School of Computer Science

Project Design - IoT Seminar 2024

Doggo: Mobile Application for Dog Owners

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GitHub Repository : shir-tz/Doggo

Project Demo : YouTube Link

Table of Contents

Use Cases 3
Requirements 4
Technology Stack 5
Implementations 6
Getting Started with Deployment 15
Endpoints (API) 18
Database Schemes 40

Use Cases

1. **Steps Data Collection**:

   The system is designed to collect and record step data from an IoT device attached to the dog's collar. This device continuously monitors and tracks the total number of steps the dog takes throughout the day. This data is captured in real-time, providing a comprehensive overview of the dog's daily physical activity.

2. **Activity Data Monitoring and Progress Summaries**:

   The system regularly updates and compares the dog's activity data with user-set goals. It provides detailed progress summaries showing how the dog is performing over time. Users receive these summaries to see how well their dog is hitting its activity targets and to make any necessary changes to improve the dog's fitness plan.

3. **Comprehensive Management of Dog's Essential Information:**

   The system allows users to manage and track their dog's essential information, including physical attributes, health data, and medical history.

4. **Integrated Map Feature for Locating Dog-Friendly Locations:**

   The system offers users a fully integrated map feature designed to help them easily locate nearby dog-friendly places. This includes parks, pet-friendly restaurants, pet stores, and other relevant locations where dogs are welcome.

Requirements

1. **Track Daily Fitness Data:**

   The system tracks the dog's activity by monitoring its steps, calories burned, and distance covered using an IoT device. This data provides a comprehensive overview of the dog's daily physical activity, helping users to monitor and maintain their dog's health and fitness.

2. **Monitor Progress Towards Goals:**

   The system must regularly compare the dog's activity data from the IoT device with user-defined goals and generate detailed progress summaries. Users will be able to track their dog's performance on a daily, weekly, and monthly basis, providing a comprehensive view of the dog's activity over time. This ensures users can monitor progress and adjust goals as needed.

3. **Manage Dog's properties:**

   Users will be able to store and manage their dog's health and property data, such as medical records, dog care details, and other relevant information. This ensures secure storage and easy access for ongoing monitoring and updates.

4. **Locate Dog-Friendly Places:**

   Users will be able to find dog-friendly locations, including parks, pet-friendly restaurants, pet stores, and more, using the map feature. They should be able to search, filter, and navigate to these destinations through the map, providing easy access to amenities and enhancing their dog's lifestyle and social experiences.

Technology Stack

1. **Backend:**
    - Language: Python
    - Framework: Flask
    - Architecture: Monolith
    - Data base: SQL using PostgreSQL
    - Cloud: AWS

2. **Frontend:**
    - Language: Dart
    - Framework: Flutter
    - Mobile application: Android

3. **Embedded:**
    - Arduino NANO 33 – IoT, Charged Battery (soldered electric circle)
    - Dog bone case – 3D printed
    - Language: Arduino programming language (C++)
    - IDE: Arduino IDE

Implementations

1. **Backend:**

   Overview –

   The back end of the app is built using Flask, a lightweight Python web framework. It serves as the main hub for handling API requests, managing data, and communicating with the database.

   - **Structure and Organization**

     The backend follows a modular structure for maintainability and scalability. Routes are organized into separate files based on different entities, such as users, dogs, and collars, to make it easier to manage and extend the codebase.

     routes folder contains all route definitions organized by feature. For example:

     - user_routes.py - Handles all user-related routes (e.g., registration, login).
     - dog_routes.py - Manages routes related to dog data (e.g., add dog, steps).

   - **Database Interaction**

     The backend connects to a PostgreSQL database (hosted on AWS RDS) using the `psycopg2` library. It handles various CRUD operations, such as retrieving, updating, and deleting data related to users and dogs. The database schema is designed to store user information, dog's activity data and more.

   - **Dockerized Application and Deployment**

     The backend is containerized using Docker, making it easy to deploy in any environment.

     In addition, the backend is deployed on an AWS EC2 instance with Docker Hub used to host the images. This setup ensures scalability and high availability.

- **Backend Functional Workflow**
  - Conversion Tables for Accurate Calculations:

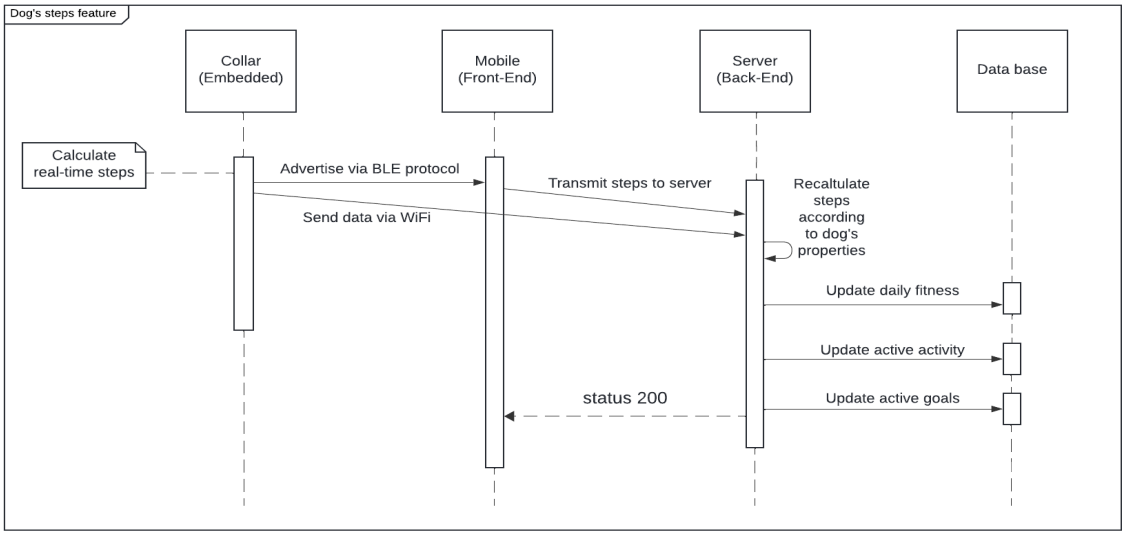
    The backend uses conversion tables based on the dog's size and weight to adjust step count, calculate distance, calories burned, and bcs. Each dog category (toy, small, medium, large, extra-large) has specific ranges for weight, height, and step length to ensure precision.

