ISSN: 2249-7196
IJMRR/April. 2025/ Volume 15/Issue 2s/275-283
Rudraraju Lakshmi Aishwarya/ International Journal of Management Research & Review

Turtle Back Zoo Management Application

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Abstract ***This Django-based web application serves as a comprehensive management system for a zoo, allowing administrators to efficiently handle assets, such as animals, attractions, buildings, employees, and wages. The system provides a variety of functionalities, including adding, viewing, and deleting zoo-related entities, as well as managing user authentication for admin access. Users can add details for animals, attractions, buildings, and employees, and these entries are stored in a MySQL database. The application also includes a dynamic system for viewing and deleting records based on real-time data from the database. The backend is powered by Python and Django, using MySQL to store data. The application allows the admin to authenticate through a login screen and provides an intuitive interface for managing zoo resources. The interface is built using HTML and Django templates, ensuring a user-friendly experience. The system also includes validation checks to prevent duplicate entries for animals, attractions, and employees, while supporting a flexible method to manage wages for zoo staff. In addition to animal and attraction management, the application supports employee management with functionality to add, view, delete, and track employee information, as well as associate employees with specific job roles. Wages for employees can be added through a dropdown selection of employee names. This management system enhances operational efficiency for zoo administrators, providing a clear overview and control over the zoo's resources.***

I. INTRODUCTION

Zoo management systems have evolved significantly over the years, becoming more complex and integrated with modern technologies. The increasing need to effectively manage zoo assets such as animals, attractions, buildings, employees, and other facilities has made the development of software systems essential for streamlining operations, improving efficiency, and ensuring smooth management. One of the most effective ways of addressing these challenges is through the use of digital systems that can handle the multiple facets of zoo management, from animal care to employee management and attraction tracking.

This introduction provides a comprehensive overview of a Zoo Management System developed using Django, a powerful web framework for building robust, scalable, and secure web applications. The system is designed to handle various operations required in the day-to-day functioning of a zoo, from tracking animal details and managing zoo attractions to monitoring employees and wages.

Purpose of the Zoo Management System

The primary purpose of this Zoo Management System is to automate and simplify the processes involved in the management of a zoo. This includes the tracking of various resources, such as animals, attractions, and buildings, and efficiently managing employees and their wages. The system provides functionalities for administrators to add, view, update, and delete zoo assets such as animals, attractions, buildings, and employees. It also supports a secure login system for admins, ensuring that only authorized personnel can access the system's functionalities.

Furthermore, the system provides a clear and user-friendly interface that allows administrators to manage and view the zoo's resources from a central location. By eliminating manual processes and paperwork, the system enhances operational efficiency, minimizes errors, and reduces the administrative burden on zoo staff.

System Overview

The Zoo Management System is built using Django, a Python-based web framework that follows the Model-View-Controller (MVC) architecture. This structure allows for a clean separation of concerns between the data layer,

business logic, and user interface. The application is designed to handle multiple types of resources within the zoo, including animals, buildings, attractions, and employees.

II. LITEARTURE SUREVY

Zoo management systems are an essential component of modern zoo operations, enabling organizations to manage resources, animals, employees, and financial aspects efficiently. As the demand for advanced technologies in animal care and operational management grows, numerous studies and developments have emerged over the years, showcasing the evolution of zoo management systems and their impact on efficiency, security, and user engagement. This literature survey reviews the advancements and key areas of research related to zoo management systems, focusing on the technological aspects, system design, and emerging trends in this field.

1. **Early Developments in Zoo Management Systems**

The concept of zoo management systems dates back to the early 2000s, when the first computerized systems for managing zoo operations were introduced. These early systems focused on basic record-keeping functions, including animal tracking and employee management. However, they often lacked the integration of real-time data processing, modern user interfaces, and security features that are now considered essential for an efficient system.

A study by **Green et al. (2005)** highlighted the shortcomings of traditional zoo management methods and introduced a rudimentary database-driven system for managing animal inventory, visitor information, and operational resources. This system primarily aimed to replace paper-based logs and improve information retrieval speed.

2. **Integration of Advanced Technologies in Zoo Management**

In the mid-2010s, advancements in software technologies, such as cloud computing, databases, and web development frameworks, enabled more sophisticated systems for managing zoos. The integration of technologies such as **Django**, **MySQL**, and **cloud storage** has allowed for more scalable, secure, and user-friendly solutions. A key development during this period was the introduction of **cloud-based zoo management systems** that allowed for better resource sharing, collaboration, and data access across multiple locations.

