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OPEN SOURCE CODING (OPSC6312)

PART 1

Planning

Contents

Introduction

Birdwatching has progressed from a little hobby to a popular outdoor activity that attracts people of all ages all around the globe. With the advent of modern technologies, birdwatchers can now use mobile apps to enhance their experiences, identify species, and interact with others who share their interests. Birda, Merlin Bird ID, and Picture Bird are some of the unique apps that allow for real-time bird identification, logging, and community involvement. This project seeks to develop comprehensive birdwatching software that integrates the best features of existing successful programs, appealing to both novice and experienced birdwatchers while also cultivating a community dedicated to wildlife conservation

Brief overview

SkyScout is a cutting-edge birdwatching app that enhances the birding experience through some unique features:

Smart Bird Identification: Utilizes photo and audio recognition, along with a manual search guide, to help users identify bird species quickly and accurately.

Personalized Birdwatching: Offers custom bird lists, detailed sighting logs with multimedia attachments, and tracks multiple sightings in a single session.

Real-Time Hotspot Navigation: Features an interactive map with bird hotspots, real-time navigation, and user-contributed data to discover new birdwatching locations.

Social Engagement and Gamification: Provides user profiles, a community for sharing sightings, and gamified elements like challenges and badges to boost engagement

SkyScout combines advanced technology, social interaction, and conservation efforts, making it a comprehensive tool for birdwatchers.

Application icon

User Interface (UI) and User Experience (UX) Requirements

1. User Interface and Experience Requirements

Intuitive Navigation: A simple, user-friendly interface that allows easy access to core features like bird identification, sighting logs, and community activities.

Responsive Design: Optimized for Android and iOS devices, supporting different screen sizes (smartphones, tablets).

Visual Design: An appealing layout with colours, icons, and images that reflect birdwatching and nature themes.

Accessibility: Features such as voice commands, screen reader support, high contrast mode, and adjustable font sizes.

2. Core Functional Requirements Bird Identification:

Use photo and audio recognition for automatic identification.

Include a manual search guide with filters (colour, size, location).

Sighting Logging:

Enable users to log sightings with details (species, date, time, location) and attach photos or videos.

Allow tracking of multiple sightings in a single session.

Personalized Bird Lists:

Maintain life lists and generate regional lists based on user location.

Community and Social Features:

User profiles with stats, achievements, and recent sightings.

Options to share sightings and interact with others through comments and discussions.

Gamification with challenges, leader boards, and badges.

Data Sync and Backup:

Cloud synchronization across devices, and options to import/export data.

3. Backend Requirements Database

Management:

A secure, scalable database for storing all user and bird data.

API Integration:

Connect with external services for bird data and machine learning models.

Data Security and Privacy:

Encrypt sensitive data and ensure compliance with data protection laws.

4. Performance Requirements Speed:

Ensure fast loading and task performance.

Scalability:

Support growing user numbers and data volume without performance degradation.

5. Maintenance and Update Requirements

Regular Updates:

Periodically add new features, improve performance, and fix bugs.

Customer Support:

In-app support with FAQs, user guides, and a contact form.

6. Integration and Compatibility

Requirements Smartwatch Integration:

Enable quick sighting logs and notifications via smartwatch apps.

Device Compatibility:

Support a wide range of Android and iOS devices, and potential future integration with smartwatches or AR glasses.

7. Analytics and Reporting Requirements

User Analytics:

Analyse user behaviour to enhance app functionality and experience.

Bird Sighting Data Analytics:

Provide insights on popular bird species, locations, and sighting trends.

8. Conservation and Data Sharing

Requirements Data Sharing with Conservation

Bodies:

Partner with organizations to share sighting data for research.

User Consent for Data Sharing:

Obtain explicit user consent and offer opt-in/opt-out options.

9. Marketing and On boarding

Requirements On boarding Experience:

Guide new users through app features and profile setup.

Push Notifications:

Send updates on app features, events, and rare bird sightings.

10. Compliance Requirements Legal

Compliance:

Adhere to relevant laws, including data privacy and intellectual property rights.

GPS Hotspot and Tracking Requirements Location

Tracking:

Request user permission for location data and enable real-time tracking.

Hotspot Data Management:

Maintain unique IDs and location data for hotspots, including bird species, best visit times, and popularity metrics.