Dog Size	Weight Range (kg)	Factor Range	Height Range (cm)	Step Length Range (cm)
Toy Dog	2 - 5	0.5 - 0.7	0 - 25	25 - 35
Small Dog	5 - 10	0.7 - 0.9	25 - 35	35 - 45
Medium Dog	10 - 25	0.9 - 1.1	35 - 50	45 - 55
Large Dog	25 - 40	1.1 - 1.3	50 - 70	55 - 65
Extra Large Dog	40 - 80	1.3 - 1.6	70 - 100	65 - 80

  - Fitness Update Workflow:

    The backend receives the initial step count from either the IoT collar or mobile device. Using the conversion tables, it adjusts the count for accuracy, calculates the distance traveled and calories burned, and then updates the active activity and any existing fitness goals.

    The following sequence diagram illustrates the workflow of the fitness update process:



- Background Task Execution:

  In the backend, a single thread handles multiple background tasks.

  The thread runs every 10 seconds, performing actions like:

  - **Collar Connection Check**: If no steps are received from a collar for 5 hours, the system disconnects the collar.
  - **Activity Monitoring**: The system checks for active activities and ends them if they've been running for 5 hours continuously.
  - **Goal Management Background Task:**
    1. Daily Goals: At the start of each new day, the system finishes the daily goals from the previous day.
    2. Weekly Goals: At the start of each new week, the system finishes the weekly goals from the previous week.
    3. Monthly Goals: On the 1st of each month, the system finishes the monthly goals from the previous month.

  After finishing the current goals, the system uses goal templates to create new goals for the day, week, or month, ensuring users have updated targets to work towards.

  This thread ensures that system tasks are handled regularly and automatically without blocking other processes.

2. **Frontend:**

Overview –

The front-end implementation of Doggo is designed using Flutter, which provides a single codebase for both iOS and Android platforms. Flutter's rich set of pre-designed widgets and its reactive framework allows for the creation of a highly responsive user interface. The design follows a modern, user-friendly approach with an emphasis on performance.

Technologies and Frameworks –

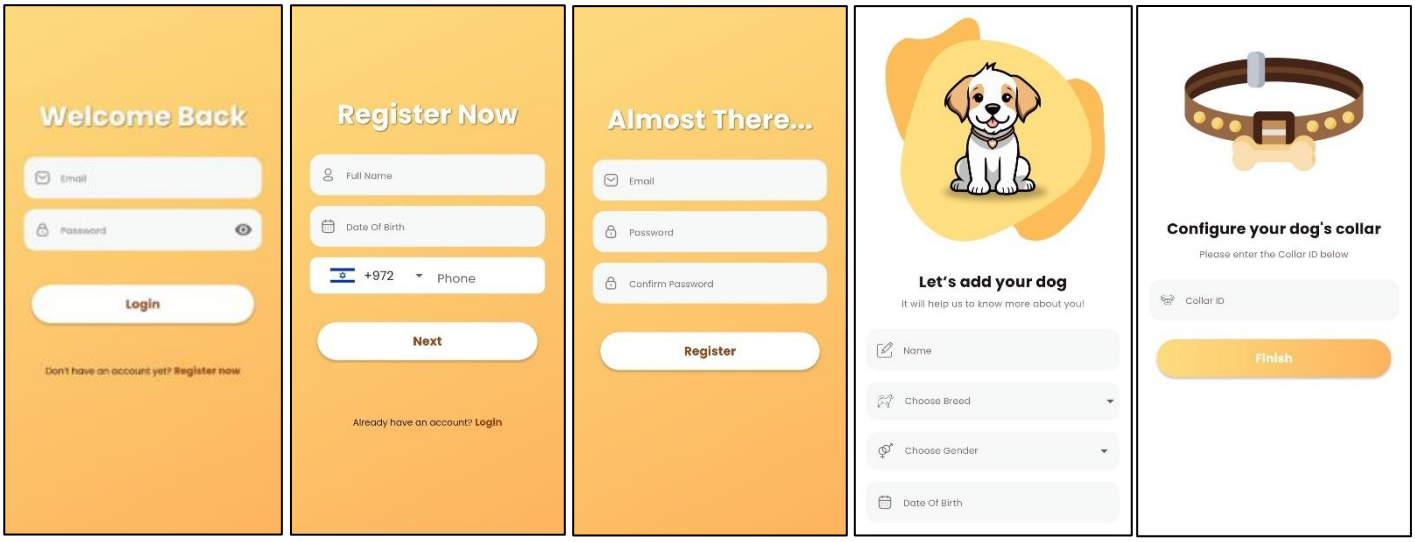
The Doggo App is built exclusively for **Android** using the **Flutter SDK,** ensuring a robust and responsive design. It leverages several third-party packages for functionality:

- **UI Components**: The app uses Carousel Slider and Simple Circular Progress Bar to provide an engaging and user-friendly interface.
- **Mapping and Location**: Flutter Map and Geolocator are integrated for location-based features, enabling users to search dog-friendly places and set favorites.
- **Networking and Data**: The app relies on the HTTP package for backend communication and Shared Preferences for local data storage.
- **Bluetooth Integration**: Flutter Reactive BLE handles Bluetooth communication, allowing the app to connect to and manage dog collars.
- **Other Packages**: Permission Handler ensures the app properly manages device permissions, and Table Calendar helps with event scheduling. The app also supports international phone number input through Intl Phone Number Input.

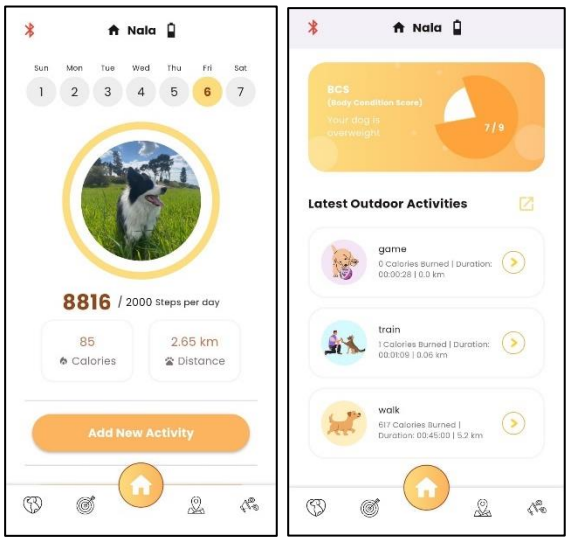
Custom assets like icons, fonts, and images are embedded to maintain a cohesive brand identity.