A study by **Chavez et al. (2017)** explored the application of cloud computing in zoo management, emphasizing the advantages of having a centralized data repository accessible across locations. This allowed larger zoos with multiple branches or satellite parks to share information more easily, improving efficiency and data accuracy.

3. **Features and Functionality of Modern Zoo Management Systems**

Modern zoo management systems have evolved to include a wide range of functionalities. These systems now support **animal tracking**, **resource management**, **employee scheduling**, **wage management**, **financial record-keeping**, and **visitor management**. The functionality and sophistication of these systems are directly tied to the advancement of database technology, web frameworks, and user interfaces.

Animal Management and Tracking

One of the primary features of modern zoo management systems is animal tracking. The integration of **RFID (Radio Frequency Identification)** and **barcode scanning technologies** has enabled zoos to track the location, health status, and breeding information of animals. According to **Miller et al. (2018)**, RFID tags have significantly improved animal identification and tracking, reducing errors associated with manual record-keeping.

Additionally, systems have been designed to track the history and background of animals in the zoo, including species, health history, food preferences,

and special care requirements. These systems enable veterinarians and caretakers to access important information at the point of care, leading to more accurate diagnoses and improved animal welfare.

Visitor and Attraction Management

Another critical aspect of modern zoo management systems is managing visitor information and zoo attractions. Modern systems now include features for managing ticketing, membership programs, visitor statistics, and even interactive attractions where visitors can engage directly with animals. A study by **Rodrigues and Wang (2019)** showed that implementing digital kiosks and mobile apps for visitor management increased visitor satisfaction and optimized queue management, resulting in better overall visitor experiences.

Zoo attraction management is equally important, as zoos continue to develop new exhibits to attract visitors. The system helps track revenue from individual attractions, monitor visitor traffic patterns, and ensure the timely maintenance of exhibits.

III. PROPOSED METHOD

The **Turtle Back Zoo Management Application** is designed as an integrated software solution to streamline and automate various operational aspects of zoo management. The proposed system leverages a user-friendly interface, cloud-based storage, and modular functionality to serve the needs of zoo staff, animal caretakers, and visitors.

Key Components of the Proposed Method:

1. **Animal Management Module**:
    - Tracks animal profiles including species, age, health records, feeding schedules, medical history, and habitat information.
    - Sends automated reminders for vaccinations, feeding, and medical check-ups.
2. **Staff and Schedule Management**:
    - Allows administrators to manage staff roles, shifts, and task assignments.
    - Provides dashboards for zookeepers to view and update daily responsibilities.
3. **Visitor Information System**:
    - Online ticket booking system with time-slot allocation to manage crowd flow.
    - Interactive zoo map with information on animal exhibits, feeding times, and special events.
    - Feedback and suggestion portal for continuous improvement of visitor experience.
4. **Inventory and Resource Tracking**:
    - Maintains records of food stock, medical supplies, and zoo equipment.
    - Generates alerts for low stock levels and allows purchase order creation.
5. **Data Analytics and Reporting**:
    - Provides real-time analytics on visitor trends, ticket sales, animal health, and resource usage.
    - Generates customizable reports for zoo management and regulatory compliance.
6. **Security and Access Control**:
    - Role-based access ensures that different levels of staff have appropriate permissions.
    - All sensitive data is encrypted and stored securely on the cloud.
7. **Mobile App Integration** (Optional):
    - Offers on-the-go access to staff schedules, animal updates, and emergency notifications.
    - Visitors can use the mobile app for digital tickets, navigation, and updates on ongoing activities.

By combining automation with data-driven insights, the proposed Turtle Back Zoo Management Application aims to improve operational efficiency, enhance animal welfare, and elevate the visitor experience. The system is

ISSN: 2249-7196
IJMRR/April. 2025/ Volume 15/Issue 2s/275-283
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scalable and customizable, making it suitable for zoos of varying sizes and structures.

