DESIGN DOCUMENT

ST1008726, ST10084349, ST10084286

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GIGGLE GANG
Varsity College

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*** Updated Content are Highlighted in Yellow ***

Introduction

Welcome to WingWatch, a revolutionary mobile application meticulously designed to redefine and elevate your bird-watching experience to unprecedented heights. In a world where technology and nature harmoniously intersect, WingWatch invites you to immerse yourself in the captivating realm of avian wonders. Whether you are a seasoned ornithologist or an inquisitive nature lover, our app serves as your dedicated companion, unlocking the vibrant and diverse world of birds right from the convenience of your mobile device.

Amidst the hustle and bustle of our fast-paced modern era, WingWatch seamlessly blends cutting-edge technology with a profound appreciation for the natural world. It transcends the conventional boundaries of birdwatching, offering an immersive journey that combines map-based navigation, sophisticated route planning, and personalized settings to redefine your bird-watching adventure. This innovative software empowers you to explore, study, and contribute to the field of bird conservation through its intuitive user interface and a plethora of creative features.

Dive into the rich tapestry of WingWatch's functionalities, where you will discover a suite of features meticulously crafted to enhance your bird-watching escapades. From customizable user authentication ensuring a personalized experience, to an embedded map driven by the latest mapping APIs, WingWatch ensures you are always in the know about the finest spots to witness awe-inspiring avian species. Effortless navigation guided by GPS, coupled with a bird observation journal allowing you to capture the beauty of your sightings, makes WingWatch an indispensable tool for any bird enthusiast.

WingWatch transcends the definition of a mere mobile app; it stands as a portal to a world of natural wonder, adventure, and scientific discovery. This application guarantees that the enthralling world of birds is perpetually within your reach, whether you are leisurely strolling through a local park or embarking on an expedition to the most secluded regions.

Prepare to embark on an expansive adventure of discovery and connection as you immerse yourself in the captivating realm of ornithology like never. WingWatch eagerly awaits your exploration; download the app, gear up, and let your bird-watching adventure take flight! With WingWatch, the enthralling world of birds is not just a mobile app away — it's a journey that unfolds on the digital canvas of discovery and connection.