Main Screens –

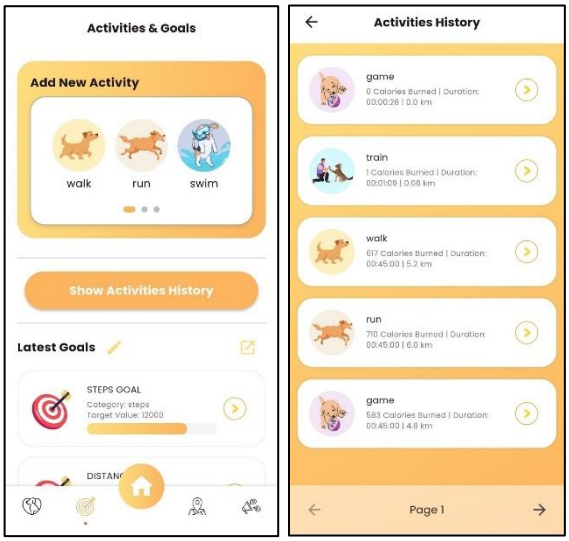
- **Login & Sign-Up Screens**: These screens enable users to sign up or log in using their email and phone number. The phone number input is powered by the intl_phone_number_input package, ensuring accurate validation and formatting for various countries. During the sign-up process, users also add their dog's information and configure the dog to a collar.



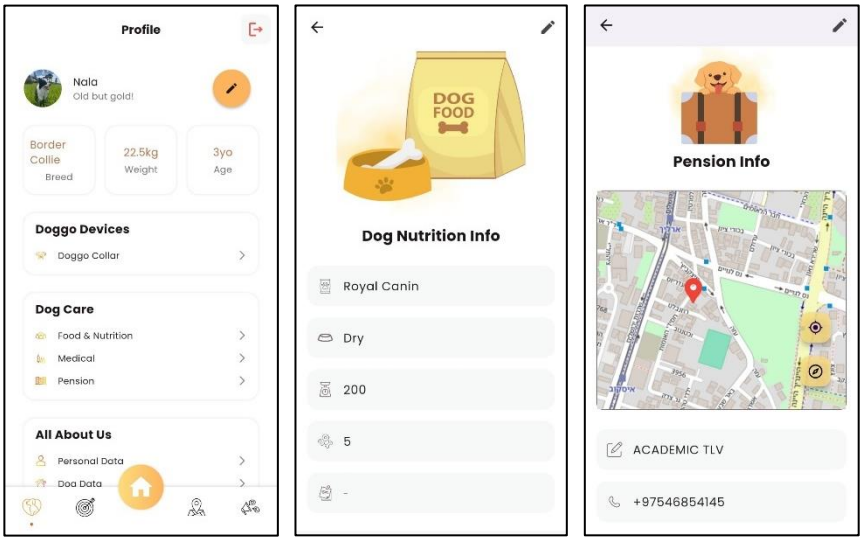
- **Home Screen:** The home screen provides users with an intuitive overview of key information. It includes widgets such as progress indicators to display the user's and their dog's activity progress, a dynamic list showcasing user and dog-related data, and quick navigation options for accessing essential features.



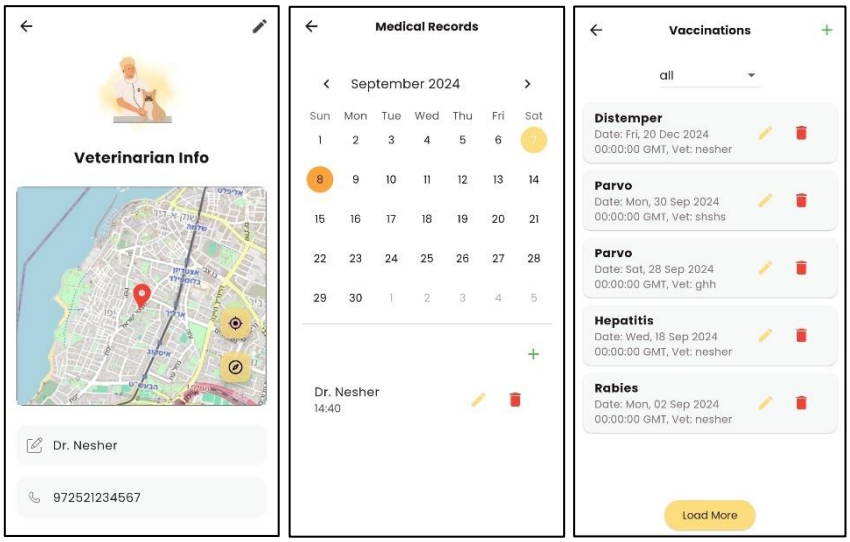
- **Activities & Goals Screen:** Users can track their dog's daily activities, set fitness goals, and monitor progress over time on this screen.



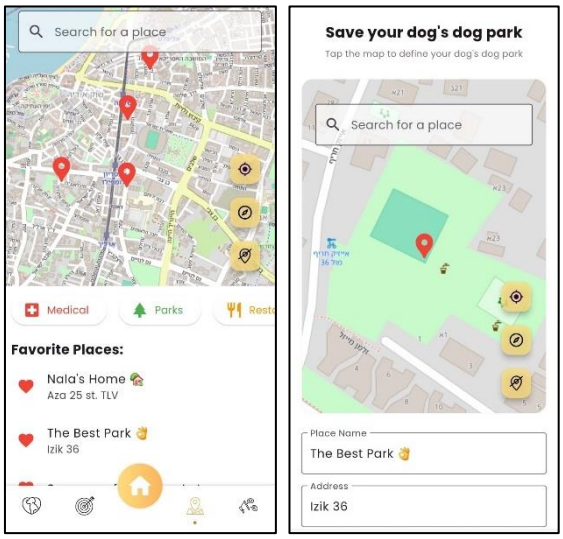
- **Profile Screen:** This screen displays the user's personal details, including their name, phone number, and other relevant information, with options to update them. Validation is managed using custom methods, and errors are displayed via the errorText property in input fields. The screen also includes sections for the dog's nutrition, medical records, and quick access to pension and vet information.



- **Medical Screens:** Designed to store and present the dog's medical information, these screens offer an organized view of vet information medical history, vaccinations details and appointments. Users can update this information as needed and view critical medical details immediately.



- **Map Screen:** The map screen, integrated with flutter_map (open street map API), allows users to search for nearby dog-friendly places, including medical facilities, restaurants, parks, pensions and more. Users can filter locations by category.



