



Software Requirements Specification

For



By

Millennium

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Introduction:

BeakPeek aims to grow the bird watching community in South Africa by making it easier to find, identify and predict the occurrence of bird species.

BeakPeek will allow users to see what bird species can be found in their area and provide conservationists with an analytical overview of the data to easily gauge the growth and decline of local bird species.

User Characteristics:

User 1 – Birders: The primary user of the application, birders can use the application to view all kinds of birds in South Africa and where to find them using SABAP2's public database. Birders can view what birds can be seen in the pentad they are currently in. They can view the list of birds that they have seen and add their sighting to the database if they want to. Birders can identify birds by taking a photo of it. Birders can identify birds through specialised filters. They can also listen to what a bird sounds like.

User 2 – Conservationists: Conservationists can use the data uploaded by users and by SABAP2 to receive an indication of what a specific bird population is doing, more sightings than expected could indicate an increase in the birds' population and vice versa. Further can use this data to track a specific bird should the species be sufficiently rare.

User 3 – Admin: Manually confirms Conservationists authenticity and will interact with the administrative systems.

Constraints:

1. Only a mobile application will be developed.
2. Only South African bird data through SABAP2 will be available.
3. The application will only be available in English.
4. Application requires internet connection at least once to download bird information for offline use.

Functional Requirements:

An Asterix (*) indicates an optional requirement and a hashtag indicates a feature that is implemented.

1. User Profile Creation and Management:

- 1.1. Register an account using either their email or Google account.#
- 1.2. Login into their account using social sign-in (Google account) or their normal details.#
- 1.3. Manage their profile.
- 1.4. Manage their life-list. (all the birds they've seen)

2. Interactive Map:

- 2.1. Display an Interactive South African map.#
- 2.2. Show user's current location.
- 2.3. View bird species by pentad.#
- 2.4. View the percentage chance that the user has of seeing a specific bird in a specific pentad.
- 2.5. View likely bird species near the user.#
- 2.6. View a heatmap of the birds' locations.

3. Identify and Find Birds:

- 3.1. Search for a specific birds' location data.#
- 3.2. View Pentad information of bird sightings.#
- 3.3. Take a picture of a bird to identify it*.
- 3.4. Record the sound a bird makes to identify it*.
- 3.5. Filter birds by colour and other features*.

4. Enrich User Knowledge:

- 4.1. Play a bird quiz minigame*.
- 4.2. View all text-based information regarding a birds' location.#
- 4.3. See what a bird looks like*.
- 4.4. Hear what a bird sounds like*.

5. Allow Users to Compete:

- 5.1. Earn experience points based on the rarity of the bird sighted to increase their level.
- 5.2. Earn special badges based on challenges.
- 5.3. Participate in daily, weekly, and monthly challenges.
- 5.4. Report users*.

6. Specialised Data View for Conservationists:

- 6.1. View the bird sighting data analytically.
- 6.2. Make note of the existence of a nest or hatchlings.
- 6.3. View population projections.
- 6.4. Filter by birds that have a tag*.
- 6.5. View unexpected sightings. (rare bird or bird in wrong area)
- 6.6. Track specific areas for species of birds.

7. Manage and Process Data from Database:

- 7.1. Contribute to the user bird sighting database.
- 7.2. Rank birds by rarity*.
- 7.3. Ingress of data from SABAP2.#
- 7.4. Processing of data from SABAP2.#
- 7.5. Verify user sighting.

8. Administrative System and Users:

- 8.1. Authorise a user as a conservationist.
- 8.2. Authorise new admins.
- 8.3. Manage database systems.
- 8.4. Ban users*.

Subsystems:

- 1. User Profile Creation and Management
- 2. Interactive Map
- 3. Identify Birds
- 4. Enrich User Knowledge
- 5. Allow Users to Compete
- 6. Specialised Data View for Conservationists
- 7. Manage and Process Data from Database
- 8. Administrative System and Users

Non-Functional Requirements:

1. Performance

- 1.1. The system should be able to handle concurrent users.
- 1.2. The system should be able to handle concurrent messages and notifications.
- 1.3. The system should be able to handle low network speeds.
- 1.4. There should be no more than a two second response time.