Logo Design

Figure 1:Logo of The App

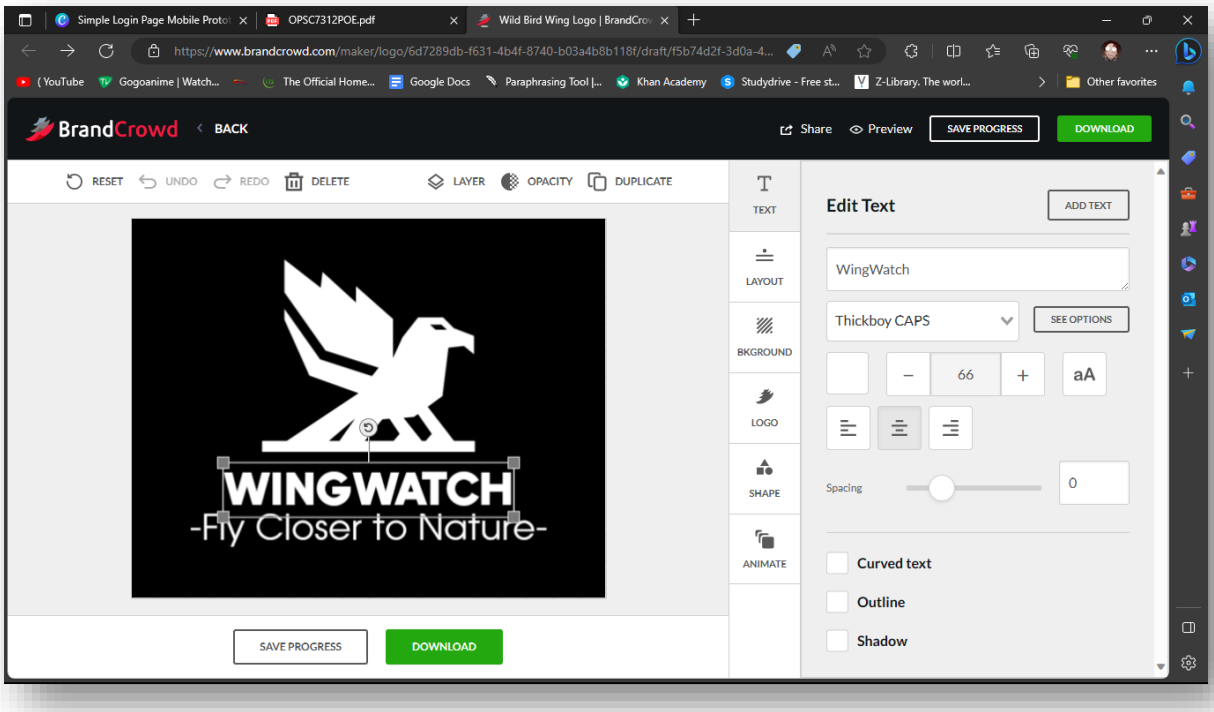

Figure 2: Design Site of the Logo

On BrandCrowd, our group created the logo for our app. We utilized this site since it is a remarkably simple service with an astonishing variety of logo templates to begin with. On August 22, 2023, we designed our logo.

Overview

WingWatch is your ticket to a world of avian wonder and discovery. This software is created to be your ultimate companion on your birding adventures, seamlessly combining cutting-edge technology with your enthusiasm for bird watching.

Discover and travel to local birding hotspots with the interactive map, which is driven by real-time data from trusted sources such as the eBird API 2.0. WingWatch features customizable settings that adapt to your interests, making every birding journey a tailor-made encounter, whether you are an avid birder or a curious nature enthusiast.

Never get lost with WingWatch's simple GPS-based navigation, which directs you to your preferred hotspots, ensuring you are always in the right place at the right time to see fascinating bird species. With the tap of a finger, record your observations in a digital bird notebook, preserving the thrill of each sighting.

Enjoy a visual story of your birding excursion as your observations come to life on the map, revealing the stories of your encounters. Connect with a like-minded community of fellow bird watchers to share thoughts and experiences while also contributing to the protection of these amazing species.

WingWatch is more than just an app; it is an invitation to explore, connect, and engage with the world of birds in ways you never thought possible. Download WingWatch today and start on an incredible trip that will change the way you look at birds.

Innovative Features

- ***Hotspot Mapping:*** WingWatch collects data from reputable databases such as the eBird API 2.0 and displays an interactive map of the most well-known birding hotspots in your area. This dynamic mapping system directs you to the centre of bird activity, guaranteeing that you never miss an opportunity to see a rare species.
- ***Precision Navigation:*** Allow WingWatch to lead you with ease. The software tracks your current location and calculates the best route to your chosen hotspot using GPS technology. Say goodbye to navigational headaches so you can enjoy the delight of bird viewing.
- WingWatch makes it simple to keep a digital bird observation journal. Capture the beauty of each meeting by taking notes at your current location. With each addition, your personal bird observation book comes to life, keeping memories of your incredible experiences.
- Immerse yourself in the world of birds through aesthetically appealing displays. See your bird sightings highlighted on the map, with each observation represented by a colourful pin. Keep an eye on your investigation as it takes shape in front of your eyes, producing a dynamic narrative of your birding excursion.
- ***Local Birding Experts:*** Users can relate to local birding specialists or guides who can offer customised recommendations and insights for the finest birdwatching experiences.
- ***Exploration on Your Own:*** You may easily customize your bird-watching excursion. Set your preferred maximum distance for hotspot discovery and toggle between metric and imperial systems in your options.