Services –

- **BLE Service:**

  This service manages Bluetooth Low Energy (BLE) communication between the app and the dog collar. It handles device scanning, connecting to the collar, and reading the battery level and step count characteristics. The service ensures real-time data updates through periodic readings (each 5 seconds) and sends the information to the backend via HTTP requests.

- **HTTP Service:**

  Responsible for making HTTP requests to the backend, this service facilitates sending key data like battery level and step count to the server. It uses http package for communication with the backend API.

- **Preferences Service:**

  This service manages local storage using shared preferences. It stores and retrieves essential user and dog information, such as user and dog IDs, ensuring persistent data access across the app.

3. **Embedded:**

This Arduino code for Doggo uses an Arduino Nano 33 IoT to track and transmit data related to the dog's steps and battery level using both BLE and Wi-Fi. Here's a simplified breakdown of how it works:

- **BLE Services**: Two BLE services are defined—one for battery level and another for step counting. The Arduino advertises these services for nearby devices to connect and read data.

- **Wi-Fi Setup**: Wi-Fi credentials are defined, allowing the Arduino to connect to a remote server when BLE is not available. It sends step and battery data to the server via HTTP every 10 seconds.

- **Step Detection**: Steps are detected using an Inertial Measurement Unit (IMU) sensor (BMI270/LSM6DS3 – motion sensors). When movement (above a threshold) is detected, based on accelerometer, the step count is increased.

- **Connection Management**: The code continuously switches between BLE and Wi-Fi based on availability. If the dog owner is near the sensor and connected to the app, the code will prefer connection via BLE and send the data locally. If not, it tries to connect to Wi-Fi and sends data to the server.

- **Battery Monitoring**: The battery level is periodically updated and sent either via BLE or HTTP, depending on the connection state.

In essence, the Arduino alternates between two wireless technologies, BLE and Wi-Fi, to monitor and report your dog's activity and battery status.

Getting Started with Deployment

Prerequisites:

Before you begin, ensure you have met the following requirements:

- Python 3.x
- Docker: Installed and running
- AWS CLI (if deploying to AWS)

Getting Started with Docker:

Download and run the Docker Image

You don't need to configure the app or deal with credentials. Simply pull and run the pre-built Docker image from Docker Hub.

Pull the Docker Image

To download the Docker Image: `docker pull niznaor/doggo-app:latest`

Run the Docker Container

To run the container and expose the app on port 5000:

```
docker run -d -p 5000:5000 niznaor/doggo-app:latest
```

This command will start the Flask application inside a Docker container, and you can access it at http://localhost:5000.

Environment Variables:

To manage your application's configuration securely, you'll need to set environment variables using a .env file. This file should contain your database connection details and any other sensitive information.

Creating a .env File Locally

1. Create file named .env in the root directory of your project.
2. Add the following environment variables to the .env file:

   ```
   DB_HOST=<your_db_host>
   DB_PORT=<your_db_port>
   DB_NAME=<your_db_name>
   DB_USER=<your_db_user>
   DB_PASSWORD=<your_db_password>
   ```

   Replace the placeholders with your actual database connection details.
3. Run the Docker container with the .env file mounted:

   ```
   docker run -d --rm --name doggo-app -p 5000:5000 --env-file .env niznaor/doggo-app:latest
   ```

Deployment on AWS EC2 (Optional):

If you want to deploy the Docker container to AWS EC2:

1. SSH into your EC2 instance
2. Install Docker on your EC2 instance (if not already installed)

   ```
   sudo yum update -y
   sudo amazon-linux-extras install docker
   sudo service docker start
   sudo usermod -a -G docker ec2-user
   ```
3. Log out and log back in to your EC2 instance to apply the changes.
4. Pull the Docker image from Docker Hub

   ```
   docker pull your-dockerhub-username/backend-demo
   ```

5. Run the Docker container on EC2

   ```
   docker run -d -p 80:5000 --name backend-demo your-dockerhub-username/backend-demo
   ```

   This will expose the Flask application on port 80 of your EC2 instance.

Install the App:

1. Build the Mobile Project: Open the project in your terminal and run the following command to build the APK:

   ```
   flutter build apk –release
   ```

2. Locate the APK: Once the build is complete, find the APK at the following path:

   ```
   build/app/outputs/flutter-apk/app-release.apk
   ```

3. Install the App:
   - Open the APK file on your Android device.
   - If prompted, enable installation from unknown sources in your device settings.
   - Follow the on-screen instructions to complete the installation.

Endpoints (API)

Mobile to backend

1. User Authentication

- POST /api/user/register – Register a new user.

Json Message	{
	"email": "test@gmail.com",
	"password": "123123",
	"name": "Nizan Naor",
	"date_of_birth": "1995-04-11",
	"phone_number": "+972546854144"
	}

Response	{
	“user_id”: 1
	}
	
	status 201

- PUT /api/user/login – Log in an existing user.

Json Message	{
	"email": " example@example.com”,
	"password": "example_password"
	}

Response	{
	“user_id”: 1,
	“dog_id”: 12
	}
	
	status 200

- PUT /api/user/logout – Log out the current user.

Query Params	user_id: 1
Response	status 200

2. User's Information

- GET /api/user/profile – Get the user's profile information.

Query Params	user_id: 1

Response	{
	"email" : "user@gmail.com","email" : "user@gmail.com",
	"password": "123",
	"name": "John",
	"date_of_birth": "Sat, 04 Nov 1995 00:00:00 GMT",
	"phone_number": "+972549034113"
	}
	
	status 200

- PUT /api/user/profile – Update the user's profile information.

Json Message	{
	"user_id": 123,
	"email": "new_email@example.com",
	"password": "example_password",
	"name": "John",
	"date_of_birth": "1995-05-11"
	"phone_number": "+972545366987"
	}

Response	{
	"user_connection": True/False
	}
	
	status 200

- DELETE /api/user/profile – Delete user from the system --> Delete user's dogs.

Json Message	{
	“user_id”: 123,
	"email": "new_email@example.com",
	"password": "example_password",
	“name”: “John”,
	“date_of_birth”: “1995-05-11”
	"phone_number": "+972456321545"
	}

Response	status 200

- GET /api/user/connection – Check if user is logged in.

Query Params	user_id: 123
Response	status 200

- GET /api/user/check_password – Check user's password.

Query Params	user_id: 123 password: nesher123

Response	{
	“is_valid”: True
	}
	
	status 200

3. Dog Settings

- POST /api/dog/add – Add a new dog.

