceed predefined thresholds, allowing shelter administrators to take timely corrective actions. The proposed model is scalable, cost- effective, and supports data logging for long-term analysis and decision-making. The research demonstrateshow IoT-driven automation enhances operational efficiency, reduces manual errors, and promotes animal welfare. This study provides strong technical support for integrating real-time monitoringandsmartalertmechanismsintopetmanagement platforms like PawStay to ensure improved safety and care standards[4].

IV. WORKING METHODOLOGY

The PawStay – Smart Pet Homestay and Caretaker Management System follows a structured and role-based working methodology to ensure secure authentication, efficient booking management, transparent communication, and controlled administrative monitoring. The system is developedusingASP.NETWebFormswithC#onthe.NET Framework 4.5 and follows a three-tier architecture consisting of Presentation Layer, Business Logic Layer, and Database Layer.

A. System Architecture

Thesystemoperatesusingthefollowinglayers:

Presentation Layer – Developed using ASP.NET for designing user interfaces such as login, registration, dashboard, booking, payment, and chat pages.

Business Logic Layer – Implemented in C# to handle validations, OTP generation, booking calculations (daily, weekly, monthly),approval workflows, payment simulation, and rating logic.

Database Layer – SQL Server database used to store user details,caretakerdetails,petinformation,services,bookings, payments, chatbot questions and answers, ratings, and diet plans.

B. UserRegistrationandAuthenticationProcess

User/CaretakerRegistration

Newusersandcaretakersregisterbyprovidingpersonal details.

SystemgeneratesaOne-TimePassword(OTP).

OTPissenttotheregisteredemailusingSMTP configuration.

UserverifiesOTPforemailauthentication.

Accountstatusremains“Pending”untilAdminapproval. Admin Approval

Admin logs into the system. Reviews registration details. Approvesorrejectstheaccount.

Onlyapprovedusersandcaretakerscanlogin. Login Process

After approval, users can log in with credentials. Sessionmanagementisimplementedforsecureaccess.

Role-basedredirectionsendsuserstotheirrespectivedashboards.

C. UserWorkflow

Aftersuccessfullogin,theuserfollowsthisprocess: Profile Management

Editprofiledetails. Change password. Pet Management

Addpetdetails(name,type,breed,age). Edit or update pet information.

CaretakerSearch

Searchcaretakersbasedonservices. View caretaker profile and ratings. Booking Request

Selectbookingtype:

Specific dates with time period Weekly booking (selectstartdate) Monthlybooking(selectstartdate)

Systemcalculatestotalcostbasedonservicerateand duration.

Bookingrequestissenttotherespectivecaretaker. Booking Approval/Rejection

Ifrejected→processends.
Ifapproved→userproceedstopayment. Payment Module
Dummypaymentgatewaysimulation. Payment status stored in database.
Aftersuccessfulpayment,bookingbecomesactive. Booking Tracking
Usercanviewindividualbookeddates.
Canseecaretakerupdates(Completed/Cancelledwith notes).
ChatSystem
Usercanchatwithapprovedcaretaker. Messages stored in database.
ChatbotModule
Predefined6questionsandanswersstoredindatabase. System fetches answer based on user selection.
RatingandReview
After completion, user rates caretaker. Ratingstoredandvisibleincaretakerprofile. User can view rating history.
StaticDietPlanModule
Displayspredefineddietplansforbirds,cats,anddogs.

D. Caretaker Workflow

Login(AfterAdminApproval)
Profile Management – Edit details and change password. ServiceManagement–Addservices,updateservicecharges. Booking Management
View booking requests. Approveorrejectrequests.
Viewpaymentstatus.
Updatedate-wisebookingprogress.
MarkasCompletedorCancelledwithnotes.
RatingView–Viewratingsandfeedbackgivenbyusers.

E. AdminWorkflow

Secureloginaccess.
Approve or reject user registrations. Approveorrejectcaretaker registrations. Monitor booking records.
Viewpayment reports.
Generatesystemreportsforoverallmonitoring.

F. Security Mechanisms

OTP-based email verification using SMTP. Role-based authentication and authorization. Session management for secure login.
Admin-controlledaccountactivation.
Inputvalidationtopreventunauthorizeddataentry.

