

## INTRODUCTION

Welcome to BuddyUp, the vibrant app that redefines social connectivity and virtual companionship. With BuddyUp, you can effortlessly expand your social circle by swiping left or right to add new friends, creating a dynamic network of connections. At the heart of the app is your very own customizable virtual buddy, a unique character you can personalize to reflect your individual style. Engage with your virtual friend through a variety of entertaining mini-games designed to keep you entertained and connected.

Buddy Up also offers a seamless way to share moments with friends through real-time image sharing. Post and view snapshots that are visible for up to 24 hours, allowing you to capture and share fleeting moments with your social circle. Combining social interaction, personalized avatar companionship, and interactive fun, Buddy Up is your ultimate companion app for both connecting with others and enjoying a unique, customized experience. (ScienceDirect,2024)

## OVERVIEW

### Welcome to BuddyUp



## Innovative features to look forward to

- **AI-Driven Responses:** The virtual buddy uses advanced artificial intelligence to interact naturally with users, understanding commands and providing intelligent, engaging responses. (ScienceDirect,2024)
- **Mini-Games:** A variety of fun and interactive mini-games are available for users to play with their virtual buddy, designed to entertain and strengthen the bond between users and their digital pet. (ScienceDirect,2024)
- **Real-Time Image Sharing:** Users can share images with their friends in real time, with posts visible for up to 24 hours, allowing for dynamic and spontaneous sharing of moments. (ScienceDirect,2024)
- **Customizable Virtual Buddy:** Users can personalize their virtual pet with different skins, accessories, and environments, enhancing the overall experience and reflecting individual preferences. (ScienceDirect,2024)
- **Swipe to Add Friends and Connect:** Users can swipe left or right to add new friends and initiate chats, making it easy to expand their social network and connect with others. (ScienceDirect,2024)
- **Widgets:** Widgets provide quick access to key features and interactions, allowing users to engage with their virtual buddy and manage their social connections more efficiently from their home screen. (ScienceDirect,2024)

# REQUIREMENTS

## Functional Requirements:

### User Authentication:

- Register and log in using single sign-on (SSO).
- Implement biometric authentication (fingerprint or facial recognition). (Software AG,2024)

### Settings Management:

- Users must be able to customize notification preferences.
- Language selection, including at least 2 South African languages.
- Accessibility options (e.g., text-to-speech, high-contrast modes). (Software AG,2024)

### Virtual Buddy Management:

- Customize the appearance of the virtual buddy.
- Interact with the virtual buddy through various activities. (Software AG,2024)

### Real-Time Image Sharing:

- Share images that are viewable for up to 24 hours.
- View images shared by friends in real time. (Software AG,2024)

### Mini-Games:

- Provide a selection of mini-games to play with the virtual buddy.
- Include varying levels of difficulty and objectives. (Software AG,2024)

### Swipe to Add Friends:

- Swipe left to pass or right to add new people as friends.
- Initiate chats and connect with added friends. (Software AG,2024)

### Widgets:

- Implement widgets for quick access to key features and interactions. (Software AG,2024)

#### Offline Functionality with Sync:

- Allow users to interact with their virtual buddy and perform certain actions offline.
- Automatically synchronize data once the internet connection is restored. (Software AG,2024)

#### REST API Integration:

- Connect to a REST API for data exchange between the app and the server.
- API endpoints for user authentication, virtual buddy management, and other essential functions. (Software AG,2024)

#### Real-Time Notifications:

- Implement a push notification system for real-time updates and alerts. (Software AG,2024)

## Non-Functional Requirements:

#### Performance:

- Ensure smooth loading times and responsive interactions. (Software AG,2024)

#### Scalability:

- Support a large number of concurrent users and future feature expansions. (Software AG,2024)

#### Security:

- Encrypt user data during transmission and storage.
- Implement secure authentication mechanisms. (Software AG,2024)

#### Usability:

- Design an intuitive and easy-to-navigate user interface.
- Include clear instructions and comprehensive help sections. (Software AG,2024)

#### Reliability:

- Maintain high availability, aiming for 99.9% uptime. (Software AG,2024)

#### Maintainability:

- Ensure code modularity, comprehensive documentation, and adherence to coding standards.
- Implement automated testing and continuous integration processes. (Software AG,2024)

#### Compatibility:

- Ensure compatibility with major mobile operating systems ( Android).
- Support diverse screen sizes and resolutions. (Software AG,2024)

#### Localization:

- Support multiple languages, initially including at least 2 South African languages.
- Design for easy addition of more languages in the future. (Software AG,2024)

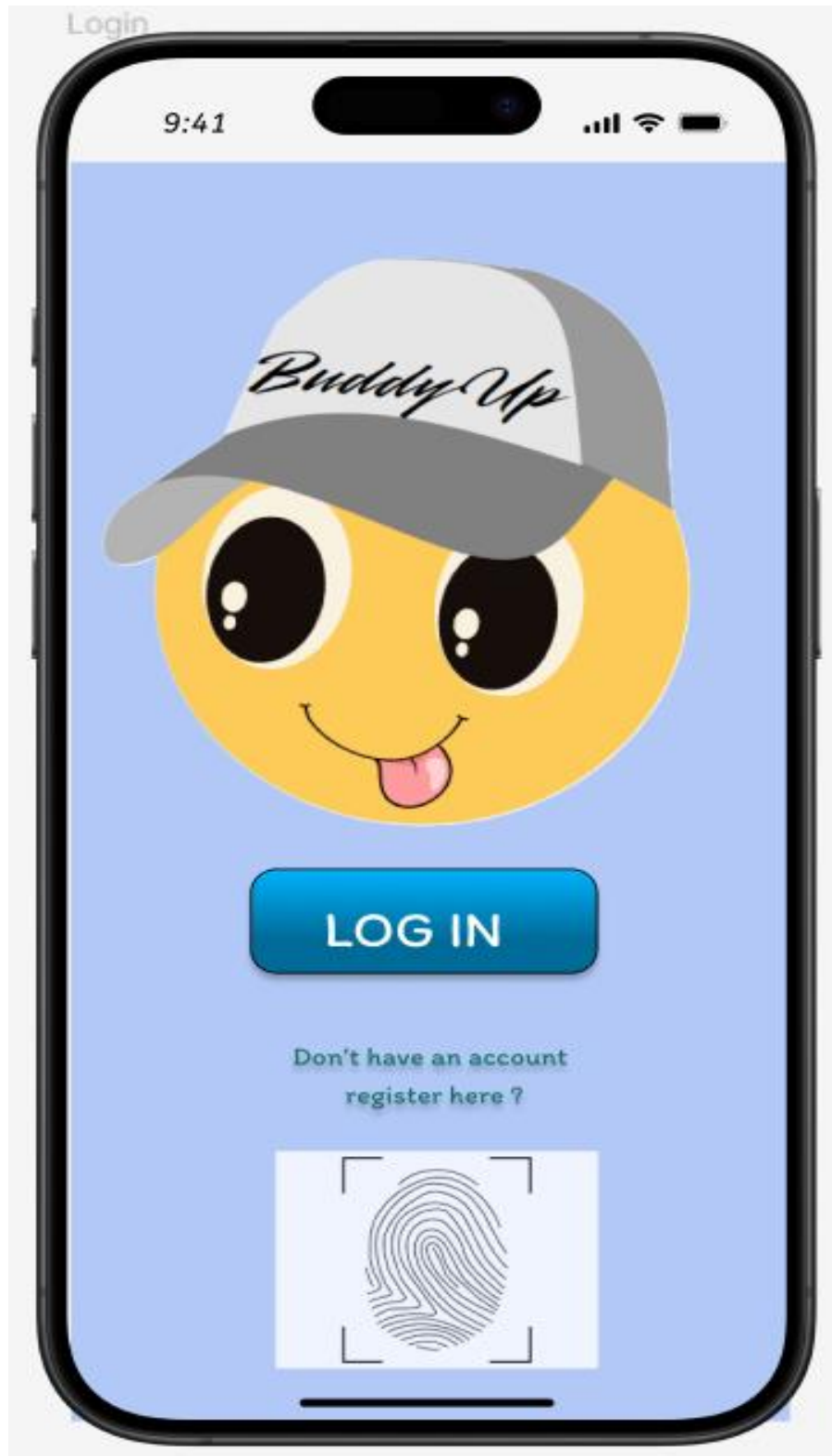
#### Analytics:

- Integrate tools to track user behavior and app performance.
- Develop reporting features for insights into user engagement and activity patterns. (Software AG,2024)

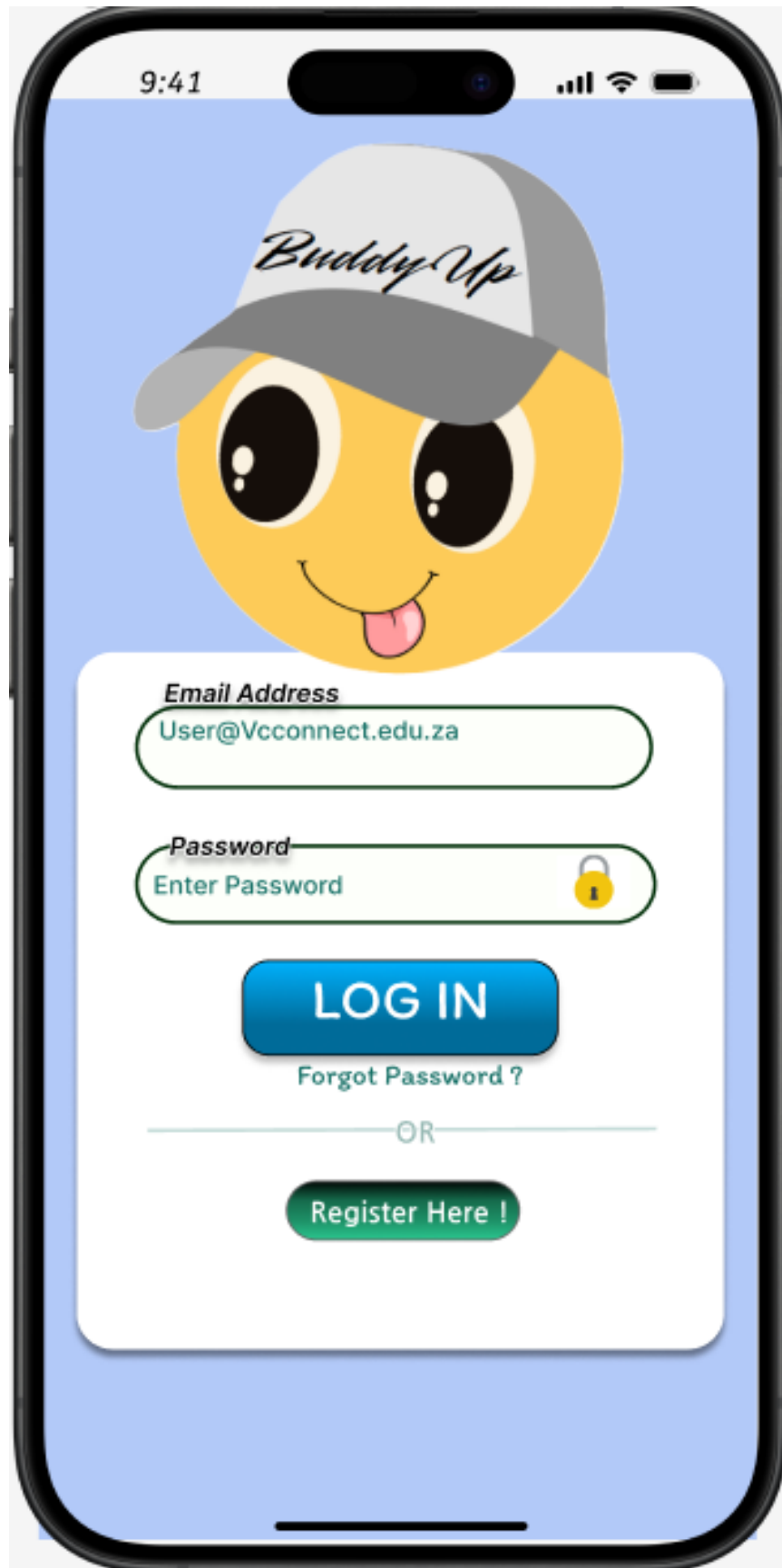
UI design



Splash screen

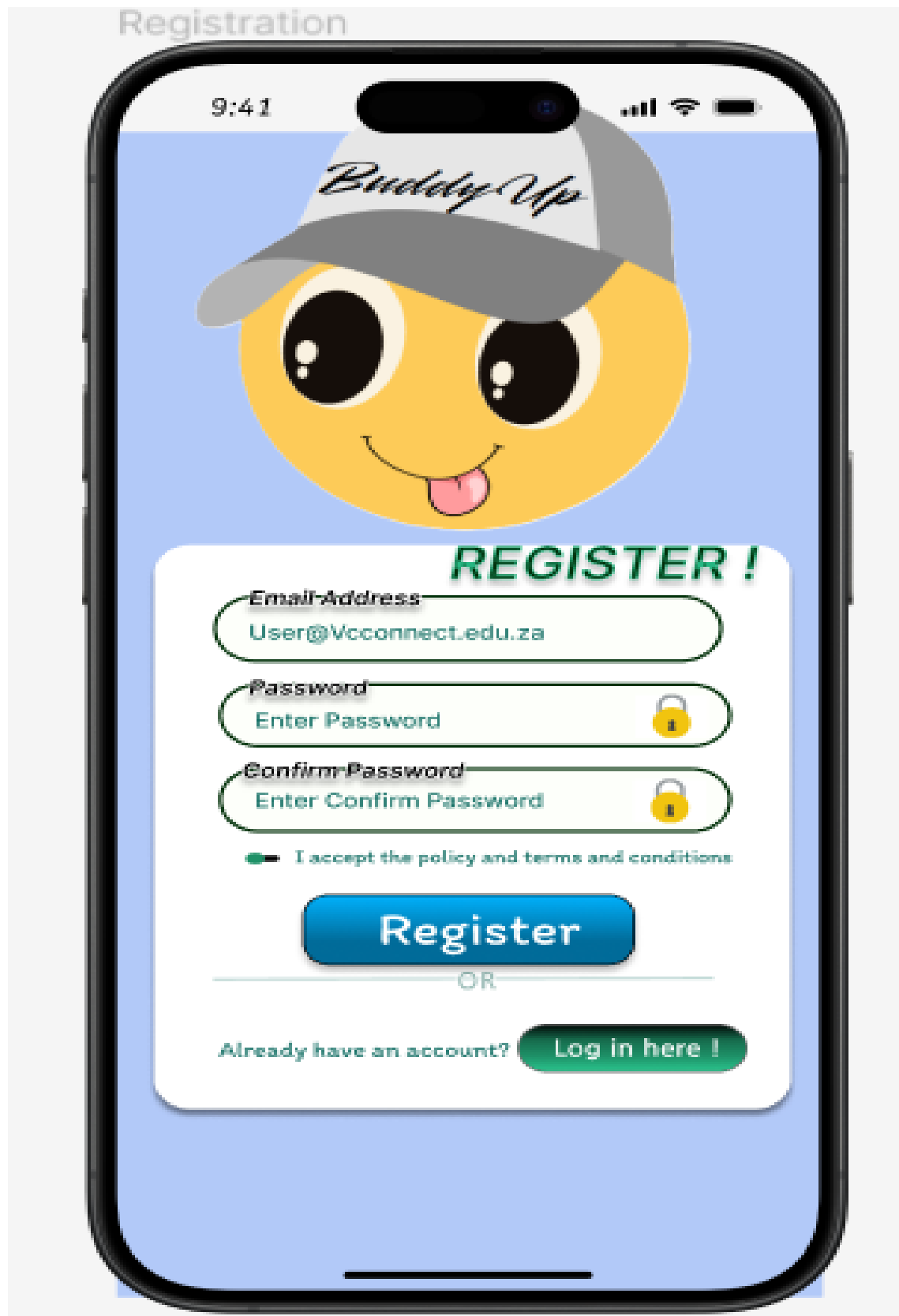