Json Message	{ “user_id”: 5, "name": "Buddy", "description": "My best friend!", "breed": "Golden Retriever", "gender": "male", "date_of_birth": "2019-05-20",

	"weight": 25.5, "height": 50, “description”: “Best dog ever!” }

Response	{
	“dog_id”: 2
	}
	
	status 201

- GET /api/dog/profile - Get dog’s profile information.

Query Params	dog_id: 2

Response	{
	"name": "Buddy",
	"breed": "Golden Retriever",
	“gender”: “male”,
	"date_of_birth": "Sat, 04 Nov 1995 00:00:00 GMT"
	"weight": 25.5,
	"height": 30,
	“description”: “Best dog ever!”
	}
	
	status 200

- PUT /api/dog/profile – Update dog’s profile.

Json Message	{ "dog_id": 1, "name": "New Name", “breed”: “Golden Retriever”, “gender”: “Male”, “date_of_birth”: “2019-05-20", "weight": 30.5, "height": 100,

	“description”: “Best dog ever!” }
Response	status 200

- DELETE /api/dog/delete – Delete a dog.

Query Params	dog_id: 1
Response	status 200

4. Dog's Care Info

- PUT /api/dog/pension – Add/Update pension.

Json Message	{
	"dog_id": 1,
	"pension_name": "BLA",
	"pension_phone": "+97211222222",
	"pension_latitude": 32.06383467209801,
	"pension_longitude": 34.784212577883665
	}

Response	status 200

- PUT /api/dog/vet– Add/Update dog's vet info.

Json Message	{
	"dog_id": 1,
	"vet_name": "New Name",
	"vet_phone": "+97211222222",
	"vet_latitude": 32.06383467209801,
	"vet_longitude": 34.784212577883665
	}

Response	status 200

- GET/api/dog/pension – Get dog's pension info.

Json Message	dog_id: 16

Response	Json Message:
	{
	"pension_name": BLA,
	"pension_phone": "+97211222222",
	"pension_latitude": 32.06383467209801,
	"pension_longitude": 34.784212577883665
	}
	Else:
	204 (content is missing)

- GET/api/dog/vet – Get dog vet info.

Query Params	dog_id: 11

Response	{
	"vet_name": "New Name",
	"vet_phone": +972545633989,
	“vet_latitude”: 32.06383467209801,
	“vet_longitude”: 34.784212577883665
	}
	Status 200
	Else:
	204 (content is missing)

5. Collars

- PUT /api/collar/add - Add new collar.

Json Message	{
	"collar_id": “123”,
	"dog_id": 11
	}

Response	status 200

- GET /api/collar/get – Get collar id by dog id.

Query Params	dog_id: 1

Response	{
	"collar_id": 65
	}
	status 200

- GET /api/collar/connectionStatus – Is the collar connected and how?

Query Params	collar_id: 12

Response	{
	"ble_connected": True,
	"wifi_connected": False
	}
	status 200

- GET /api/dog/collar/availability – Is collar available?

Query Params	collar_id: 12

Response	{
	"availability": True
	}
	status 200

- PUT /api/collar/disconnect– Disconnect collar from dog.

Query Params	collar _id: 15
Response	status 200

- PUT /api/collar/battery - Updates the battery level by dog id.

Query Params	{
	"dog_id": 5,
	"battery_level": 40
	}

Response	status 200

- GET /api/collar/battery - gets the battery level by collar id.

Query Params	collar_id: 13

Response	{
	"batter_level": 58
	}
	status 200

6. Dog's Activities

- GET /api/dog/activities/all – Get n activities.

Query Params	dog _id: 6 limit: 8 offset: 5
Response	List of: { "activity_id": 12, "activity_type": "run", "calories_burned": 0, "distance": 0.01, "duration": "00:45:00", "end_time": "Fri, 23 Aug 2024 09:45:00 GMT", "start_time": "Fri, 23 Aug 2024 09:00:00 GMT", "steps": 20 } .... status 200

- GET /api/dog/activities – Get a chosen activity.

Query Params	activity _id: 1

Response	{
	"calories_burned": 0,
	"distance": 0.01,
	"duration": "00 days 00:45:00",
	"end_time": "Fri, 23 Aug 2024 09:45:00 GMT",
	"start_time": "Fri, 23 Aug 2024 09:00:00 GMT",
	"steps": 20
	}
	Status 200

- POST /api/dog/activities – add new activity

Query Params	activity _id: 1

Response	{
	"activity_id": 3
	}
	Status 201

- PUT /api/dog/activities/end – End an activity.

Query Params	activity _id: 1
Response	status 200

- DELETE /api/dog/activities– Delete a specific activity.

Query Params	activity _id: 1
Response	status 200

7. Dog's Fitness

- GET /api/dog/fitness – Get dog's daily fitness.

Query Params	dog_id: 6 date: 2024-08-31

Response	{
	"distance": 12.3,
	"steps": 2333,
	"calories_burned": 3333
	}
	status 200

- PUT /api/dog/fitness – Update the dog's steps, distance and calories through the day (Recieving data from mobile)

Query Params	dog_id: 6 steps: 6416
Response	status 200

- GET /api/dog/bcs– Get bcs of chosen dog.

Query Params	dog _id: 4
Response	5, status 200

8. Dog's Goals

- GET /api/dog/goal_templates/all – Get dog's goal templates.

Query Params	dog_id: 4
Response	List of: { "dog_id": 123, "template_id": 2, "frequency": "daily", "category": "steps", "target_value": 1000, (if it's distance --> float. Unless --> int) } .... status 200 or 204

- GET /api/dog/goal_templates – Get chosen goal template.

Query Params	template_id: 4

Response	{
	"dog_id": 123,
	"template_id": 2,
	"frequency": "daily",
	"category": "steps",
	"target_value": 1000, (if it's distance --> float. Unless --> int)
	}
	status 200

- GET /api/dog/goals/all – Get dog's goals.

Query Params	dog_id: 41 Limit: 60 Offset: 5
Response	List of: { “goal_id”: 123, "start_date": "Mon, 09 Sep 2024 00:00:00 GMT", "end_date": "Mon, 16 Sep 2024 00:00:00 GMT", "category”: “steps”, “current_value”: 200, (for steps/calories_burned : int. For distance: float) “target_value”: 1000, “done”: False (would be True after completing) "is_finished": False } .... status 200 or 204 if not found

- GET /api/dog/goals – Get goal log.