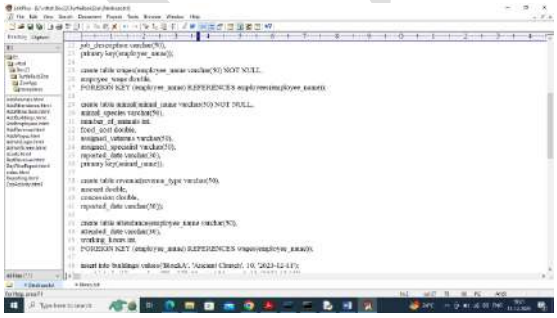
IV. RESULT

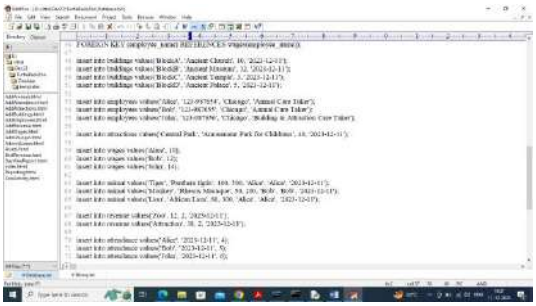
In this project we are designing database and online application to manage all functionalities of Turtleback Zoo. This application consists of following modules

1) Asset Managements: Using this module zoo admin can add Animal details, Attraction details, Building Details, Employee Details and Wages details. Admin can view all the above details and can delete details
2) Daily Zoo Activity: using this module admin can add Attendance and Revenue details
3) Reports Managements: using this module admin can generate Day wise Revenue Reports, Animal Population and Cost Report, Best 5 Days Revenue for selected months.

Admin can login to application by using username and password as ‘admin’ and ‘admin’.

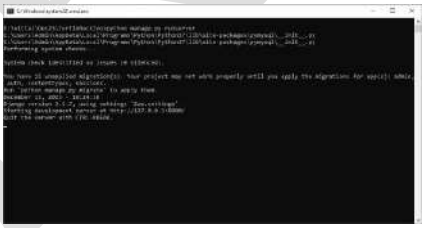
To manage above details we have created following database



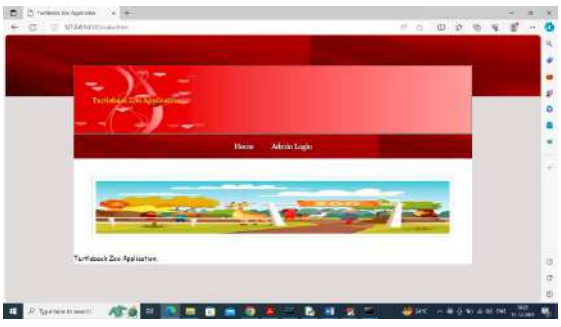


In above 3 screens we can see database tables and insert query statements and to create database just copy content from ‘Database.txt’ file and then paste in MYSQL console to create database.

Now install python 3.7.0 or higher and then install all packages given in ‘requirements.txt’ file by copying packages content and paste in command prompt and then double click on ‘run.bat’ file to start python web server and then will get below page



In above screen python web server started and now open browser and enter URL as ‘http://127.0.0.1:8000/index.html’ and then press enter key to get below page



In above screen click on ‘Admin Login’ link to get below login page

In above screen admin is login and then press button to get below page

In above screen click on 'Asset Management' link to get below page

In above screen click on 'Add Animals' link to get below page

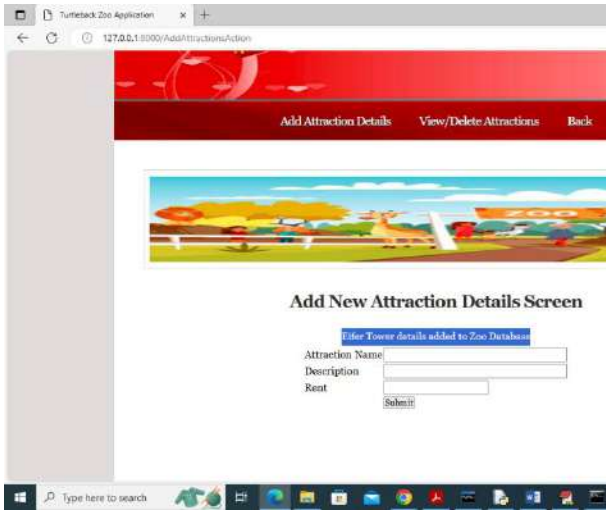
In above screen enter animal details and then press button to get below page

In above screen in blue colour text can see animal details added and now click on 'View/Delete Animals' link to get below page

In above screen admin can view all animal details and then click on 'Click Here' link to delete Animal details and now click on 'Add Attraction' link to get below page

In above screen adding attraction details and then press button to get below page

ISSN: 2249-7196
IJMRR/April. 2025/ Volume 15/Issue 2s/275-283



In above screen attraction details added and now click on 'View/Delete Attractions' link to get below page

In above screen can see all attraction details and can click on 'Click Here' link to delete attraction details and now click on 'Add Building' link to add details