Mapping and Navigation:

Integrate mapping services to display and navigate to hotspots with search and filter options.

User Interaction:

Allow check-ins, reviews, and submissions for new hotspots.

Data Visualization:

Use visualizations like heatmaps to display hotspot density and species distribution.

By fulfilling these requirements, the app will ensure a top-notch experience for birdwatching enthusiasts.

Design/prototype below:

Login Page

Connect With Nature,
find your flock

Login with Google

Register

Login

Registration Page

Register to find your flock

Name

Surname

Email

Password

Register

Hotspot Page

BIRDING HOTSPOTS

Distance from nearest hotpsot 10KM

Select Available Hotspots

Red Cross

Blues

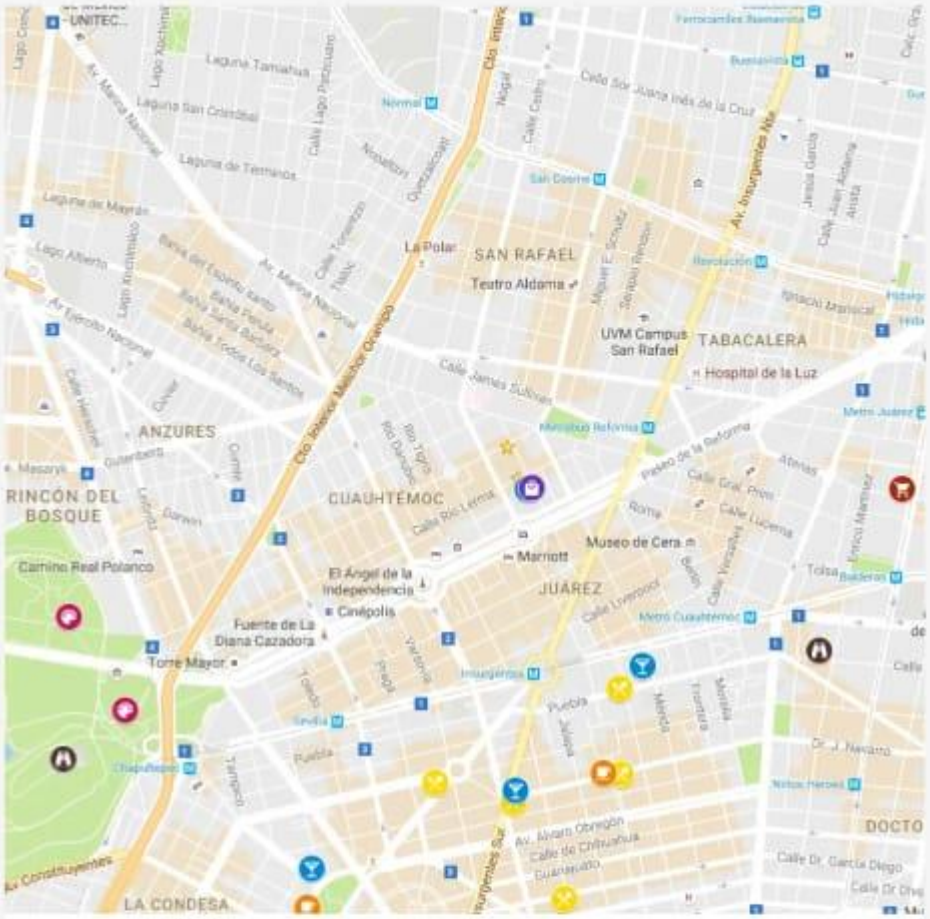
Humming

Peble

Filter Your Distance

30KM

Calculation Page

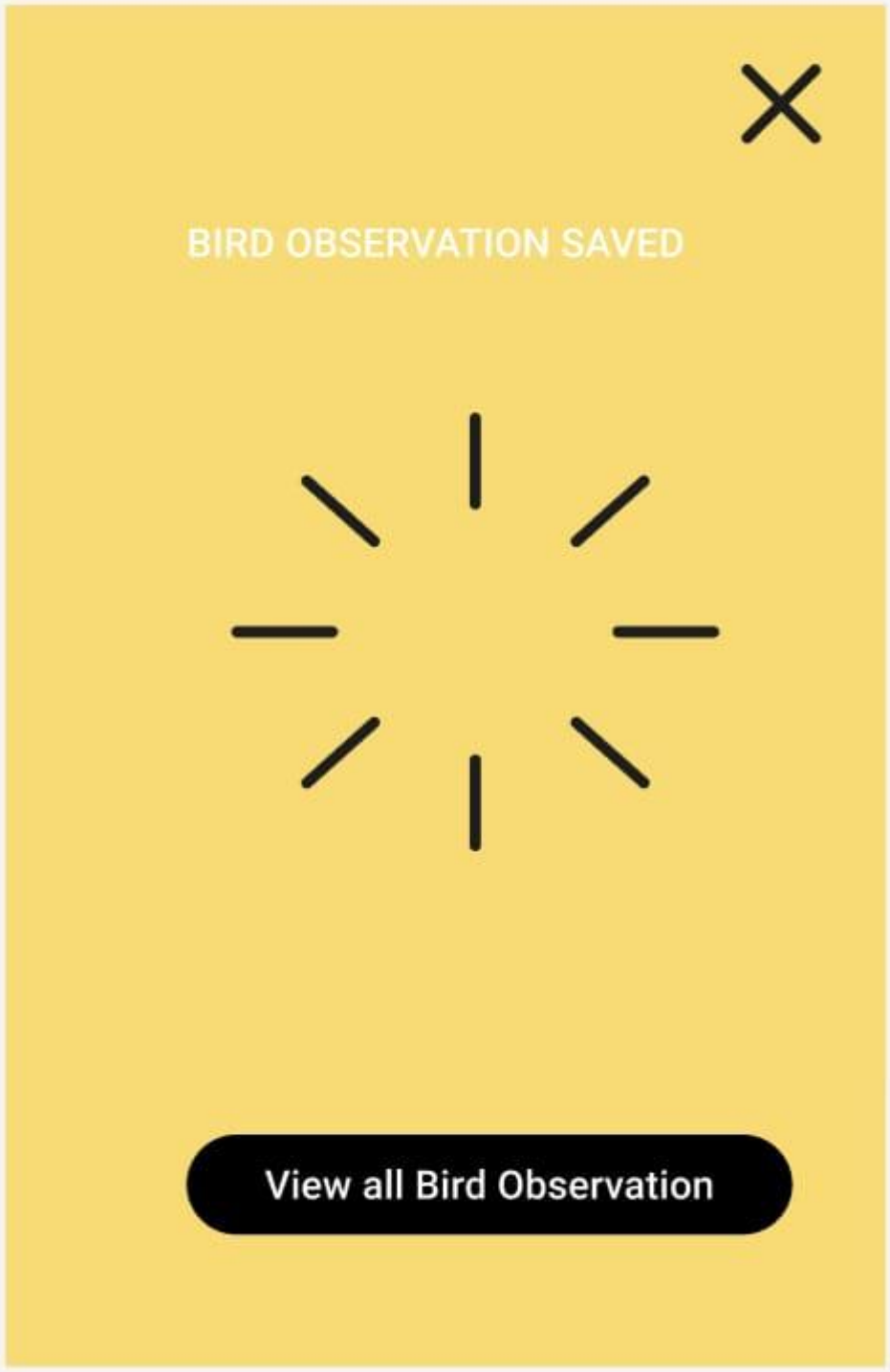