Query Params	goal_id: 4

Response	{
	"start_date": "Mon, 09 Sep 2024 00:00:00 GMT",
	"end_date": "Mon, 16 Sep 2024 00:00:00 GMT",
	"category”: “steps”,
	“current_value”: 200, (for steps/calories_burned : int. For distance: float)
	“target_value”: 1000,
	“done”: False (would be True after completing)
	“is_finished”: False (if goal passed the end_date --> True)
	}
	status 200

- POST /api/dog/goals/add – Create a new goal (new goal template).

Json Message	{
	“dog_id”: 2,
	“target_value”: 2000,
	“frequency”: “weekly”,
	“category”: “steps”
	}

Response	Status 201

- GET /api/dog/dailyStepsGoal – Retrieve the dog’s daily steps goal.

Query Params	Dog_id: 15

Response	{
	“daily_steps_goal”: 1000
	}
	status 200 (default value = 2000)

- PUT /api/dog/goals – Update a goal template --> updating also the active goal using the template’s data.

Query Params	Template_id: 5 Target_value: 600
Response	Status 200

- DELETE /api/dog/goal_templates – Delete a goal template --> Deleting also the active goal using the template’s data.

Query Params	Template_id: 5
Response	Status 200

- DELETE /api/dog/ goals – Delete a goal.

Query Params	goal_id: 5
Response	Status 200

9. Dog's Nutrition

- GET /api/dog/nutrition - Retrieve the nutrition information for a specific dog.

Json Message	{
	"dog_id": 16,
	"food_brand": "Royal Canin",
	"food_type": "Dry",
	"food_amount_grams": 200,
	"daily_snacks": 1,
	"notes": "Recommended by the vet"
	}

Response	Status 200 Status 204 if there is no nutrition record for chosen dog

- PUT /api/dog/nutrition - Create/Update a new record for a dog's nutrition.

Json Message	{
	"dog_id": 16,
	"food_brand": "Royal Canin",
	"food_type": "Dry",
	"food_amount_grams": 200,
	"daily_snacks": 1,
	"notes": "Recommended by the vet"
	}

Response	Status 201

- DELETE /api/dog/nutrition - Delete the nutrition information for a specific dog.

Query Params	dog_id: 5
Response	Status 200

10. Dog's Vaccinations

- GET /api/dog/vaccinations - Retrieves all vaccination records for a specific dog.

Query Params	dog_id: 16 vaccination_type: "Distemper" limit: 3 offset: 0
Response	List of: { "vaccination_id": 4, "vaccination_date": "Mon, 16 Sep 2024 00:00:00 GMT", "vaccination_type": "Distemper" (if "all" --> returns all types), "dosage": "4 ml", "vet_name": "Dr. Nesher", "next_vaccination": Mon, 16 Sep 2024 00:00:00 GMT", } ... Status 200 or 204 (No content)

- POST /api/dog/vaccinations - Creates a new vaccination record for a specific dog.

Json Message	{
	"dog_id": 16,
	"vaccination_date": "Mon, 16 Sep 2024 00:00:00 GMT",
	"vaccination_type": "Distemper",
	"dosage": "4",
	"vet_name": "Dr. Nesher",
	"next_vaccination": Mon, 16 Sep 2024 00:00:00 GMT",
	}

Response	Status 201

- PUT /api/dog/vaccinations - Updates a specific vaccination record.

Json Message	{
	“vaccination_id”: 4,
	“vaccination_date”: "Mon, 16 Sep 2024 00:00:00 GMT",
	“vaccination_type”: “Distemper”,
	“dosage”: “4”,
	“vet_name”: “Dr. Nesher”,
	“next_vaccination”: Mon, 16 Sep 2024 00:00:00 GMT",
	}

Response	Status 200

- DELETE /api/dog/vaccinations - Deletes a specific vaccination record for a dog.

Query Params	vaccination_id: 5
Response	Status 200

11. Dog’s Medical Records

- GET /api/dog/medical_records/days- Retrieves a dictionary: for each day of the chosen month – True if there is at least one medical record for the chosen dog. Unless - False

Query Params	dog_id: 15 Month: 5 Year: 1999

Response	{
	“1”: false,
	"2": true,
	.
	.
	“30”: true,
	31: false
	}
	status 200

- GET /api/dog/medical_records/by_date - Retrieves medical records according to date.

Query Params	dog_id: 15 Date: 1999-02-15

Response	List of dictionaries:
	[
	{
	“record_id”: 16,
	“dog_id”: 16,
	"vet_name": "Dr. Smith",
	“address”: “9101 Maple Road, Springfield, IL”,
	“record_datetime": "Sun, 21 Jul 2024 11:22:20 GMT",
	"description": " Treated for flea infestation and ear infection "
	}
	]

- GET /api/dog/ medical_records - Returns a medical record according to record_id.

Query Params	record_id: 3

Response	Json Message:
	{
	“dog_id”: 52,
	“record_id”: 16,
	"vet_name": "Dr. Smith",
	“address”: “9101 Maple Road, Springfield, IL”,
	“record_datetime": "2024-06-15 09:45:00",
	"description": " Treated for flea infestation and ear infection "
	}
	status 200

- POST /api/dog/ medical_records - Creates a new medical record for a specific dog.

Json Message	{
	“dog_id”: 52,
	"vet_name": "Dr. Smith",
	“address”: “9101 Maple Road, Springfield, IL”,
	“record_datetime": "2024-06-15 09:45:00",
	"description": " Treated for flea infestation and ear infection "
	}

Response	Status 201

- PUT /api/dog/medical_records- Updates a specific medical record.

Json Message	{
	“record_id”: 16,
	"vet_name": "Dr. Smith",
	“address”: “9101 Maple Road, Springfield, IL”,
	“record_datetime": "2024-06-15 09:45:00",
	"description": " Treated for flea infestation and ear infection "
	}

Response	Status 200

- GET /api/dog/ medical_records - Returns a medical record according to record_id.

Query Params	record_id: 3

Response	{
	"address": "9101 Maple Road, Springfield, IL",
	"description": "Treated for flea infestation and ear infection",
	"dog_id": 101,
	"record_datetime": "Sat, 15 Jun 2024 09:45:00 GMT",
	"record_id": 3,
	"vet_name": "Dr. Sarah Davis"
	}
	status 200

12. Places

- GET /api/ places/all – Retrieve all places.