Figure1.SystemDiagram

Fig2.Flow Diagram

V. RESULTS AND DISCUSSION

The PawStay – Smart Pet Homestay and Caretaker Management Syste**m** was successfully developed and implementedusingASP.NETWebFormswithC#onthe.NET Framework 4.5. The system wastested under different user roles (Admin, Caretaker, and User) to evaluate its functionality, security, performance, and usability. The results demonstrate that the application effectively manages pet homestay bookings, caretaker approvals, payment processing (dummy), and communication workflows in a structured and secure manner.

A. Functional Results

1) Registration and OTPVerification

The SMTP-based OTP verification system successfully validates user and caretaker email addresses during registration. Only verified and admin-approved accounts are allowed to log in, which significantly reduces unauthorized access. The two-step verification (OTP + Admin Approval) enhances system security and reliability.

2) Role-BasedAccessControl

Each role (Admin, Caretaker, User) is redirected to a dedicateddashboardafterlogin.Unauthorizedpageaccessis restricted using session management and role validation. Testing confirmed that users cannot access caretaker or admin functionalities and vice versa.

3) BookingManagementSystem

Thebookingmoduleperformsaccuratecalculationsfor:

- Specificdateandtimeperiodbookings
- Weeklybookings(basedonstartdate)
- Monthlybookings(basedonstartdate)

The system correctly sends booking requests to caretakers. Caretakers can approve or reject requests, and the workflow behaves as expected:

- Rejectedrequeststerminatetheprocess.
- Approvedrequestsallowpaymentprocessing.

Date-wise booking tracking allows caretakers to update status(Completed/Cancelled)withnotes, whichareinstantly visible to users.

4) PaymentModule

The dummy payment gateway simulation records payment details and updates booking status only after successful payment confirmation. The system prevents further booking progress without payment approval, ensuring controlled workflow execution.

5) ChatandChatbotModule

The one-to-one chat system between booked users and caretakers functions correctly, storing messages in the database.

The database-driven chatbot successfully retrieves answersto predefined questions related to system processes, improving user guidance and reducing dependency on manual support.

6) RatingandReviewSystem

Users can rate caretakers after service completion. Ratings are stored and calculated correctly, and caretaker profiles reflect updated average ratings. Users can also view their rating history, enhancing transparency.

7) StaticDietPlanModule

Thedietplan sectioncorrectlydisplayspredefineddietplans for birds, cats, and dogs. This feature adds informational value to the platform.

B. PerformanceAnalysis

- Thesystemperformsefficientlyundernormal usage conditions.
- Databasequeriesareoptimizedusingrelational mapping and primary/foreign keys.
- Session-basedauthenticationensuresstableuser sessions without conflict.
- Thethree-tierarchitectureimprovesmaintainability and scalability.

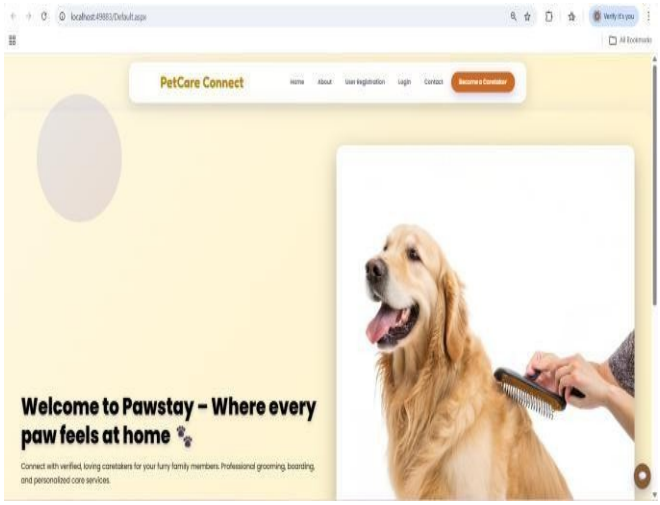
C. SecurityEvaluation

Thefollowingsecuritymechanismswerevalidated:

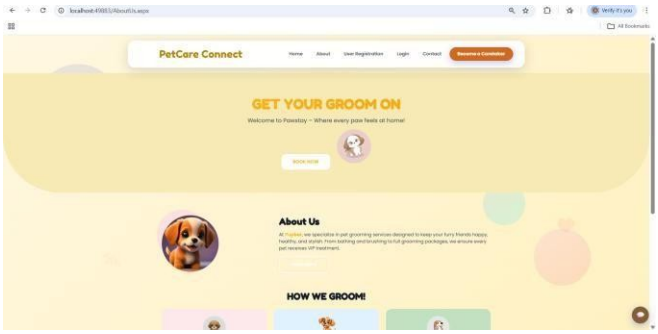
- OTP-basedemailauthenticationviaSMTP
- Admin-controlledaccountactivation
- Role-basedauthorization
- Sessionmanagement
- Server-sideinputvalidation

These measures collectively reduce risks such as unauthorized login, fake account creation, and improper access to restricted modules.

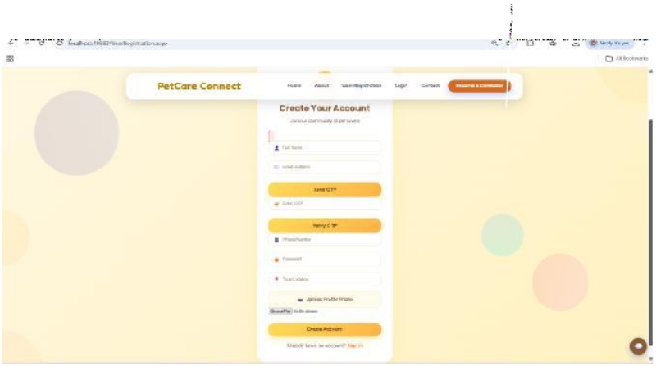
- HomePage