Requirements:

- ***Authentication and registration of users:***
  - Users should be able to create accounts with an email address and a password.
  - Users must offer a unique username while registering.
  - Passwords must meet certain security requirements (for example, minimum length and complexity).
  - For forgotten passwords, password reset capability should be implemented.
- ***User Login:***
  - Users can access the site by entering their registered email address and password.
  - Use session management to keep users logged in while using the app.
- ***Interactive Hotspot Mapping:***
  - Use mapping APIs (such as Google Maps) to display birdwatching hotspots.
  - To populate hotspot information, retrieve data from a trusted source (e.g., eBird API 2.0).
  - Hotspots should be represented on the map as pins with labels and icons indicating their prominence.
- ***Geolocation:***
  - Use the GPS capabilities of the device to track the user's current location.
  - Show the user's current location on a map in real time.
- ***Navigation to Hotspots:***
  - Allow users to receive directions by selecting a hotspot on the map.
  - Using navigation APIs (for example, Google Directions API), calculate optimal routes.
- ***Bird Observation Journal:***
  - Allow users to record their bird observations.
  - Include fields like bird species, date, time, and any further notes.
- ***Educational Content:***
  - Learn about bird species, birdwatching techniques, conservation activities, and more.
- ***Integration of a Hosted Database:***
  - Create a hosted database (for example, Firebase Realtime Database) to record user preferences and bird observations.
  - Ensure the safe and effective storage and retrieval of data.

- ***Image Storing:***
  - Users are able to store images of their finding in the app and the image will be saved in the app's database
- ***App Security and Performance:***
  - Improve app performance by ensuring smooth navigation, fast loading, and responsiveness.
  - Use data encryption and user authentication to protect user data and privacy.
- ***Forgot Password***
  - Users should be able to reset their password of their account via a link that is sent to their email

Use of Firebase

Figure 3:Firebase Logo

Firebase provides a complete range of tools and services that can help you construct a bird watching app. Here are some reasons why you might consider using Firebase for various areas of your app:

- Authentication: Firebase Authentication provides secure and straightforward user authentication methods, including email/password, Google Sign-In, and more. This can be a crucial component for your app's registration and login functionality.
- Realtime Database: Firebase Realtime Database offers a cloud-hosted NoSQL database, which can be ideal for storing user settings, bird observations, and other dynamic data. It allows real-time synchronization, making sure that data is always up to date across devices.
- Easy Integration: Firebase SDKs provide easy integration with Android Studio, enabling you to use Firebase services directly from your app's code.
- Scalability: Firebase services are backed by Google Cloud, ensuring reliability, scalability, and performance, even as your app's user base grows.

