

## Database Design & Data Modeling

### 1. ER Diagram (Entity-Relationship Diagram)

The ER Diagram represents the relationships between key entities in the IoT-enabled smart home dashboard. The main entities include:

- **Users:** Stores user details and authentication data.
- **Devices:** Represents IoT-enabled devices in the system.
- **Device\_Logs:** Tracks historical data of device interactions.

#### Entity Relationships:

- A **User** can control multiple **Devices** (One-to-Many).
  - A **Device** generates multiple **Device\_Logs** (One-to-Many).
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### 2. Logical & Physical Schema

#### Tables & Attributes:

##### Users Table:

- UserID (Primary Key, INT, Auto-Increment)
- Username (VARCHAR, UNIQUE)
- Email (VARCHAR, UNIQUE)
- PasswordHash (VARCHAR)
- RoleID (Foreign Key → Roles)
- CreatedAt (DATETIME)

##### Devices Table:

- DeviceID (Primary Key, INT, Auto-Increment)
- DeviceName (VARCHAR)
- DeviceType (VARCHAR)
- Status (BOOLEAN)
- UserID (Foreign Key → Users)

- LastUpdated (DATETIME)

**Device\_Logs Table:**

- LogID (Primary Key, INT, Auto-Increment)
  - DeviceID (Foreign Key → Devices)
  - Action (VARCHAR)
  - Timestamp (DATETIME)
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