Database Schema Design

Introduction

This project is focused on creating a web application for downloading YouTube videos using Django. The database schema is designed to store data related to users, videos, download requests, and video formats. The schema aims to maintain data integrity and minimize redundancy.

Entity-Relationship Diagram (ERD)

Database Schema

The database schema consists of the following five related tables:

1. **Users**
2. **Videos**
3. **DownloadRequests**
4. **VideoFormats**
5. **VideoFormatOptions**

1. Users Table

- user_id (Primary Key)
- username
- email
- password

2. Videos Table

- video_id (Primary Key)
- youtube_url
- title
- description
- thumbnail_url

3. DownloadRequests Table

- request_id (Primary Key)
- user_id (Foreign Key referencing Users table)
- video_id (Foreign Key referencing Videos table)
- request_time

4. VideoFormats Table

Columns:

- format_id (Primary Key)
- format_name
- extension

5. VideoFormatOptions Table

- option_id (Primary Key)
- video_id (Foreign Key referencing Videos table)
- format_id (Foreign Key referencing VideoFormats table)
- resolution
- size

SQL Code for Database Implementation

```sql
-- Create Users Table
CREATE TABLE Users (
    user_id INTEGER PRIMARY KEY AUTOINCREMENT,
    username TEXT NOT NULL,
    email TEXT NOT NULL UNIQUE,
    password TEXT NOT NULL
);

-- Create Videos Table
CREATE TABLE Videos (
    video_id INTEGER PRIMARY KEY AUTOINCREMENT,
    youtube_url TEXT NOT NULL,
    title TEXT NOT NULL,
    description TEXT,
    thumbnail_url TEXT
);

-- Create DownloadRequests Table
CREATE TABLE DownloadRequests (
    request_id INTEGER PRIMARY KEY AUTOINCREMENT,
    user_id INTEGER NOT NULL,
    video_id INTEGER NOT NULL,
    request_time TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    FOREIGN KEY (user_id) REFERENCES Users(user_id),
    FOREIGN KEY (video_id) REFERENCES Videos(video_id)
);

-- Create VideoFormats Table
CREATE TABLE VideoFormats (
    format_id INTEGER PRIMARY KEY AUTOINCREMENT,
    format_name TEXT NOT NULL,
    extension TEXT NOT NULL
);

-- Create VideoFormatOptions Table
CREATE TABLE VideoFormatOptions (
    option_id INTEGER PRIMARY KEY AUTOINCREMENT,
    video_id INTEGER NOT NULL,
    format_id INTEGER NOT NULL,
    resolution TEXT NOT NULL,
    size INTEGER NOT NULL,
    FOREIGN KEY (video_id) REFERENCES Videos(video_id),
    FOREIGN KEY (format_id) REFERENCES VideoFormats(format_id)
);
```