Login screen, user may login with biometrics if they are a previous user



user may enter credentials to log in to their account which they will then be allowed to sign in with biometrics there after





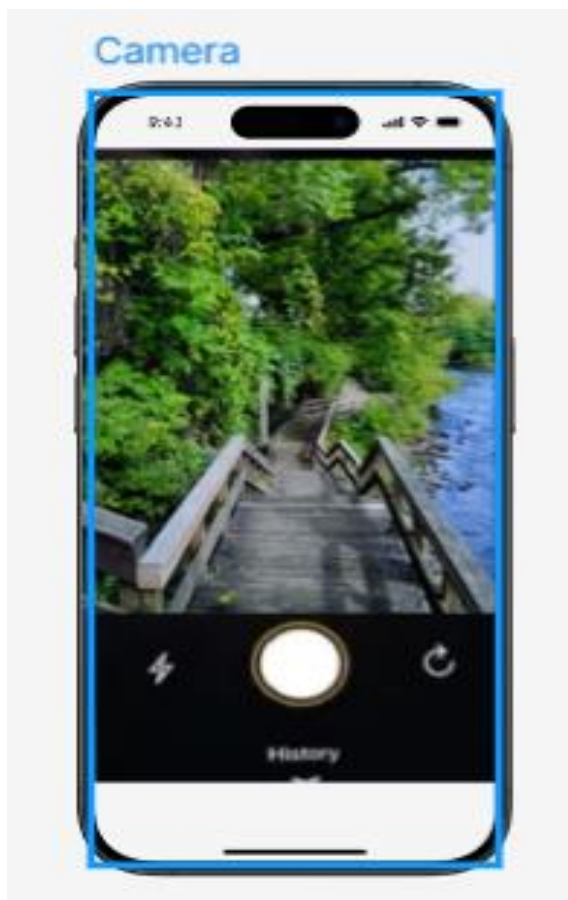
user may sign up for an account and register here