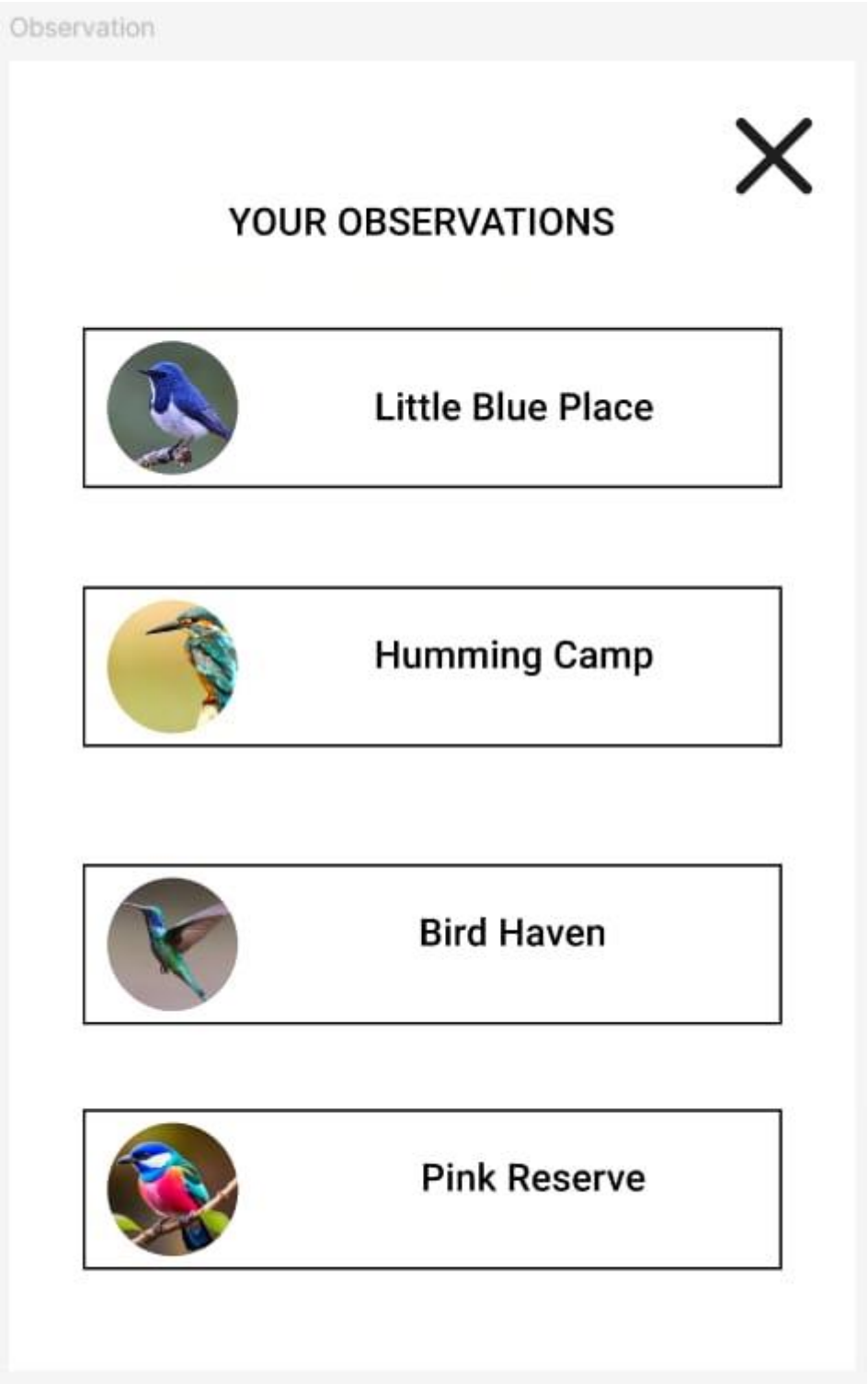
Calculating best route to hotspot...

YOU ARE 3KM FROM HOTSPOT

Start Directions

Saved Page





Detailed list of the data the application needs to capture from the user and store including data types:

1. User Profile Data

User ID: A unique identifier for each user.

Data Type: String

Full Name: The user's first and last name.

Data Type: String

Username: A chosen name that will be publicly visible in the community.

Data Type: String

Email Address: The user's email for login, notifications, and communication.

Data Type: String

Password: A hashed and salted version of the user's password for authentication.

Data Type: String

Profile Picture: A URL or binary data representing the user's profile image.

Data Type: String (URL) or Blob (binary data)

Location: The user's primary location, optionally set manually or derived from GPS.

Data Type: String (City, State, Country)

Bio: A short description or bio written by the user.

Data Type: String

Preferences: User preferences like notification settings, dark/light mode, etc. Data

Type: JSON

2. Sighting Data

Sighting ID: A unique identifier for each bird sighting entry. Data

Type: String

User ID: Foreign key linking the sighting to the user profile.

Data Type: String

Species Name: The common and/or scientific name of the bird species observed.

Data Type: String

Date and Time: The date and time when the sighting occurred.

Data Type: Date Time

Location (Latitude, Longitude): The GPS coordinates where the bird was sighted.

Data Type: Float (for latitude and longitude)

Number of Birds Seen: The quantity of birds observed in a particular sighting.

Data Type: Integer

Photos/Videos: URLs or binary data for images or videos uploaded by the user related to the sighting.