Query Params	
Response	lisf of : { "address": "Rokach Blvd, Tel Aviv", "placelatitude": 32.0853, "place_longitude": 34.7882, "place_name": "Yarkon Park", "place_type": "parks" }..... Status 200

- GET /api/ places/by_type – Retrieve all places by type.

Query Params	place_type: “medical”
Response	lisf of: { "address": "Rokach Blvd, Tel Aviv", " place_latitude": 32.0853, " place_longitude": 34.7882, "place_name": "Yarkon Park", "place_type": "parks" }..... , Status 200

13. Dog's Favorite Places

- GET /api/favorite_places– dog's favorite places.

Query Params	dog_id : 15
Response	lisf of : { "address": "Rokach Blvd, Tel Aviv", "dog_id": 101, "place_latitude": 32.0853, "place_longitude": 34.7882, "place_name": "Yarkon Park", "place_type": "parks" }..... Status 200... or Status 204 (not found)

- GET /api/favorite_places– dog's favorite place by type.

Query Params	dog_id: 1 place_type: "home"

Response	{
	"address": "Rokach Blvd, Tel Aviv",
	"dog_id": 101,
	"place_latitude": 32.0853,
	"place_longitude": 34.7882,
	"place_name": "Yarkon Park",
	"place_type": "parks"
	}
	Status 200... or Status 204 (not found)

- PUT /api/favorite_places – Add dog's favorite place.

Json Message	{
	"dog_id": "5",
	"place_name": "My dog's home",
	"place_latitude": 102,
	"place_longitude": 21,
	"address": "Aza 12",
	"place_type": "home"
	}

Response	Status 200

14. FAQ

- GET /api/faq/questions – Retrieve frequently asked questions.

Json Message	-
Response	{ "1": "Question 1...", "2": "Question 2...", ... }, Status 200

- GET /api/faq/answer – Get answer for the chosen question.

Query Params	"faq_id": 5
Response	Answer to the specific question

Collar Embedded to backend:

- PUT /api/dog/collar_data – Update the dog's steps, distance and calories through the day (Receiving data from mobile).
  In addition, updates the battery level.

Form	collar_id: 6 battery: 48 steps: 6416
Response	status 200

Message Structure - Collar Embedded to Mobile:

The embedded collar will broadcast multiple types of messages using the BLE protocol (Advertising). The mobile device will listen to these broadcasts.

```
typedef struct {
  uint32_t collarID;
  int steps;
  int batteryLevel;
} CollarMessage;
```

Database Schemes

- users:
  Stores user information, including login details and personal data like name, date of birth, and last activity timestamp.

user_id	Integer
email	VARCHAR (100)
password	VARCHAR (255)
name	VARCHAR (100)
date_of_birth	Date
phone_number	VARCHAR (15)
last_activity	Timestamp
logged_in	Boolean

- dogs:
  Stores information about each dog, including breed, gender, physical measurements, and activity-related metrics.

dog_id	Integer
name	VARCHAR (50)
gender	VARCHAR (10)
date_of_birth	Date
weight	Float
height	Integer
last_steps	Integer

- users_dogs
  Links users and their dogs, establishing a many-to-many relationship between users and dogs.

dog_id	Integer
user_id	Integer

- collars

  Stores information about a dog's collar, including BLE and Wi-Fi connection statuses, battery level, and related services.

collar_id	VARCHAR (50)
battery_service_uuid	VARCHAR (50)
battery_level_characteristic_uuid	VARCHAR (50)
step_service_uuid	VARCHAR (50)
step_count_characteristic_uuid	VARCHAR (50)
distance_service_uuid	VARCHAR (50)
distance_characteristic_uuid	VARCHAR (50)
dog_id	Integer
ble_connected	Boolean
wifi_conncted	Boolean
battery_level	Integer
last_update	Timestamp

- fitness

  Tracks daily fitness statistics for each dog, including steps taken, distance covered, and calories burned.

dog_id	Integer
fitness_date	Date
distance	Float
steps	Integer
calories_burned	Float

- activities

  Stores data on a dog's physical activities, such as type, duration, steps, and calories burned.

dog_id	Integer
Activity_id	Integer
activity_type	VARCHAR (30)
start_time	Timestamp
end_time	Timestamp
duration	Interval
steps	Integer
distance	Float
calories_burned	Float

- goal_templates

  Provides predefined goal templates for dogs, specifying target values, frequency, and category.

template_id	Integer
dog_id	Integer
target_value	Float
frequency	VARCHAR (50)
category	VARCHAR (50)

- goals

  Contains goal-setting information for dogs, tracking progress and target completion for specific categories.

goal_id	Integer
dog_id	Integer
start_date	Date
end_date	Date
current_value	Float
target_value	Float
category	VARCHAR (50)
done	Boolean
is_finished	Boolean
template_id	Integer

- care_info

  Contains details about a dog's veterinarian and pension, including their contact information and geographic coordinates.

dog_id	Integer
vet_name	VARCHAR (50)
vet_phone	VARCHAR (15)
vet_latitude	Float
vet_longitude	Float
pension_name	VARCHAR (50)
pension_phone	VARCHAR (15)
pension_latitude	Float
pension_longitude	Float

- medical_records

  Logs a dog's medical records, including vet visits, address, and detailed descriptions.

record_id	Integer
vet_name	VARCHAR (50)
address	VARCHAR (50)
record_datetime	Timestamp
description	VARCHAR (255)
dog_id	Integer

- nutrition

  Records a dog's nutritional data, including food brand, type, daily intake, and additional notes.

dog_id	Integer
food_brand	VARCHAR (100)
food_type	VARCHAR (100)
food_amount_grams	Integer
daily_snacks	Integer
notes	VARCHAR (500)

- vaccinations

  Logs vaccination records for each dog, including type, dosage, and future vaccination schedules.

dog_id	Integer
vaccination_id	Integer
vaccination_date	Date
vaccination_type	VARCHAR (100)
dosage	VARCHAR (30)
vet_name	VARCHAR (100)
next_vaccination	date
notes	VARCHAR (500)

- places

  Stores data about places, including names, addresses, and geographic coordinates, categorized by type.

place_name	VARCHAR (100)
address	VARCHAR (100)
place_latitude	Float
place_longitude	Float
place_type	VARCHAR (100)