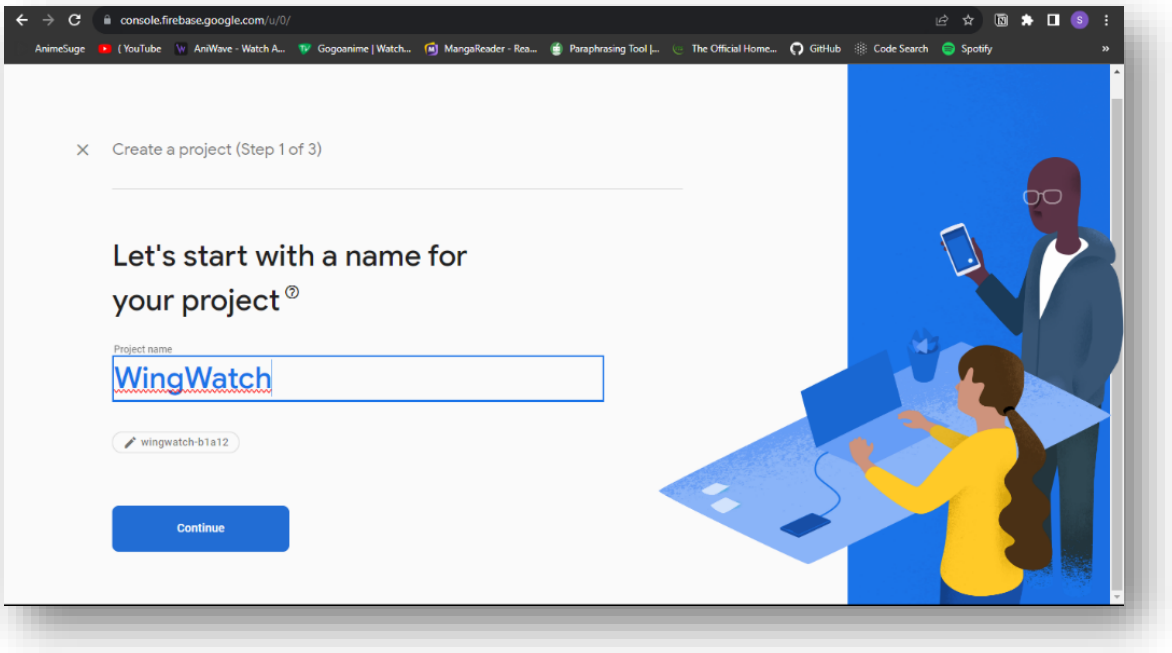

Figure 4: Screenshot of Creating a Firebase Project

Firebase can assist streamline user authentication, save user settings, and bird observations, handle media assets, and provide a robust backend infrastructure in the context of your bird watching app, allowing you to focus more on the app's main features and user experience. Before selecting, evaluate whether Firebase's features correspond with the needs of your app and consider considerations such as pricing and data security.

UI Design: Screenshots of the Design Pages

Loading/Splash Screen

Figure 5:Splash Screen Draft Design Screenshot Taken from Device

A loading screen featuring our app's logo is a preliminary visual element that appears when you open our app. Its main purpose is to provide users with visual feedback that the application is in the process of loading. During this moment, the loading screen prominently showcases the company's logo, reinforcing brand recognition and identity.

Login Page

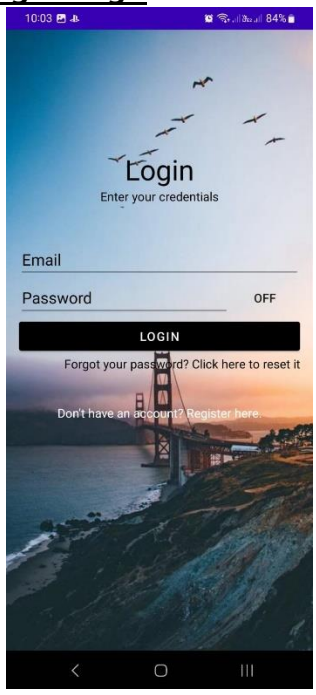

Figure 6:Login Page Draft Design Screenshot Taken from Device

The login screen is the gateway to a personalized digital experience. Users are prompted to input the same email and password they used during their account registration. Upon successful login, users gain access to the application's or website's home page, where they can explore the full range of features and content available to them. The login screen serves as a secure checkpoint, allowing only authorized users to enter and engage with their individualized content. By maintaining this essential barrier, the page safeguards user data and experience.

Register Page

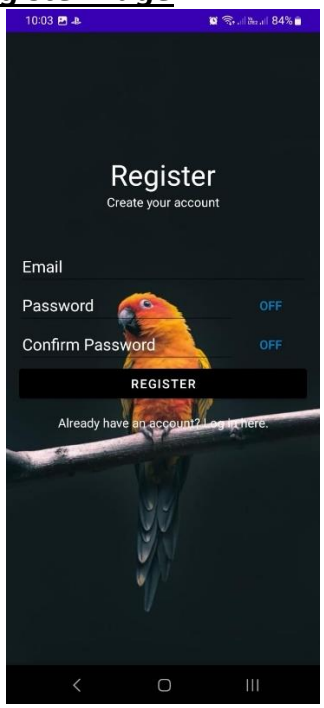

Figure 7: Register Page Draft Design Screenshot Taken from Device

The registration screen serves as the gateway to accessing an application or website's features. On this screen, users are prompted to provide their email address and create a secure password. This information is essential for account creation and future logins. Additionally, the registration screen offers a convenient option for users who already have an account to proceed directly to the login page. This dual functionality streamlines the user's journey, whether they are newcomers looking to join the platform or returning users aiming to access their existing account. By simplifying the registration process and accommodating existing users, the page enhances user engagement and ensures a user-friendly experience.