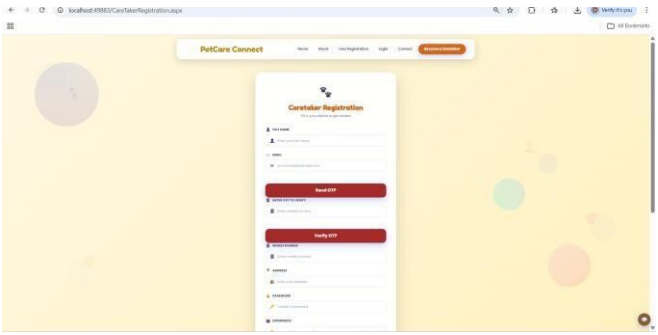
- Aboutus



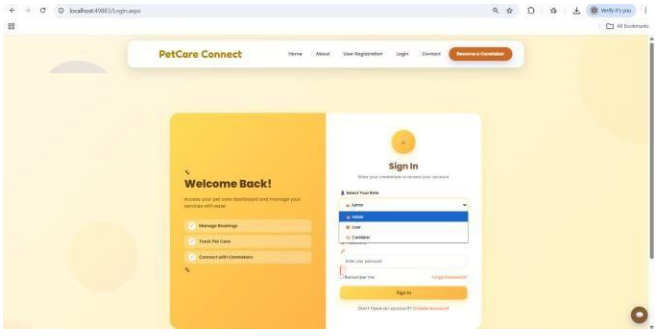
- SignupPage



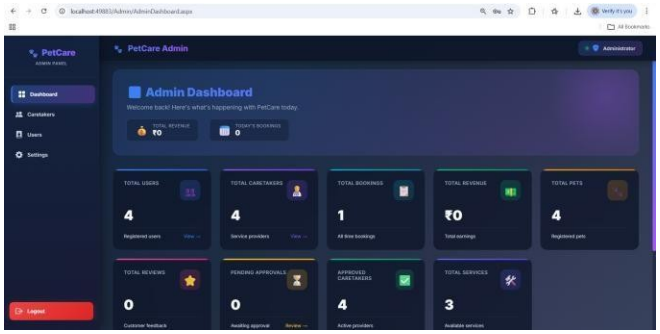
- CareTakerRegistration



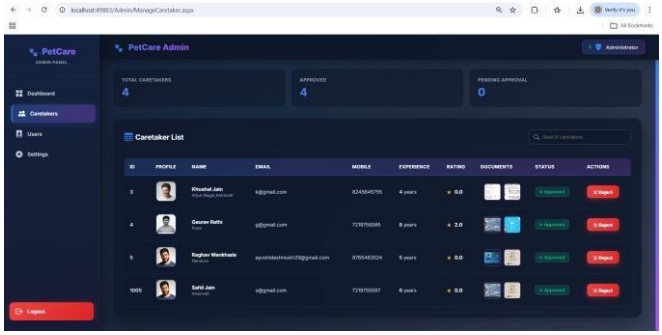
- LoginPage



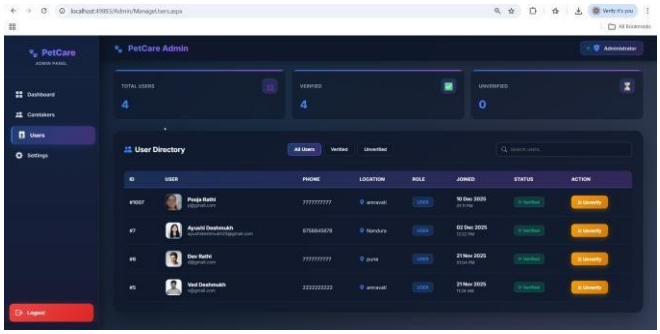
- AdminDashboard



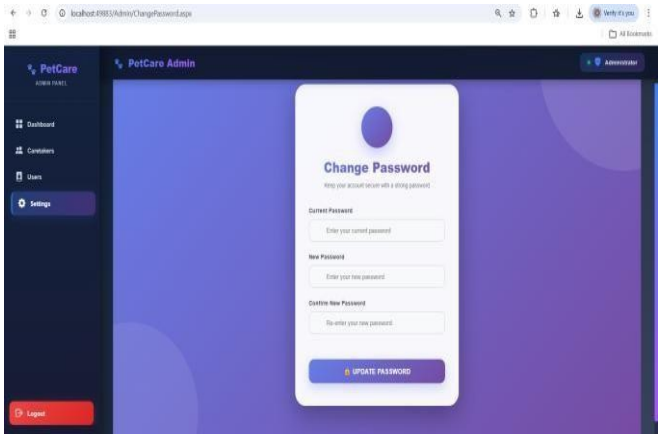
- ManageCaretaker



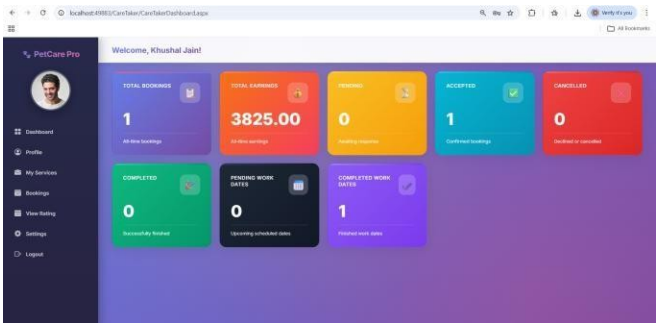