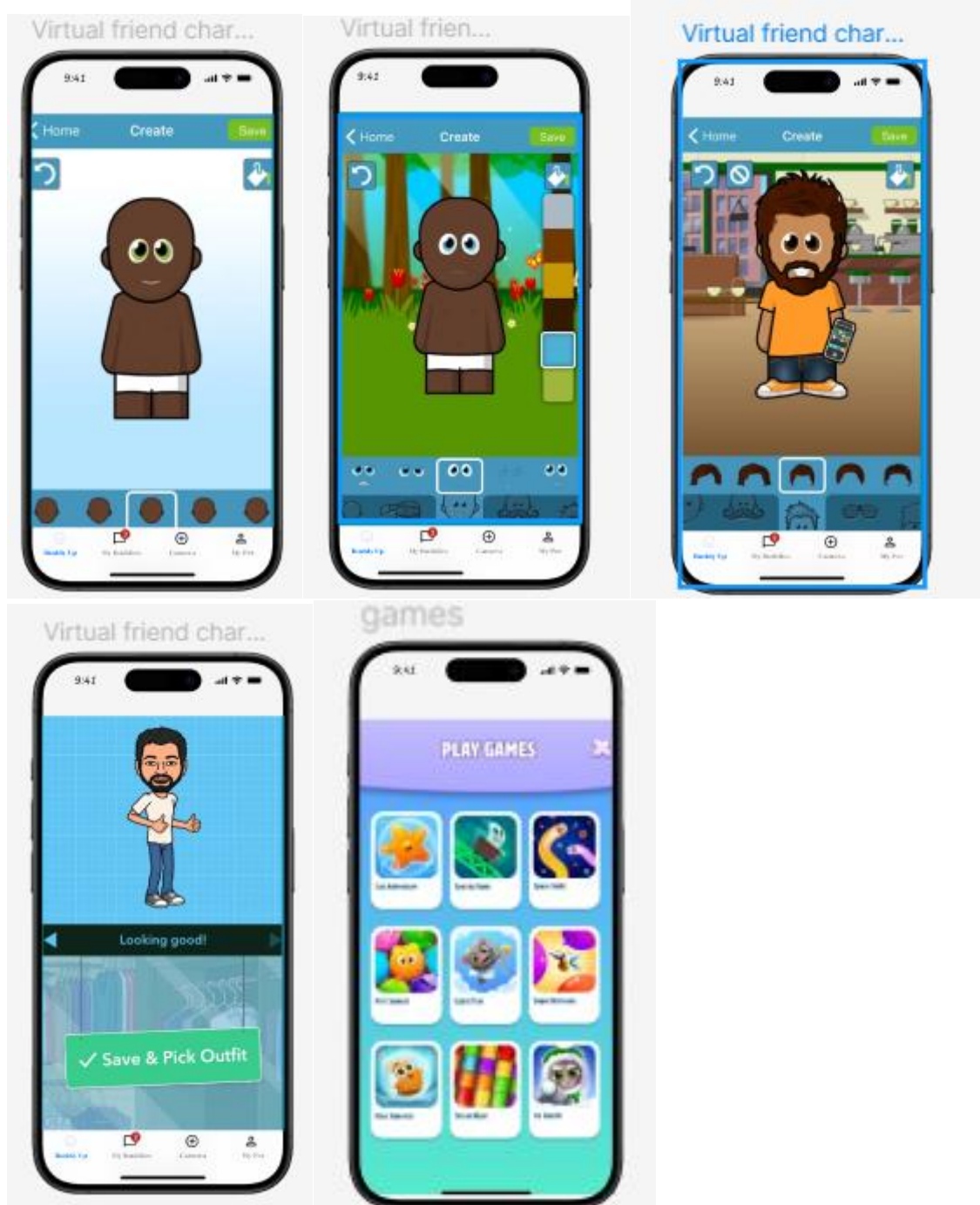


Once logged in,, the user will be able to swipe to add friends whom they will be able to contact via text messages



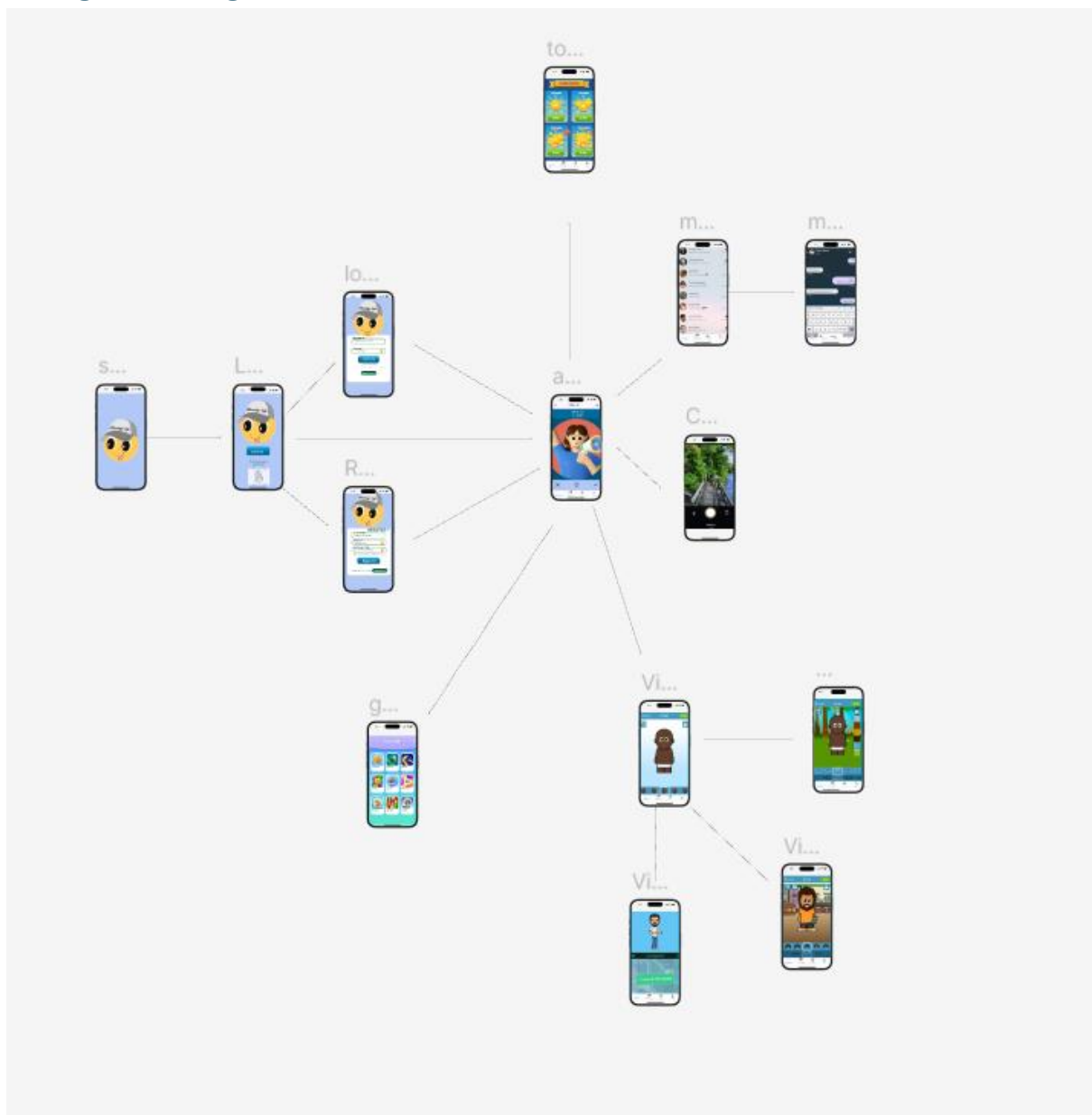
the user can also upload real time photos as stories





the user has a virtual friend to which they can customize and play mini games with, they can also earn tokens to which they can access premium clothes for the character