Mapping Page

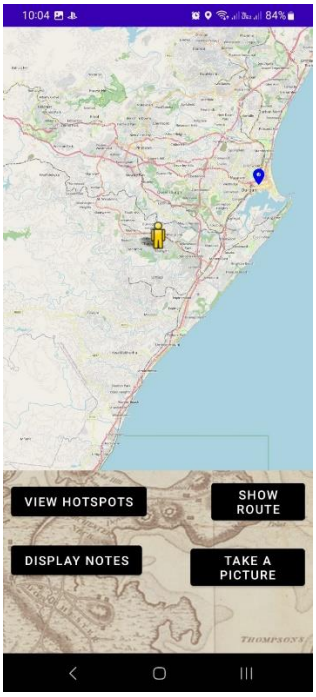

Figure 8: Mapping Page Draft Design Screenshot Taken from Device

The map page offers users an interactive and informative experience centred around birdwatching hotspots. On this page, users can explore a map that highlights locations known as "hotspots." These hotspots are prime areas for birdwatching enthusiasts to observe a diverse array of avian species. Users have the option to search for hotspots near you or browse the map to discover new ones. Once a hotspot is selected, the map page provides users with detailed information about the location, such as the types of birds commonly spotted there, seasonal variations, and any notable bird-related events. Users can then access step-by-step directions that guide them to the birdwatching location of their choice. This ensures a smooth and enjoyable journey to the hotspot, enhancing the overall birdwatching experience.

Data List

Login and Register Pages	
Strings	To store and manipulate text-based data, such as usernames, passwords, and email addresses.
Booleans	To represent true or false values, often used to track if a user is authenticated or logged in.
Splash Screen	
Drawable	To display images or graphics for the splash screen background.
Strings	For displaying any text or messages on the splash screen.
Mapping Page	
Double or Float	To store latitude and longitude values for marking locations on the map.
Strings	For location names or labels.
Bitmap or Drawable	For custom markers or icons on the map.
Booleans or Enums	For toggling different map layers (e.g., satellite view, street view).
Lists or Arrays	To store multiple location data for displaying multiple markers.
Integers or Enums	To store zoom levels and map types.

Flow of the app

The below diagram visually depicts the process that a user will have to follow when they are using the app.