- ManageUser



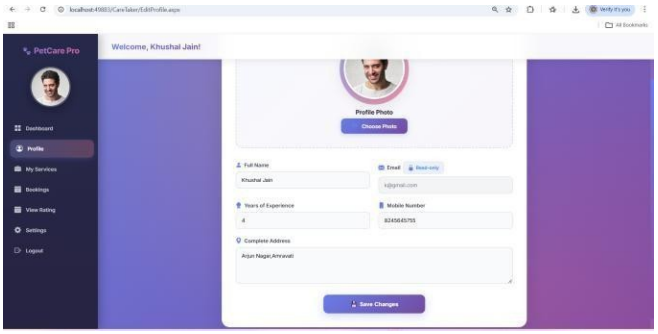
- Change Passowrd



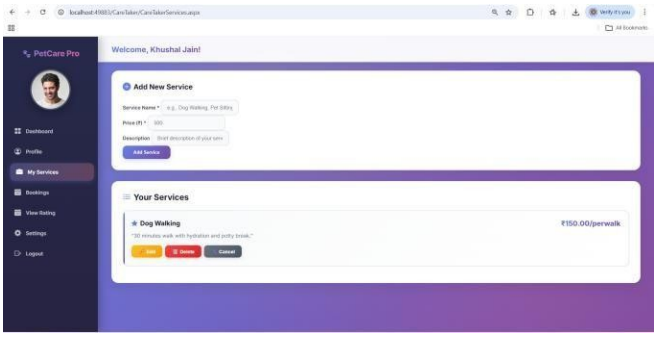
- CaretakerDashboard



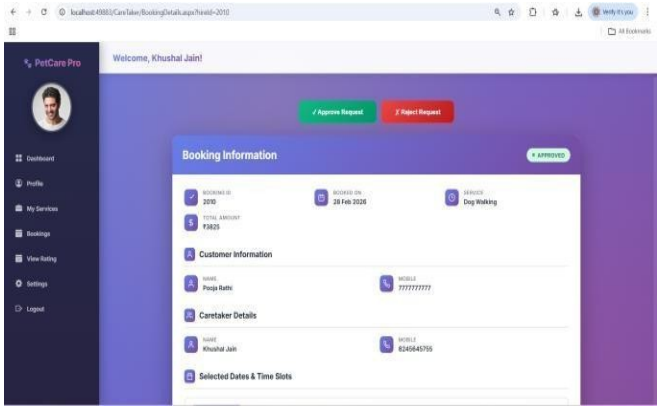
- CaretakerEditProfile



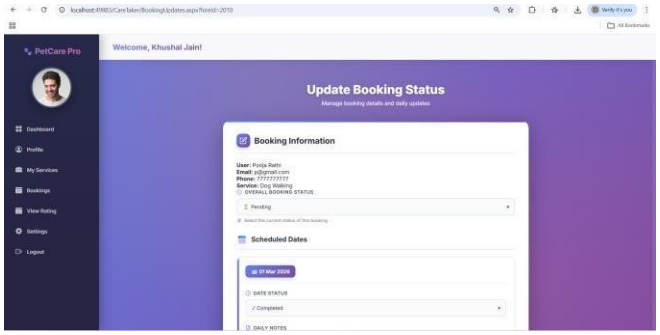
- Caretakeraddservice/editservicedata



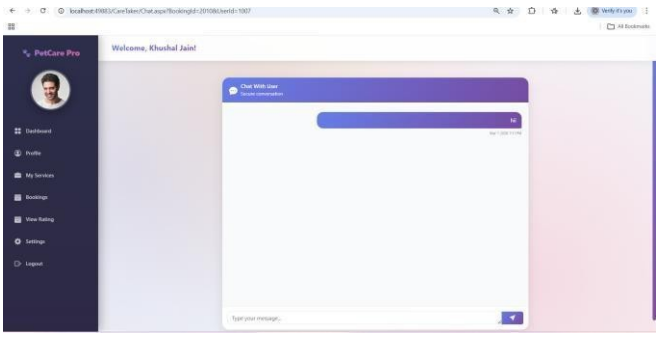
- CaretakerViewBookingdetails/approve/rejectrequest