2. Reliability

- 2.1. The system should be available 20/7 (Four-hour maintenance window is acceptable between 22:00 and 02:00).
- 2.2. Should be able to recover from crashes and failures.
- 2.3. The system must survive upgrades and device migration.
- 2.4. The system should be scalable past 10 000 active users per month*.
- 2.5. The system must function with low bandwidth.

3. Security Through Azure

- 3.1. Be able to protect user data from unauthorised access.
- 3.2. Be able to protect user data from unauthorised modification.
- 3.3. Be able to protect user data from unauthorised deletion.
- 3.4. Be able to protect user data from unauthorised disclosure.

4. Maintainability

- 4.1. The system should be easy to debug.
- 4.2. Be able to be updated without affecting the user experience.
- 4.3. Retrieve updated SABAP2 data without affecting users.
- 4.4. The system should be easy to maintain.

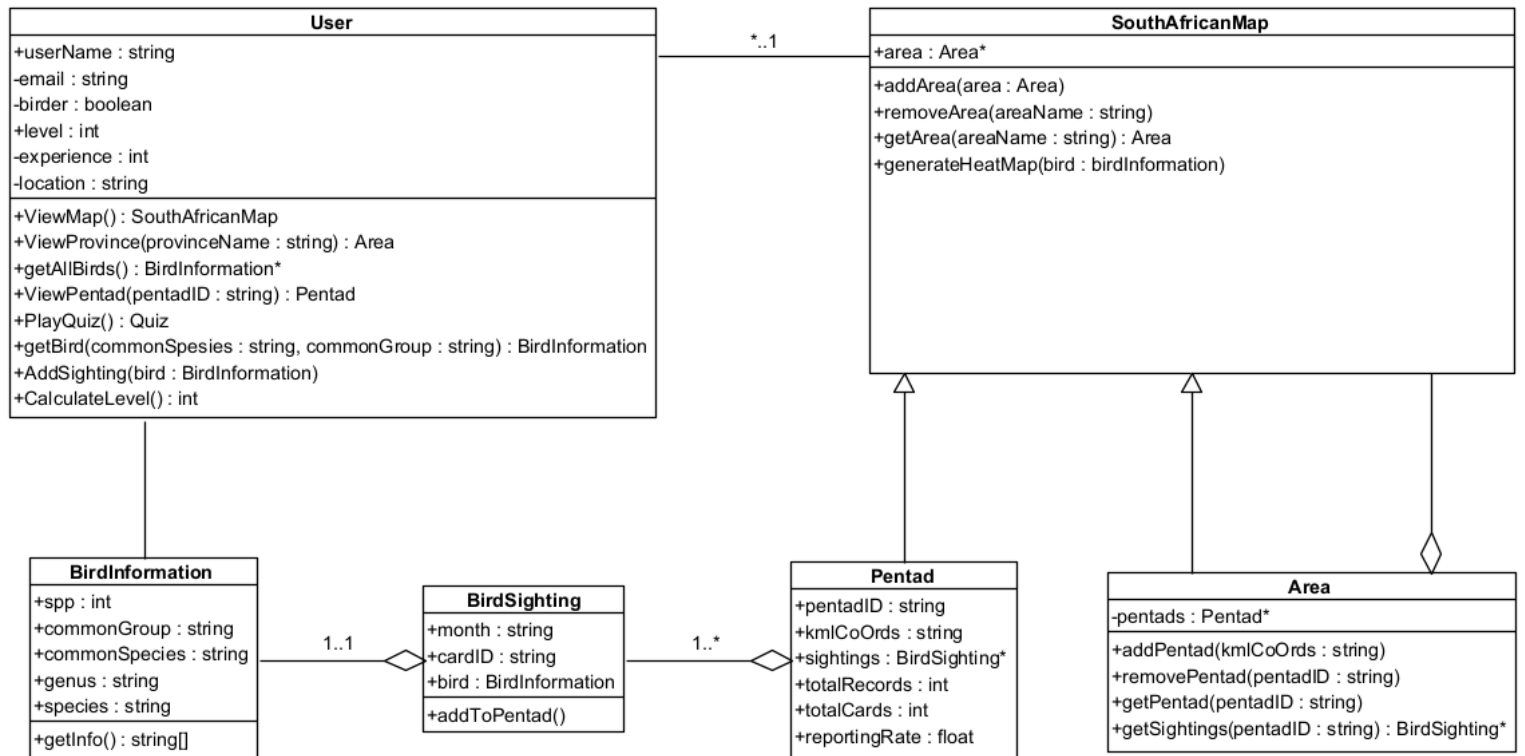
5. Usability

- 5.1. The system should be easy to use.
- 5.2. The system should be easy to navigate.
- 5.3. The system should be easy to understand.
- 5.4. The system should be easy to learn.

6. Efficiency

- 6.1. The system should not drain more than 5% battery per hour.

UML Class Diagram:

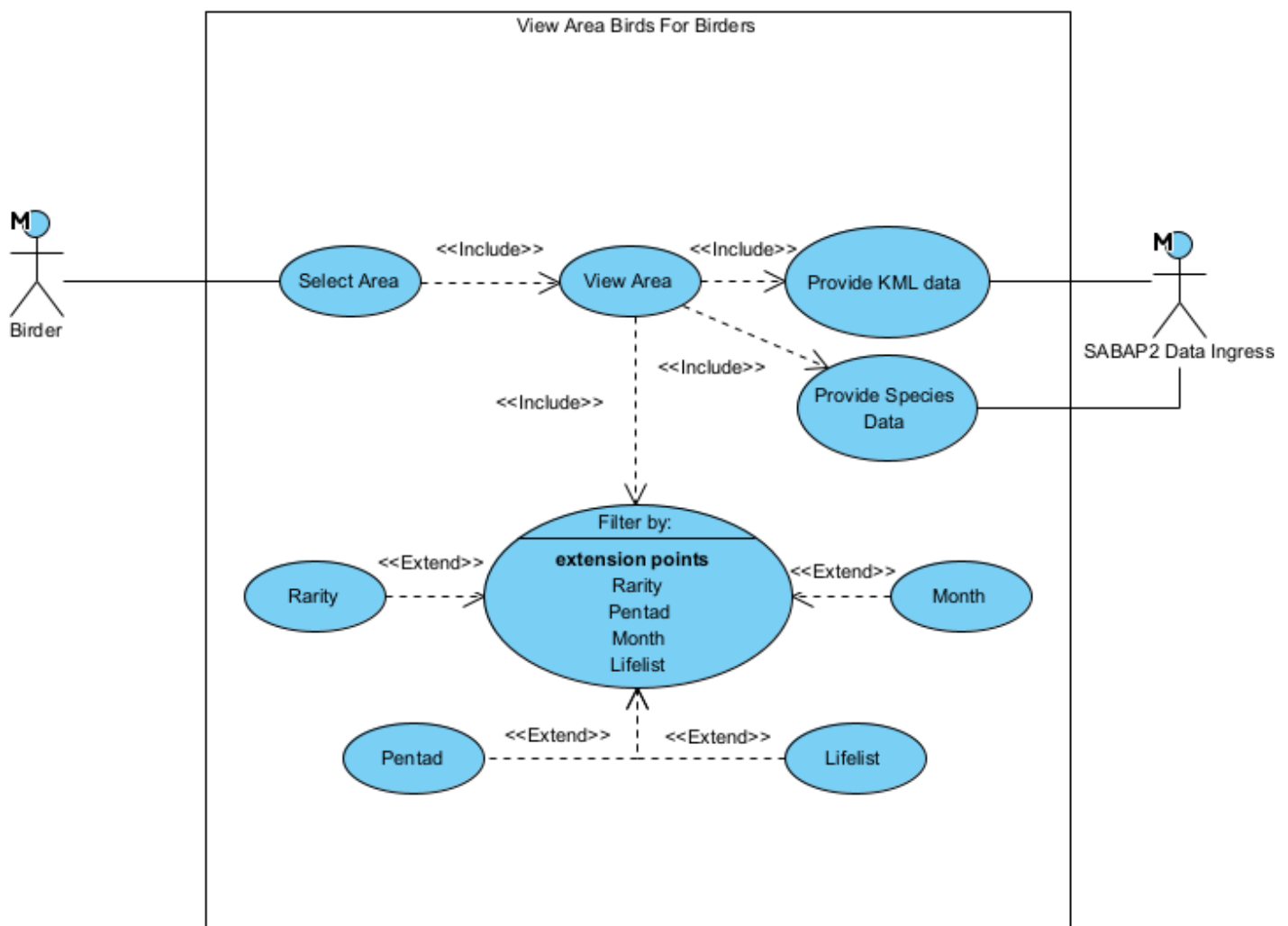


Use Cases:

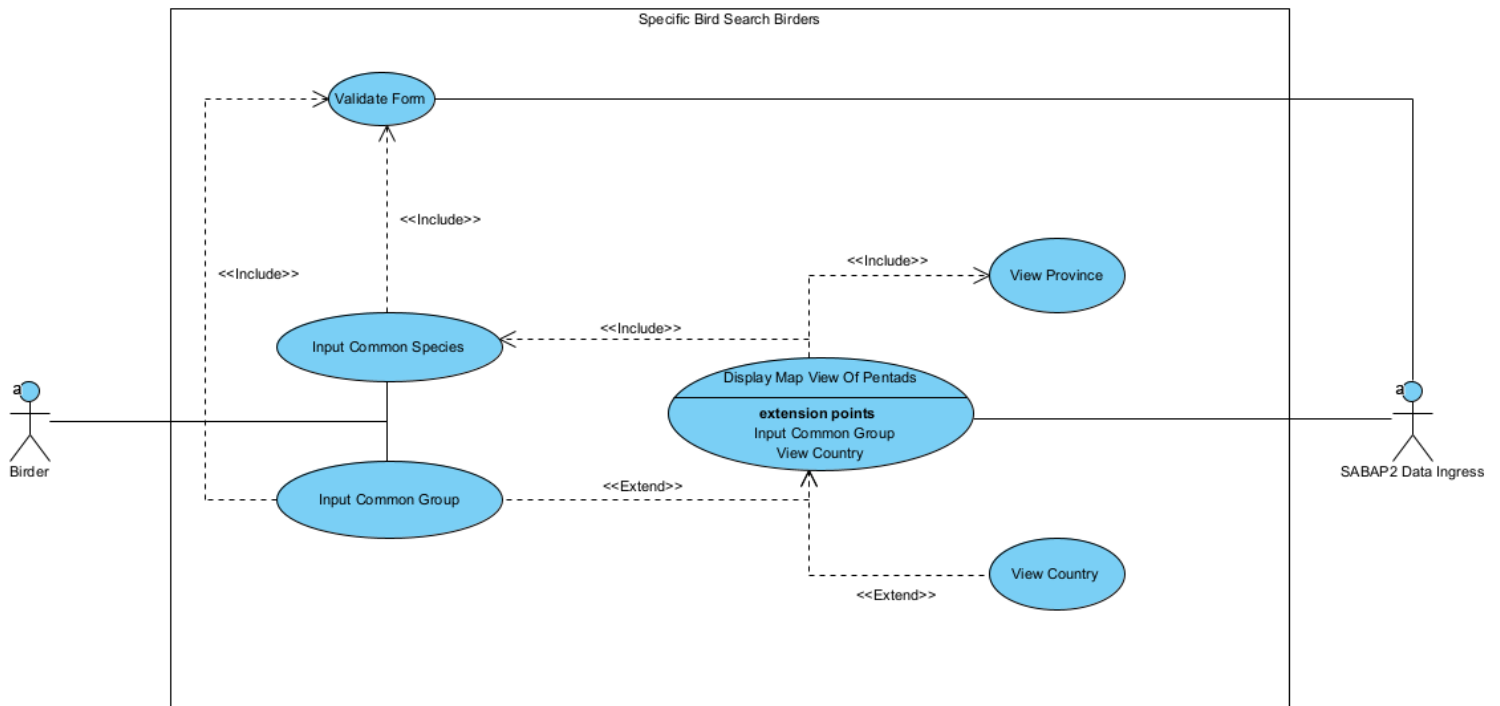
1. View Province birds. (Birder)
2. Search for a specific bird. (Birder)
3. User Login. (Conservationist and Birder)