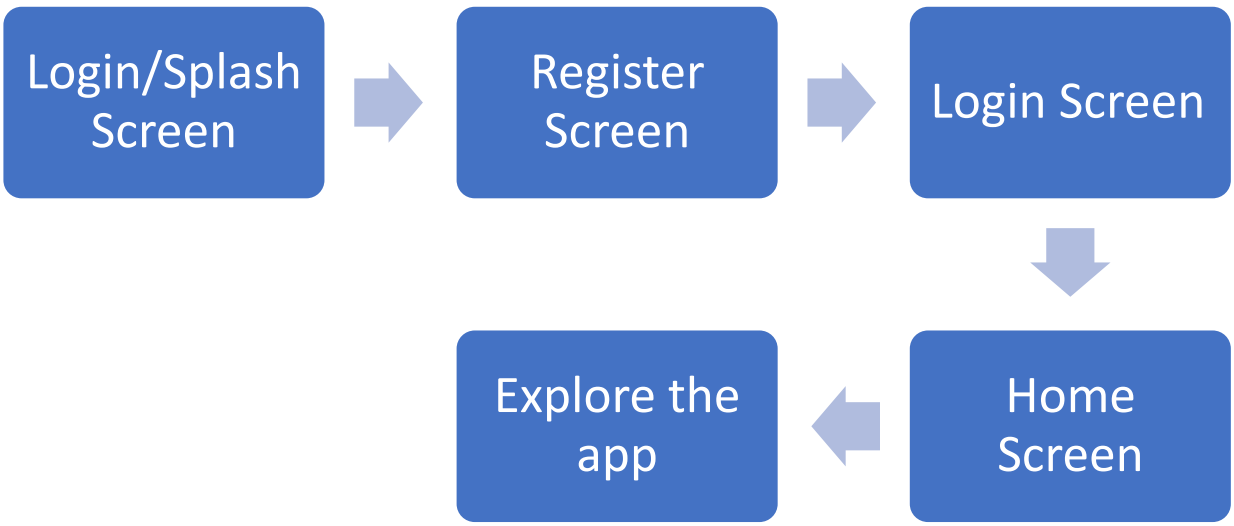

Figure 9:Flow of the App

Kanban Project

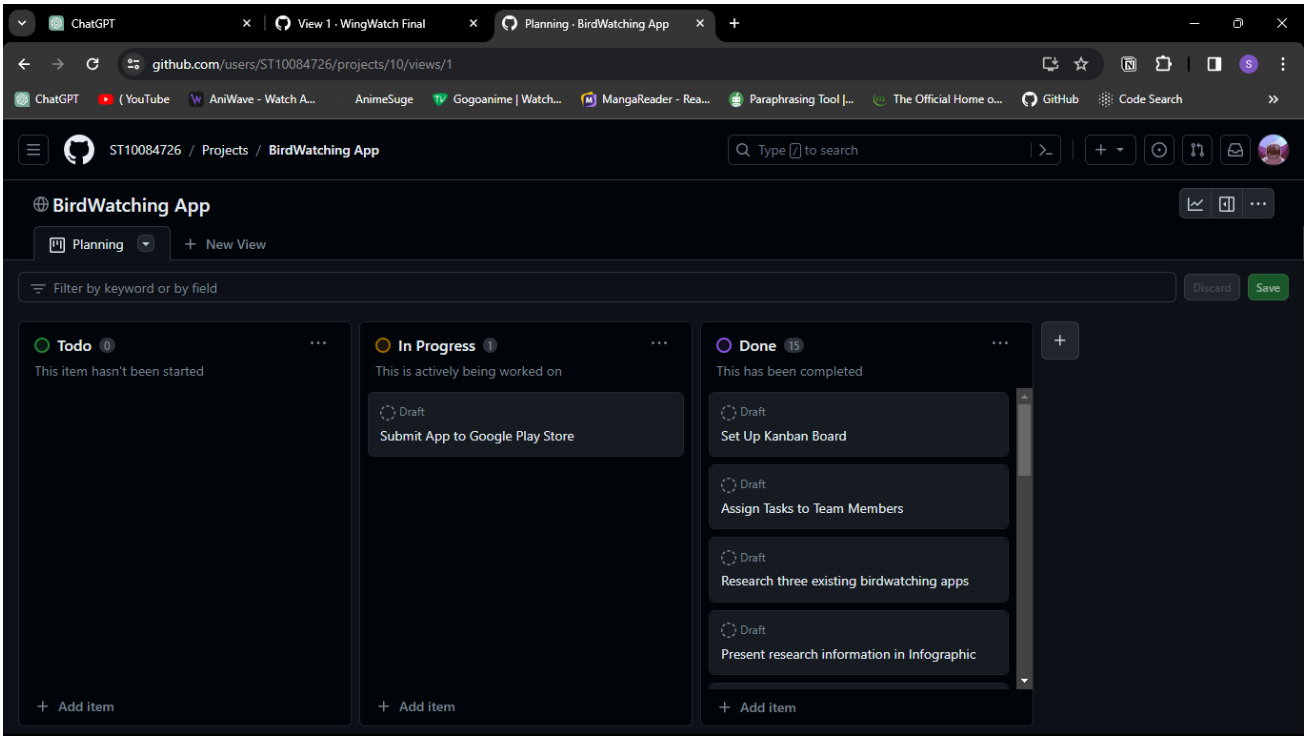

Figure 10: Screenshot from Laptop of GitHub Kanban for this project

Kanban on GitHub gives a visual and organized method to project management for your bird watching app project. It aids in work breakdown, tracking progress, and promoting collaboration within your development team. The integration of GitHub with repositories, problems, and pull requests simplifies workflows and increases transparency. Kanban on GitHub provides flexibility, prioritizing, and automation options, making it an easy-to-use and effective tool for streamlining development processes, assuring job completion, and encouraging continuous improvement.