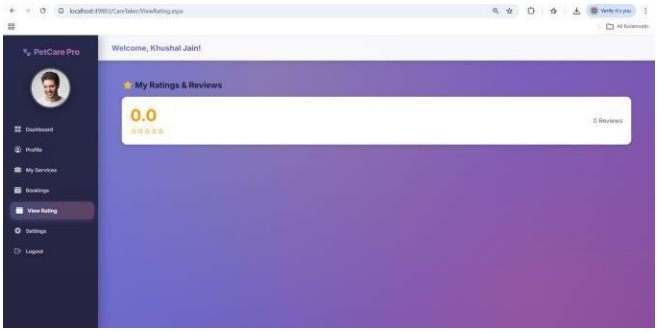
- Caretakerupdatebookingdetails



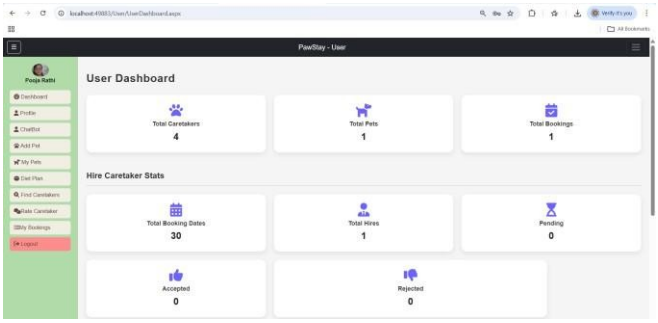
- Chatwithuser



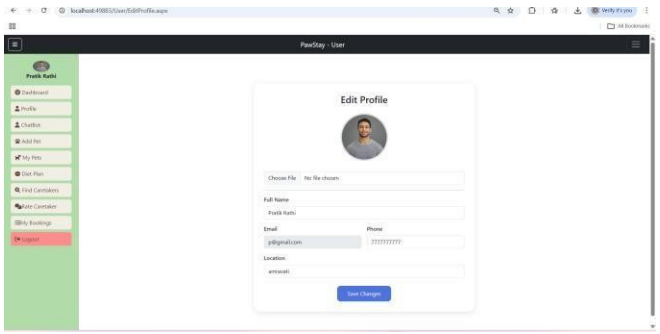
- Caretakerviewrating



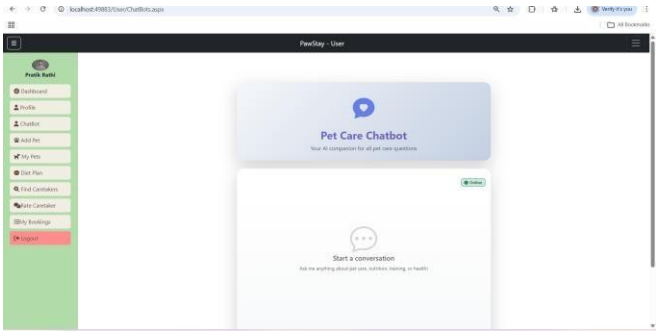
- UserDashboard



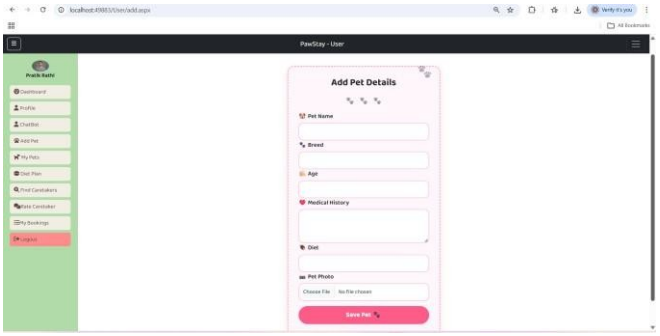
- UserEditProfile



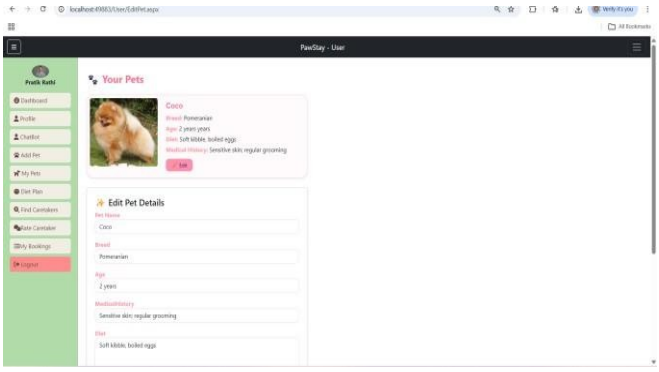
- UserChatBot



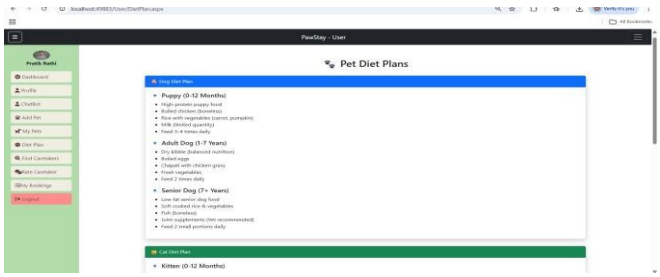
- UserAddPet



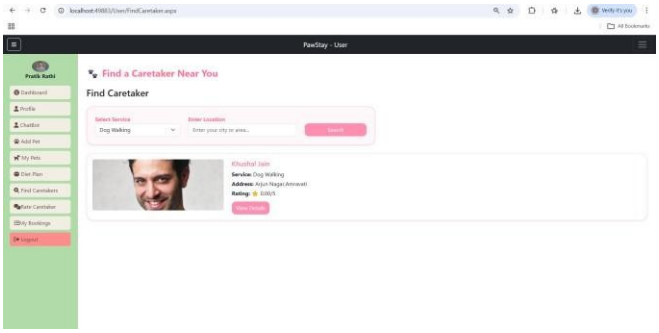
- Editpetdetails



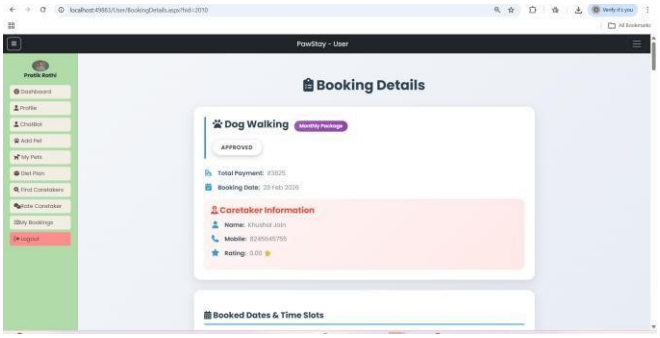
- StaticDietPlan



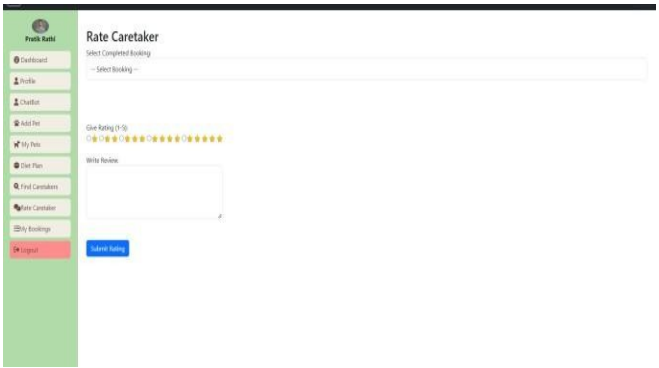
- BrowseCaretaker



- BookingDetails



- Rate Caretaker



VI. CONCLUSION

ThePawStaySmartPetHomestayandCaretakerManagementSystemhasbeensuccessfullydesignedandimplementedusingASP.NETWeb FormswithC#onthe.NET Framework 4.5 to provide a secure, reliable, and structured platform for managing pet care and homestay services. The system effectively digitizes the traditional process of finding and managing pet caretakers by introducing a centralized, role-based web application.

The application integrates three primary roles—Admin, Caretaker, and User—each with clearly defined functionalities to ensure systematic workflow management. The implementation of OTP-based email verification using SMTP, combined with admin approval, strengthens authentication and enhances overall system security. Role- based access control and session management further ensure that users can access only authorized features.

The booking module successfully supports flexible booking options, including specific date-based, weekly, and monthly reservations. The caretaker approval mechanism ensures accountability,whilethedummypaymentgatewaysimulates secure transaction processing before confirming bookings. Date-wisestatusupdates,chat functionality, chatbotsupport, and a rating and review system enhance transparency, communication, and service quality.

The system demonstrates improved efficiency, better record management, secure data handling, and enhanced trust between pet owners and caretakers compared to manual processes. By integrating authentication, booking automation,communicationtools, andfeedbackmechanisms within a single platform, PawStay achieves its objective of providing a comprehensive smart pet care management solution.