- favorite places

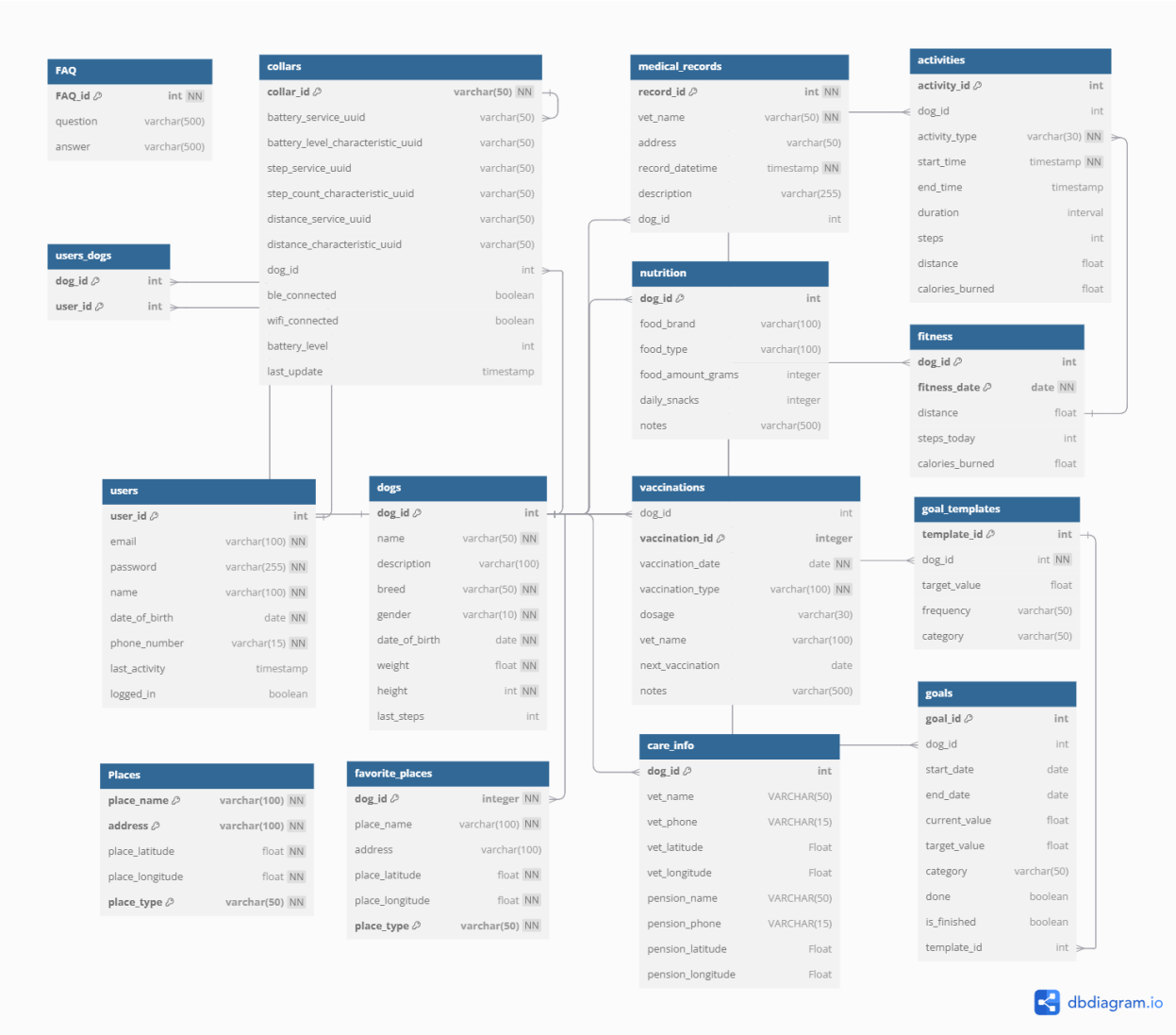
  Tracks a dog's favorite places, storing their details and geographic coordinates.

dog_id	Integer
Place_name	VARCHAR (100)
address	VARCHAR (100)
place_latitude	Float
place_longitude	Float
place_type	VARCHAR (100)

- FAQ

  Contains frequently asked questions and corresponding answers, assisting users with common queries.

faq_id	Integer
question	VARCHAR (500)
answer	VARCHAR (500)


FAQ
FAQ_id int NN
question varchar(500)
answer varchar(500)
collars
collar_id varchar(50) NN
battery_service_uuid varchar(50)
battery_level_characteristic_uuid varchar(50)
step_service_uuid varchar(50)
step_count_characteristic_uuid varchar(50)
distance_service_uuid varchar(50)
distance_characteristic_uuid varchar(50)
dog_id int
ble_connected boolean
wifi_connected boolean
battery_level int
last_update timestamp
medical_records
record_id int NN
vet_name varchar(50) NN
address varchar(50)
record_datetime timestamp NN
description varchar(255)
dog_id int
activities
activity_id int
dog_id int
activity_type varchar(30) NN
start_time timestamp NN
end_time timestamp
duration interval
steps int
distance float
calories_burned float
users_dogs
dog_id int
user_id int
nutrition
dog_id int
food_brand varchar(100)
food_type varchar(100)
food_amount_grams integer
daily_snacks integer
notes varchar(500)
fitness
dog_id int
fitness_date date NN
distance float
steps_today int
calories_burned float
users
user_id int
email varchar(100) NN
password varchar(255) NN
name varchar(100) NN
date_of_birth date NN
phone_number varchar(15) NN
last_activity timestamp
logged_in boolean
dogs
dog_id int
name varchar(50) NN
description varchar(100)
breed varchar(50) NN
gender varchar(10) NN
date_of_birth date NN
weight float NN
height int NN
last_steps int
vaccinations
dog_id int
vaccination_id integer
vaccination_date date NN
vaccination_type varchar(100) NN
dosage varchar(30)
vet_name varchar(100)
next_vaccination date
notes varchar(500)
goal_templates
template_id int
dog_id int NN
target_value float
frequency varchar(50)
category varchar(50)
goals
goal_id int
dog_id int
start_date date
end_date date
current_value float
target_value float
category varchar(50)
done boolean
is_finished boolean
template_id int
Places
place_name varchar(100) NN
address varchar(100) NN
place_latitude float NN
place_longitude float NN
place_type varchar(50) NN
favorite_places
dog_id integer NN
place_name varchar(100) NN
address varchar(100)
place_latitude float NN
place_longitude float NN
place_type varchar(50) NN
care_info
dog_id int
vet_name VARCHAR(50)
vet_phone VARCHAR(15)
vet_latitude Float
vet_longitude Float
pension_name VARCHAR(50)
pension_phone VARCHAR(15)
pension_latitude Float
pension_longitude Float
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