Link: https://github.com/users/ST10084726/projects/10/views/1

Plugins, Keys and Gradle

Plugin

WingWatch uses numerous plugins in Android Studio to speed up development. The Kotlin Plugin, for example, permits the use of Kotlin, a modern programming language, alongside Java for compact and expressive code. Furthermore, Android KTX (Kotlin Extensions) is included, which optimizes the Kotlin programming language for Android development by speeding common tasks and enhancing code readability.

Another important plugin used in WingWatch is Firebase, a complete mobile development platform. Firebase enables real-time data synchronization, authentication, and cloud services, all of which contribute to the app's dynamic and responsive nature. The integration of Firebase Analytics provides useful insights into user behaviour, assisting in the application's continual improvement.

Keys

WingWatch prioritizes security, and API keys are critical in safeguarding communication between the app and external services. For example, integrating the Google Maps API key means that the embedded map works seamlessly, providing users with real-time data about birding hotspots. The eBird API 2.0 key is used to access reliable sources and keep users up to speed on the most recent birding information, which adds to the app's dependability.

Authentication keys are also used to protect user information and interactions. These keys, combined with encryption techniques, protect critical information, and keep user profiles and observations safe from unauthorized access.

Gradle

WingWatch's build system is based on the Gradle build tool, which is a versatile and robust Android development tool. The build Gradle file in the app orchestrates the dependencies, configurations, and actions required for compiling and packaging the app.

Gradle simplifies dependency management by including dependencies on libraries such as Retrofit for seamless API connectivity, Glide for quick image loading, and Room for local data storage and caching. These dependencies, which are described in the Gradle files, contribute to the overall functionality and performance of the program.

The Gradle build system also makes flavour implementation easier, enabling for the construction of multiple versions of the program for different purposes such as development, testing, and production.

Conclusion

We carefully created a thorough design plan that encompasses the essence of a seamless and compelling bird viewing experience while developing and building the WingWatch app. The app's goal is to combine cutting-edge technology with natural wonders, and our design strategy reflects this ambition with intelligent features and functionalities.

WingWatch has always been envisioned as more than simply an app - it is a portal to exploration, connection, and conservation. Our user-centric design strategy guarantees that every component of the app meets the demands of bird enthusiasts, whether they are novices or seasoned ornithologists.

The combination of a personalized user experience, interactive hotspot mapping, and simple navigation allows bird watchers to focus on their hobby without being distracted by practical issues. The novel mapping of bird sightings provides a dramatic story of encounters, while community features stimulate relationships, knowledge exchange, and conservation activities among fellow lovers.

The importance of detail has been stressed throughout this design plan. The addition of a gamification aspect and dark mode support, as well as the usage of Firebase for authentication, storage, and database needs, enhances the app's functionality and user experience.

As the design plan ends, WingWatch has the potential to be more than just a mobile app; it can become a vital part of the global bird watching community. We are set to bring WingWatch to life, making bird watching more accessible, entertaining, and influential than ever before, by adhering to the well-structured development phases, meticulously following the Kanban project management approach, and harnessing the power of Firebase.

We are excited to embark on the development journey with this design plan as our guiding light, sure that WingWatch will soon take wing as a genuinely amazing bird watching companion.

References

- Android, 2013. *Android Studio.* [Online]
  Available at: https://developer.android.com/studio
  [Accessed 23 August 2023].
- BrandCrowd, 2008. *BrandCrowd.* [Online]
  Available at: https://www.brandcrowd.com
  [Accessed 23 August 2023].
- Canva, 2013. *Canva.* [Online]
  Available at: https://www.canva.com
  [Accessed 23 August 2023].
- GitHub, 2008. *GitHub.* [Online]
  Available at: https://github.com
  [Accessed 23 August 2023].
- Kashyap, S., 2023. *Kanban Board Examples for Beginners: The Many Faces of Kanban Board.* [Online]
  Available at: https://www.proofhub.com/articles/kanban-board-examples
  [Accessed 23 August 2023].
- Mapbox, 2010. *Mapbox.* [Online]
  Available at: https://www.mapbox.com
  [Accessed 23 August 2023].
- Visme, 2013. *Visme.* [Online]
  Available at: https://www.visme.co
  [Accessed 23 August 2023].