**Database Structure Document 20250531**

1. **Overview**

This project uses **Firebase Firestore** as the primary NoSQL cloud database for real-time data storage and user interaction logging. The database is designed to support a modular backend architecture for a mobile application, with collections focused on authentication, user activity, and feedback logging.

Key characteristics:

* **Database Type:** Firebase Firestore (NoSQL, document-based)
* **Data Format:** JSON-style documents
* **Usage Focus:** Logging user actions (e.g., login/logout), managing user data, collecting feedback, and storing geolocation points
* **Time Zone:** All timestamps are recorded in UTC+10

1. **Collection List**

* **Users:** Contains user profile data such as display name, email, avatar, and challenge completion medals. Linked to Firebase Authentication users via UID.
* **Feedback:** Collects user-submitted feedback, including a numeric rating and optional text. Allows the system to evaluate user satisfaction.
* **locations/{userId}/history:** Stores historical GPS coordinates (latitude and longitude) per user. Useful for generating activity heatmaps and analysing movement data.
* **auth\_logs:** Logs user authentication events such as login/logout with timestamps and device info
* **ChallengeSessions:** Records each user's session when participating in a challenge. Stores metadata such as start time and transport type (e.g., walk, ride), with nested data in subcollections.
* **challengeSessions/challenges:** A subcollection under each session that tracks the progress of individual challenge categories (e.g., nature, safety). Each document logs completion status and timestamps.

1. **Details:**

Collection: users

|  |  |  |  |
| --- | --- | --- | --- |
| Field Name | Data Type | Required | Description |
| avatarUrl | String | No | Path to the user's avatar image (used in frontend UI) |
| createAt | Timestamp | Yes | The account creation time |
| email | String | Yes | User's registered email address |
| name | String | Yes | User’s display name |
| uid | String | Yes | Unique identifier from Firebase Authentication |
| medals.completeAll | Boolean | No | Indicates whether the user has completed all challenges |

Collection: feedback

|  |  |  |  |
| --- | --- | --- | --- |
| Field Name | Data Type | Required | Description |
| feedbackText | String | No | Optional comment or message from the user |
| rating | Integer | Yes | User’s rating score (typically on a scale of 1 to 5) |
| submittedAt | Timestamp | Yes | The date and time the feedback was submitted |
| uid | String | Yes | The UID of the user who submitted the feedback (linked to users) |

Subcollection: locations/{userId}/history

|  |  |  |  |
| --- | --- | --- | --- |
| Field Name | Data Type | Required | Description |
| latitude | Float | Yes | The geographic latitude of the location |
| longitude | Float | Yes | The geographic latitude of the location |
| timestamp | Timestamp | Yes | The exact time the location was recorded |

Collection: auth\_logs

|  |  |  |  |
| --- | --- | --- | --- |
| Field Name | Data Type | Required | Description |
| action | String | Yes | The type of action performed by the user, e.g., "login" or "logout" |
| device | String | No | The device or user agent used to perform the action |
| timestamp | Timestamp | Yes | The date and time when the action occurred (with time zone) |
| uid | String | Yes | The unique user ID associated with the action (links to users.uid) |

Collection: challengeSessions

|  |  |  |  |
| --- | --- | --- | --- |
| Field Name | Data Type | Required | Description |
| startedAt | Timestamp | Yes | The start time of the challenge session |
| transportType | String | Yes | The mode of transportation used (e.g., "walk", "ride") |
| userId | String | Yes | The UID of the user participating in the session |

Collection: challengeSessions/{sessionId}/challenges

|  |  |  |  |
| --- | --- | --- | --- |
| Field Name | Data Type | Required | Description |
| type | String | Yes | The name of the challenge category (e.g., "nature") |
| isCompleted | Boolean | Yes | Indicates whether the challenge has been completed |