Data Type: List of Strings (URLs) or List of Blobs

Additional Notes: Any extra notes or observations made by the user.

Data Type: String

Weather Conditions: Optional data on weather conditions at the time of the sighting.

Data Type: JSON or String

3. Bird Species Data

Species ID: A unique identifier for each bird species in the app database. Data

Type: String

Common Name: The common name of the bird species.

Data Type: String

Scientific Name: The scientific (Latin) name of the bird species.

Data Type: String

Description: A brief description of the bird species, including appearance and behaviour.

Data Type: Text

Habitat: Information about the typical habitats where the bird can be found.

Data Type: String

Range Map: A URL or file reference to an image displaying the geographical range of the species.

Data Type: String (URL) or Blob

Bird Calls/Songs: Audio files of bird calls or songs.

Data Type: List of Strings (URLs) or Blobs

Conservation Status: The IUCN conservation status (for example: Least Concern, Endangered).

Data Type: String

4. Session Data

Session ID: A unique identifier for each birdwatching session.

Data Type: String

User ID: Foreign key linking the session to the user profile.

Data Type: String

Start and End Time: The start and end time of the birdwatching session.

Data Type: Date Time

Location (Latitude, Longitude): The location where the session was conducted.

Data Type: Float (for latitude and longitude)

Total Number of Species Observed: The total number of different bird species seen during the session.

Data Type: Integer

Total Number of Sightings: The total number of bird sightings recorded in the session.

Data Type: Integer

Photos/Videos: URLs or binary data of any photos or videos taken during the session.

Data Type: List of Strings (URLs) or List of Blobs

5. Community and Social Data

Post ID: A unique identifier for each post or entry made by the user in the community section.

Data Type: String

User ID: Foreign key linking the post to the user profile.

Data Type: String

Content: Text or media content of the post.

Data Type: Text or Blob

Comments: List of comments associated with a post, each having a unique ID, user ID, and content.

Data Type: List of JSON objects

Likes and Reactions: Count and types of reactions on a post.

Data Type: Integer (count), JSON (types)

6. Notification Data

Notification ID: A unique identifier for each notification sent to the user.

Data Type: String

User ID: Foreign key linking the notification to the user profile.

Data Type: String

Notification Type: Type of notification (e.g., sighting alert, community activity, app update).

Data Type: String

Timestamp: The time the notification was sent.

Data Type: Date Time

Status: Read/unread status of the notification.

Data Type: Boolean

7. Analytics and Usage Data

User Activity Logs: Details of user actions within the app (e.g., logins, screen views, feature usage).

Data Type: JSON

Session Duration: The time spent by the user in each session of app use. Data

Type: Integer (seconds)

8. Data Sharing and Consent Data

Consent ID: A unique identifier for each consent record.

Data Type: String

User ID: Foreign key linking the consent to the user profile.

Data Type: String

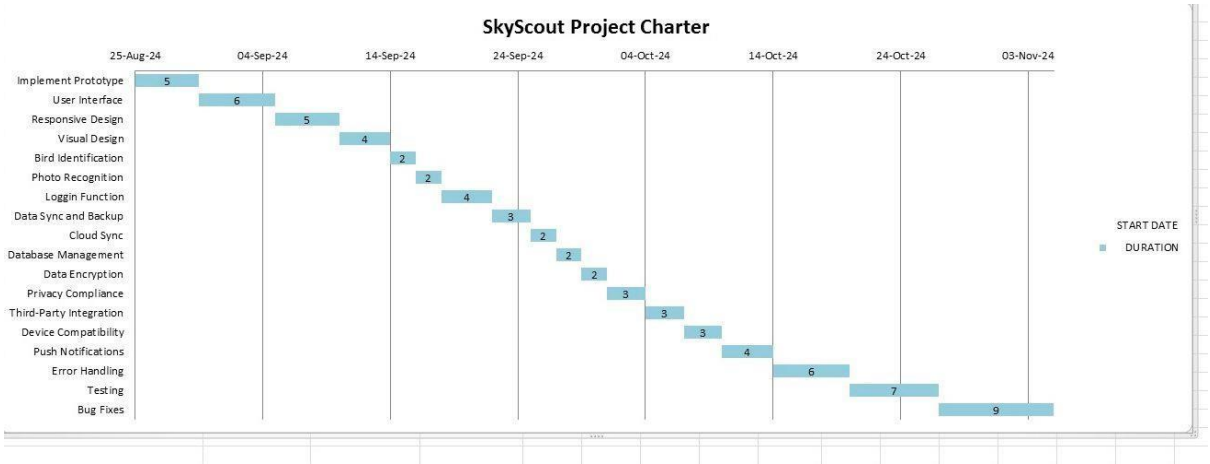
Consent Type: Type of consent (e.g., data sharing for research, email marketing).