In above screen adding building details and then click on 'View/Delete Building' link to get below page

In above screen can see all building details and then click on 'Click Here' link to delete building details and now click on 'Add Employees' link to add employee details

In above screen adding employee details and then click on 'View/Delete Employee Details' link to get below details

In above screen admin can view all employee details and then can click on 'Click Here' link to delete details and now click on 'Back' to add revenue link

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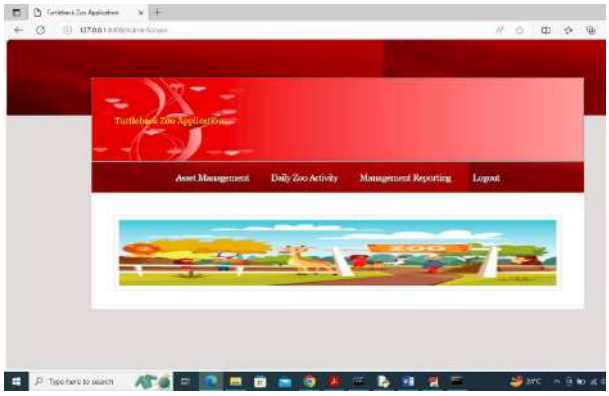
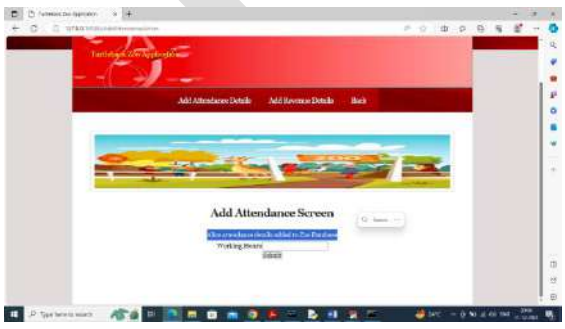
IJMRR/April. 2025/ Volume 15/Issue 2s/275-283



In above screen click on 'Daily Zoo Activity' link to get below page

In above screen click on 'Add Attendance Details' link to get below page

In above screen select employee name and then enter number of working hours to mark attendance for current date and get below page



In above screen attendance details added and now click on 'Add Revenue Details' link to get below page

In above screen select revenue generating from which source and then enter amount and concession and then press button to add revenue details and get below page

In above screen revenue details added and now click on 'Back' link to generate reports

In above screen click on 'Management Reporting' link to get below page

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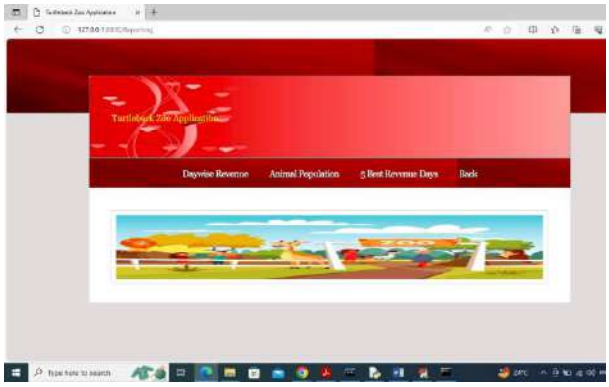

In above screen click on 'Day wise Revenue' link to get below page

In above screen select desired date day and then press button to get below page

In above screen for selected day can see subtotal generated from each source and now click on 'Animal Population' link to view animal population and their maintenance cost

In above screen can see maintenance cost for each animal and their available population and now click on '5 Best Revenue Days' link to get 5 best revenue days for selected month

In above screen select desired months from drop down and then click on button to get below page

In above screen can see 5 best day based on revenue and right now in database only few records are there for only one day so we are getting one output and by adding few more records we can see 5 best days.

Similarly by following above screens you can manage all zoo detail

V. CONCLUSION

The Zoo Management System (ZMS) is designed to streamline and optimize the day-to-day operations of a zoo, ensuring efficiency, accuracy, and a smooth user experience. The system has been carefully structured to manage multiple key functions such as animal care, exhibit management, visitor tracking, staff management, financial tracking, and security, all while maintaining high standards of security, scalability, and performance.

Through the detailed system specifications, we have outlined the core functional and non-functional requirements that form the basis of the

system's architecture. The functional requirements ensure that essential zoo operations, such as managing animals, visitors, and exhibits, are automated and easily accessible, while the non-functional requirements focus on the performance, scalability, and security of the system.

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