Use Case Diagram: BeakPeek System

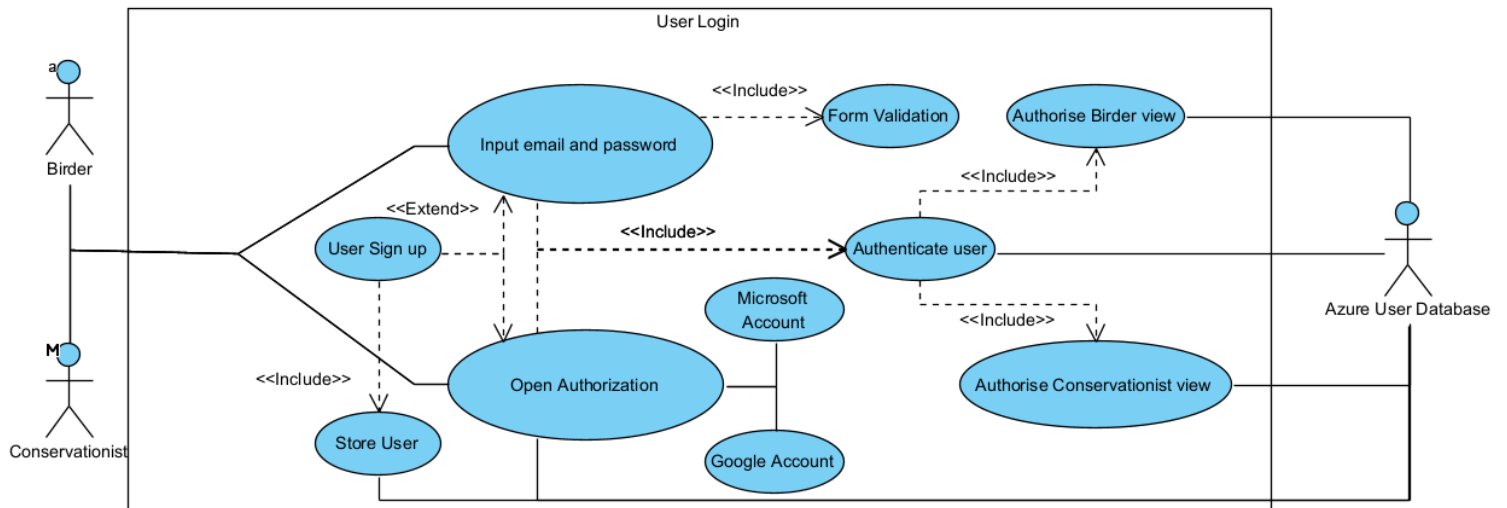
1. View Area Birds for Birders:



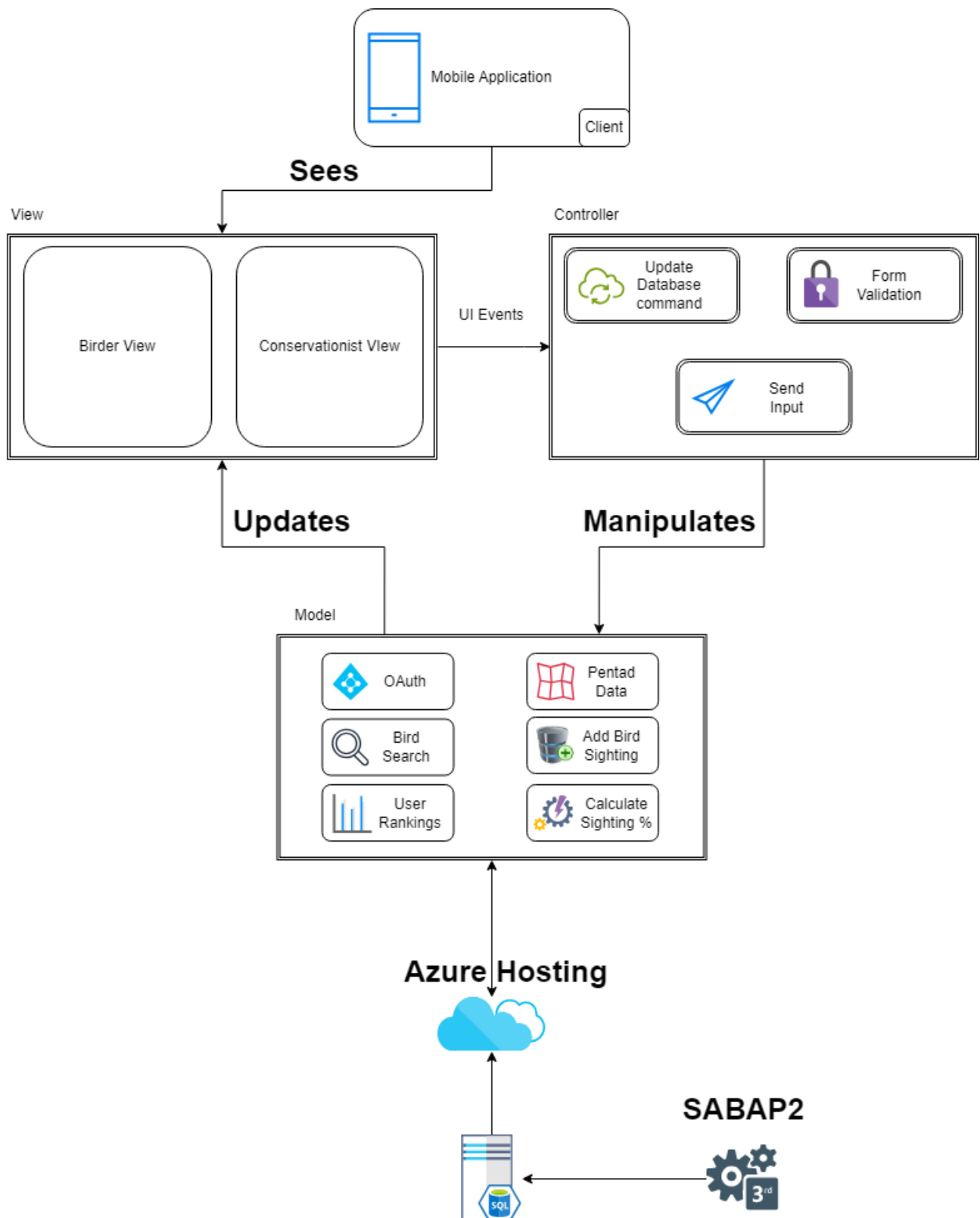
2. Specific Bird Search for Birders:



3. User Login:



Architectural Diagram



Service Contract

Provided Software

The client shall provide access to the Azure framework required for the software that Millennium will develop. Millennium will produce a working, user-friendly application that can show the pentad location of where South African birds can be located and what the percentage chance is of location each bird listed in that pentad. This data will be sourced from SABAP2 and its accuracy and functionality relies on the continued maintenance of SABAP2.

Technology Stack

The mobile application will be developed using Microsoft Azure for user management and the storage of bird data. The Dot Net framework will be used to communicate with the bird information database on Azure. Flutter will be used for all front-end development and communicated directly to Azure for user authentication and authorisation.

Project Management

For the duration of the project an agile methodology will be adopted. A weekly meeting will be held with the industry mentor and university mentor to provide progress reports and sprint reviews; this aims to ensure efficient development of the mobile application that will not only meet but surpass the clients' requirements. Team members will meet every weekday briefly to discuss progress and any problems that may have been encountered and to implement changes to the sprint plan should any be necessary.

Security

Azure implements form validation as developed by Microsoft. Users will not be able to access SABAP2 data directly: through the MVC model users will always be separated from the main database systems by the controller. User bird sightings are separated into their own database that will be indicated as untrustworthy and users will have the option to include it in the data they view.

Taking Laws into Consideration

The mobile application will comply with South African regulations, specifically provision will be made to comply to laws such as the POPI Act; ensuring that user data is secured. A user agreement policy allowing BeakPeek to store their data will be made and user data will not be made publicly available unless specifically stated that it will be (for example usernames)