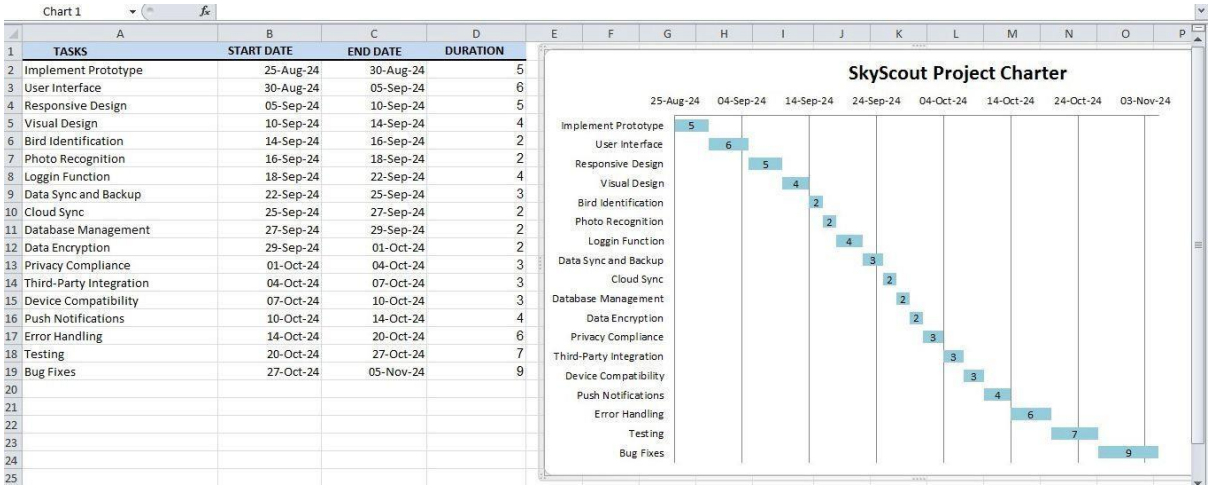
Data Type: String

Timestamp: The time when the consent was given or updated.

Data Type: Date Time

Project plan/Gantt chart below:





	TASKS	START DATE	END DATE	DURATION
2	Implement Prototype	25-Aug-24	30-Aug-24	5
3	User Interface	30-Aug-24	05-Sep-24	6
4	Responsive Design	05-Sep-24	10-Sep-24	5
5	Visual Design	10-Sep-24	14-Sep-24	4
6	Bird Identification	14-Sep-24	16-Sep-24	2
7	Photo Recognition	16-Sep-24	18-Sep-24	2
8	Loggin Function	18-Sep-24	22-Sep-24	4
9	Data Sync and Backup	22-Sep-24	25-Sep-24	3
10	Cloud Sync	25-Sep-24	27-Sep-24	2
11	Database Management	27-Sep-24	29-Sep-24	2
12	Data Encryption	29-Sep-24	01-Oct-24	2
13	Privacy Compliance	01-Oct-24	04-Oct-24	3
14	Third-Party Integration	04-Oct-24	07-Oct-24	3
15	Device Compatibility	07-Oct-24	10-Oct-24	3
16	Push Notifications	10-Oct-24	14-Oct-24	4
17	Error Handling	14-Oct-24	20-Oct-24	6
18	Testing	20-Oct-24	27-Oct-24	7
19	Bug Fixes	27-Oct-24	05-Nov-24	9

Conclusion

This planning and design report outlines the key features and requirements for developing SkyScout, a comprehensive birdwatching app. By integrating advanced bird identification tools, personalized user experiences, social engagement, real-time hotspot navigation, and conservation-focused data sharing, SkyScout aims to provide a valuable and engaging platform for birdwatchers of all levels. With a strong focus on user experience, accessibility, and privacy, SkyScout is poised to become a leading tool in the birdwatching community

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