## Navigation diagram



## API

### 1. What the API Will Do for the App:

- **User Management:**
  - **Functionality:** Handle user registration, login, and profile management.
  - **Purpose:** Allows users to securely access their accounts and manage their profiles. (Jamie, 2023)
- **Game Data Management:**

- **Functionality:** Store and retrieve game data, including player stats, inventory items, and achievements.
- **Purpose:** Ensures game data is consistent and up-to-date. (Jamie, 2023)
- **In-Game Economy:**
  - **Functionality:** Manage virtual transactions, such as buying virtual currency or items.
  - **Purpose:** Handles in-game purchases and currency management. (Jamie, 2023)
- **Content Delivery:**
  - **Functionality:** Deliver game assets like textures, updates, and models.
  - **Purpose:** Ensures players receive the latest content and updates. (Jamie, 2023)
- **Analytics and Monitoring:**
  - **Functionality:** Collect data on player behavior and game performance.
  - **Purpose:** Provides insights for improving the app by understanding player interactions and performance. (Jamie, 2023)

## 2.Data types

Data Type	Sent	Received
User Data	<ul style="list-style-type: none"> <li>- User credentials</li> <li>- Player profiles</li> <li>- Customization choices</li> </ul>	<ul style="list-style-type: none"> <li>- Authentication tokens</li> <li>- User profile information</li> <li>- Game settings</li> </ul>
Game State Data	<ul style="list-style-type: none"> <li>- Player actions</li> <li>- In-game progress</li> <li>- Achievements</li> </ul>	<ul style="list-style-type: none"> <li>- Updated game state</li> <li>- Other player actions</li> <li>- Event triggers</li> </ul>
In-Game Economy Data	<ul style="list-style-type: none"> <li>- Transactions</li> <li>- Virtual currency exchanges</li> </ul>	<ul style="list-style-type: none"> <li>- Transaction confirmations</li> <li>- Updated currency balances</li> <li>- Item availability</li> </ul>
Content Delivery Data	<ul style="list-style-type: none"> <li>- Requests for game assets</li> </ul>	<ul style="list-style-type: none"> <li>- Game assets (patches, updates)</li> </ul>
Analytics Data	<ul style="list-style-type: none"> <li>- Player behavior metrics</li> </ul>	<ul style="list-style-type: none"> <li>- Reports on game performance and player engagement</li> </ul>

## 3. Developing the API:

- **Determine Requirements:**

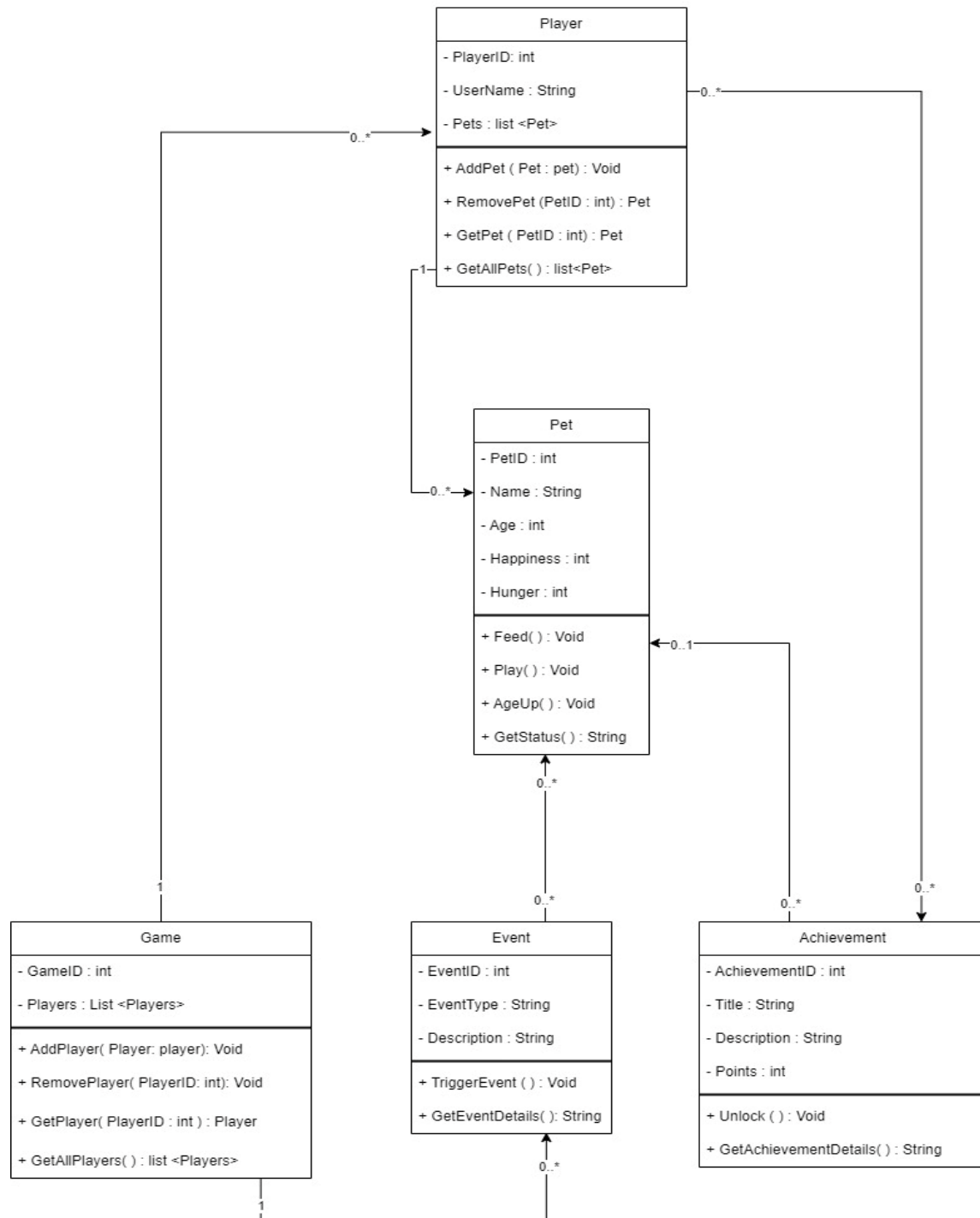
- Define necessary API features, such as user profiles, game data, and notifications. (Attract Group, 2023)
- **API Design:**
  - **Endpoints:** /users, /game-data, /transactions, /assets, /analytics
  - **Methods:** Use POST (create), GET (retrieve), PUT (update), DELETE (remove)
  - **Data Models:** Use JSON for data structures.
  - **Authentication:** Implement secure methods like OAuth 2.0. (Attract Group, 2023)
- **Choosing a Technology Stack:**
  - **Backend Framework:** Node.js with Express.
  - **Database:** MongoDB for flexible data storage. (Attract Group, 2023)
- **Implementation:**
  - Set up the development environment.
  - Write and test code for API endpoints.
  - Implement logging and error handling. (Attract Group, 2023)
- **API Testing:**
  - Use Postman for testing endpoints.
  - Write unit and integration tests. (Attract Group, 2023)
- **Documentation:**
  - Document API details, including endpoints and data structures, for developers. (Attract Group, 2023)
- **Deployment:**
  - Prepare deployment with cloud platforms. (Attract Group, 2023)