In conclusion, PawStay serves as a scalable and secure foundation for modern pet homestay services. With future enhancements such as real-time payment integration, mobile application support, and AI-based chatbot functionality, the system can be further expanded to meet growing market demands and technological advancements.

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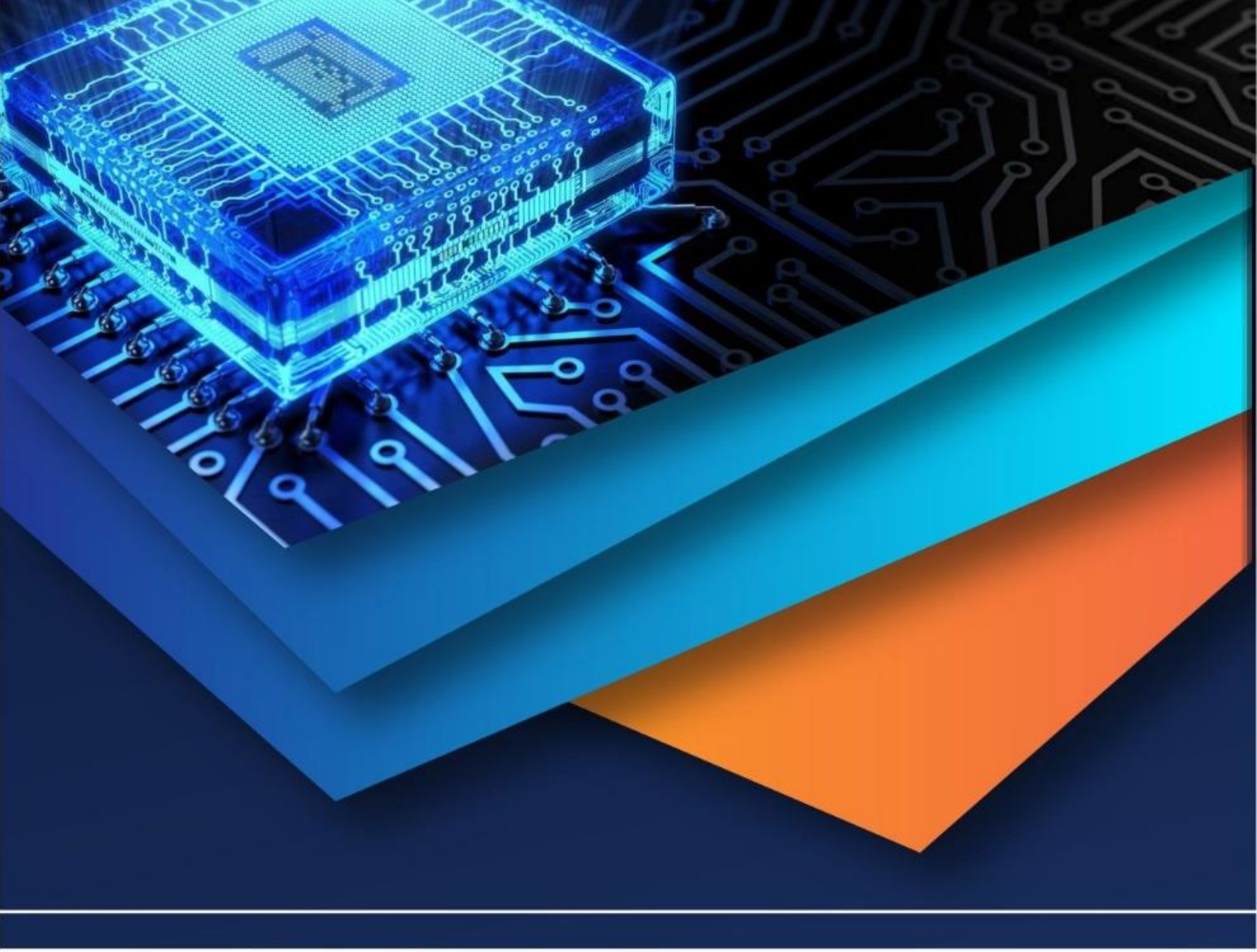

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