## 4. Hosting Services:

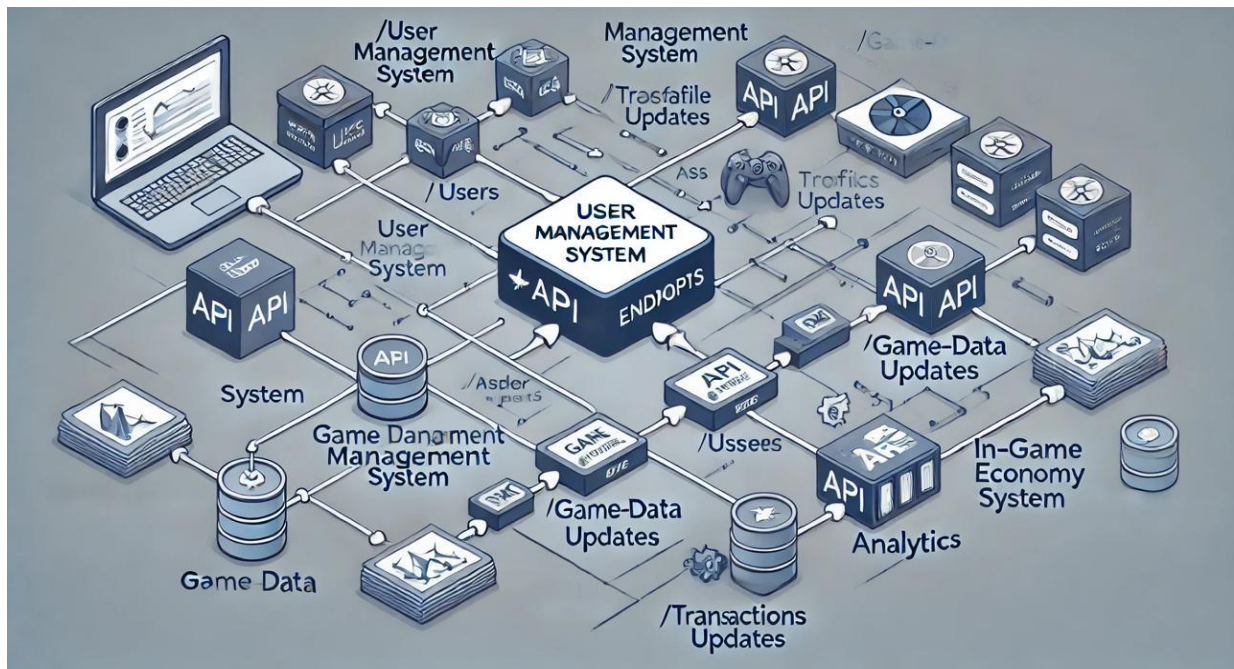
- **Cloud Platforms:**
  - **Google Cloud Platform:** Utilize Google App Engine and Cloud Functions.
  - **Microsoft Azure:** Use Azure App Services and Azure Functions. (Attract Group, 2023)
- **Serverless Options:**
  - **Google Cloud Functions:** For running serverless code.
  - **Azure Functions:** For executing event-driven code. (Attract Group, 2023)

## Diagrams

# BuddyUp







#### API as Central Hub:

- Acts as the main point of interaction for various subsystems.
- Connects User Management System, Content Delivery System, Game Data Management System, In-Game Economy System, and Analytics System. (Attract Group, 2023)

#### Subsystem Interactions:

- User Management System: Handles user data management.
- Content Delivery System: Fetches and delivers game assets to users.
- Game Data Management System: Manages player stats, achievements, and other game-related data.
- In-Game Economy System: Processes virtual transactions, managing in-game purchases.
- Analytics System: Collects data to generate reports on player behavior and game performance. (Attract Group, 2023)

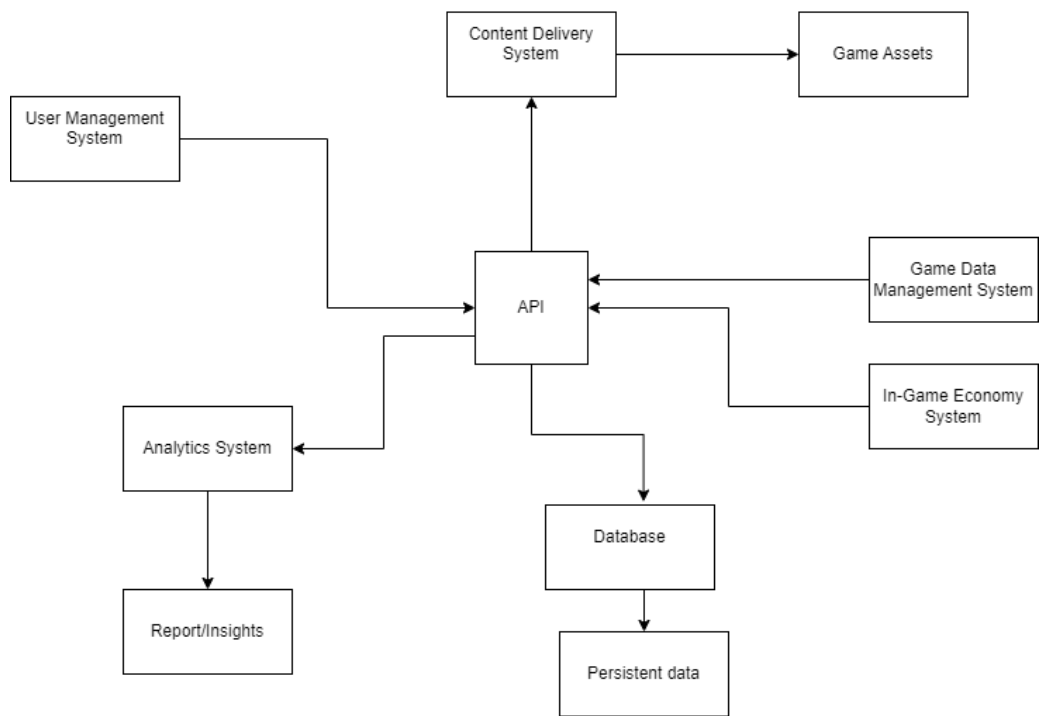
#### Database Connection:

- Linked to the API for secure storage of temporary and persistent data.
- Ensures data is easily accessible and securely stored. (Attract Group, 2023)

#### Integrated Architecture:

- Centralizing interactions through the API leads to a cohesive and efficient system.

- Supports seamless user management, content delivery, game data management, and analytics functions. (Attract Group, 2023)



## Data information

### User Profile Data

Data Field	Description	Data Type
User ID	Unique identifier for each user	String (UUID)
Username	Display name chosen by the user	String
Email Address	User's email for authentication and notifications	String
Password	Hashed password for secure authentication	String
Date of Birth	User's birthdate for age verification	Date
Profile Picture	User's avatar or profile image	Binary Data or String (URL)
Gender	User's gender, if provided	String (Enum: Male, Female, etc.)
Location	User's location data	String (City, Country)
Bio/Description	Short bio or description entered by the user	String
Preferred Language	Language selected by the user	String

Virtual Buddy Data

Data Field	Description	Data Type
Buddy ID	Unique identifier for each virtual buddy	String (UUID)
Buddy Name	Name given to the virtual buddy by the user	String
Buddy Appearance	Customization options selected (skin, accessories, etc.)	JSON
Buddy Level/Progress	Level or progress in interaction with the virtual buddy	Integer
Interaction History	Log of activities performed with the virtual buddy	JSON or Array of Strings
Last Interaction Timestamp	Last time the user interacted with the buddy	DateTime

Authentication Data

Data Field	Description	Data Type
Login Method	Method used for login (email, SSO, etc.)	String (Enum: Email, SSO, etc.)
Authentication Token	Token generated upon login for session management	String
Biometric Data	Fingerprint or facial recognition data	Binary Data (Encrypted)
Last Login Timestamp	Date and time of the user's last login	DateTime

Mini-Games Data

Data Field	Description	Data Type
Game ID	Unique identifier for each mini-game	String (UUID)
Game Scores	High scores achieved by the user	Integer
Game History	Record of games played, including timestamps and results	JSON
Game Settings	User preferences for each mini-game	JSON

Friends and Social Data

Data Field	Description	Data Type
Friend ID	Unique identifier for each friend	String (UUID)
Friend Username	Display name of each friend	String
Friendship Status	Status of the friendship (e.g., pending, accepted)	String (Enum: Pending, Accepted, etc.)
Chat History	Messages exchanged with each friend	JSON or Array of Strings
Shared Images	Images shared with friends	Binary Data or String (URL)
Swipe History	Record of users swiped left or right	JSON

Image Sharing Data

Data Field	Description	Data Type
Image ID	Unique identifier for each image	String (UUID)
Image Data	Actual image content	Binary Data
Upload Timestamp	Date and time the image was uploaded	DateTime
Visibility Duration	How long the image remains visible (up to 24 hours)	Integer (in hours)
Image Metadata	Information such as resolution, size, and format	JSON

Notification Data

Data Field	Description	Data Type
Notification ID	Unique identifier for each notification	String (UUID)
Notification Type	Type of notification (e.g., friend request, image shared)	String (Enum: Friend Request, etc.)
Notification Content	Text or content of the notification	String
Notification Timestamp	Date and time the notification was sent	DateTime
Read Status	Whether the notification has been read	Boolean

Settings Data

Data Field	Description	Data Type
Notification Preferences	User's preferences for notifications	JSON
Language Preference	Selected language for the app interface	String
Accessibility Settings	User's preferences for accessibility features	JSON
Privacy Settings	User's settings for privacy and data sharing	JSON

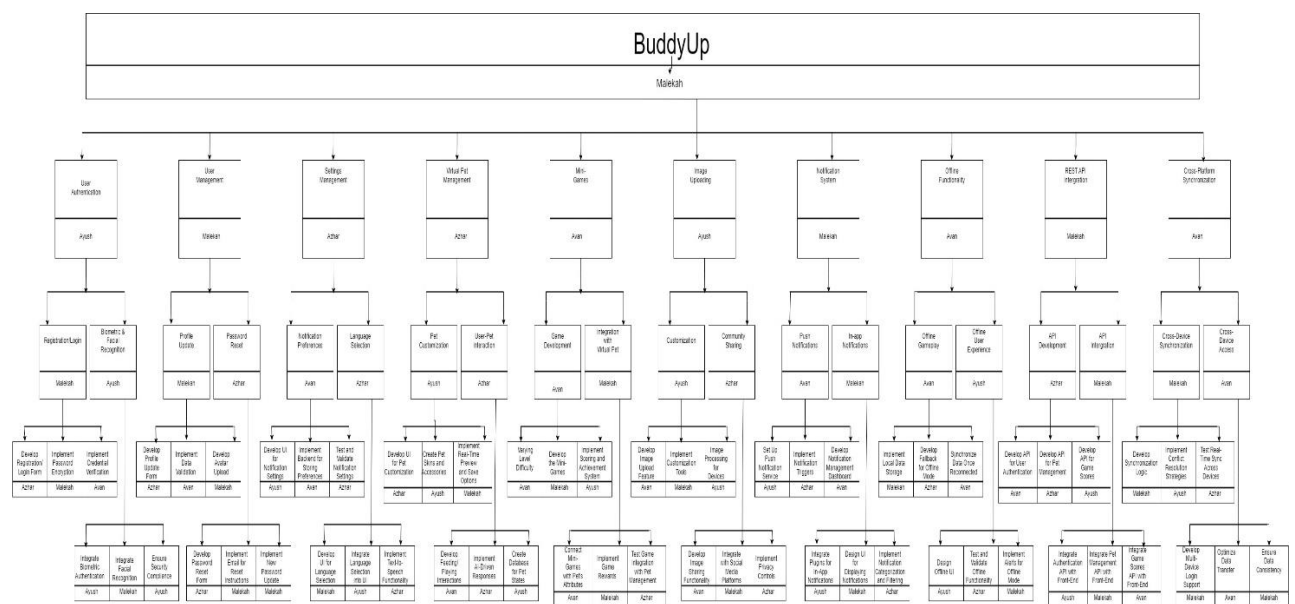
Analytics Data

Data Field	Description	Data Type
User Behavior Data	Logs of user interactions with the app	JSON
Session Data	Duration and frequency of user sessions	DateTime (start and end times)
App Performance Data	Metrics like load times, errors, etc.	JSON

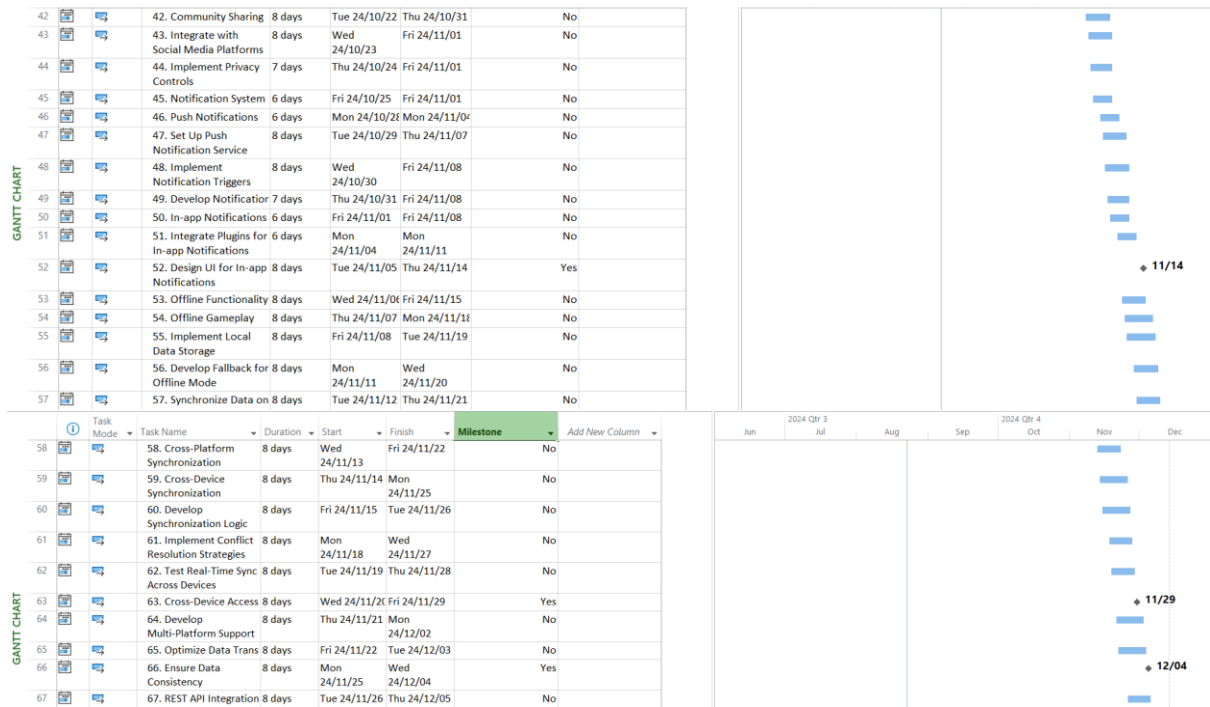
### In-Game Economy Data

Data Field	Description	Data Type
Transaction ID	Unique identifier for each transaction	String (UUID)
Virtual Currency Balance	User's balance of in-game currency	Integer
Purchase History	Record of virtual items purchased	JSON
Transaction Timestamp	Date and time of each transaction	DateTime

## project planning







68		68. API Development	8 days	Wed 24/11/21	Fri 24/12/06	No
69		69. Develop API for User Authentication	8 days	Thu 24/11/28	Mon 24/12/09	No
70		70. Develop API for Pet Management	8 days	Fri 24/11/29	Tue 24/12/10	No
71		71. Develop API for Game Scores	8 days	Mon 24/12/02	Wed 24/12/11	Yes
72		72. API Integration	8 days	Tue 24/12/03	Thu 24/12/12	No
73		73. Integrate User Management API with Front-End	8 days	Wed 24/12/04	Fri 24/12/13	No

## Unit Testing

Task Name	Start Date	End Date
Write Unit Tests for Authentication Module	2024-09-06	2024-09-08
Write Unit Tests for Registration/Login Form	2024-09-11	2024-09-13
Write Unit Tests for Biometric & Facial Recognition	2024-09-26	2024-09-28
Write Unit Tests for User Management	2024-09-06	2024-09-08
Write Unit Tests for Password Reset	2024-09-16	2024-09-18
Write Unit Tests for Notification System	2024-10-05	2024-10-07
Write Unit Tests for Virtual Pet Management	2024-09-30	2024-10-02
Write Unit Tests for Mini-Games	2024-10-01	2024-10-03
Write Unit Tests for Image Uploading and Customization	2024-10-05	2024-10-07
Write Unit Tests for Offline Functionality	2024-10-08	2024-10-10

## Bug Fixing

Task Name	Start Date	End Date
Fix Bugs in Authentication Module	2024-09-09	2024-09-11
Fix Bugs in Registration/Login Form	2024-09-14	2024-09-16
Fix Bugs in Biometric & Facial Recognition	2024-09-29	2024-10-01
Fix Bugs in User Management	2024-09-09	2024-09-11
Fix Bugs in Password Reset	2024-09-19	2024-09-21
Fix Bugs in Notification System	2024-10-08	2024-10-10
Fix Bugs in Virtual Pet Management	2024-10-03	2024-10-05
Fix Bugs in Mini-Games	2024-10-04	2024-10-06
Fix Bugs in Image Uploading and Customization	2024-10-08	2024-10-10
Fix Bugs in Offline Functionality	2024-10-11	2024-10-13



## CONCLUSION

BuddyUp is more than just an app—it's a fresh way to connect and have fun. With its innovative features like customizable virtual buddies, real-time image sharing, and engaging mini-games, BuddyUp offers a unique platform for users to expand their social circles and enjoy a personalized experience.

The app's design focuses on both functionality and performance, ensuring a smooth, secure, and scalable experience. The robust API supports everything from user management to game data, while our choice of cloud and serverless technologies ensures reliability and efficiency.

As we continue developing BuddyUp, our goal is to create an app that not only meets but exceeds user expectations, making social interactions and virtual companionship more enjoyable than ever.

## References

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