

A Scalable Entity-Relationship Model for Booking Systems

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October 5, 2024

Introduction

In modern booking platforms, managing the relationships between entities such as users, hosts, and services is critical for ensuring system scalability and performance. This poster presents an entity-relationship (ER) model that addresses these challenges by systematically defining entities and their relationships while breaking down many-to-many relationships through intermediary entities.

Problem Statement

As booking systems grow in complexity, the handling of many-to-many relationships, such as between trips and services, can become inefficient. Poorly managed relationships lead to data redundancy, decreased performance, and difficulty in scaling the system.

Methodology

This ER model was developed with a focus on scalability and performance:

- **Component Definition:** The system’s primary components (stays, experiences) are identified.
- **Entity Mapping:** Entities such as users, hosts, bookings, and services are modeled.
- **Attribute Assignment:** Each entity is assigned attributes relevant to its real-world counterpart.
- **Intermediary Entities:** Many-to-many relationships are broken down using intermediary entities such as *Booking*.

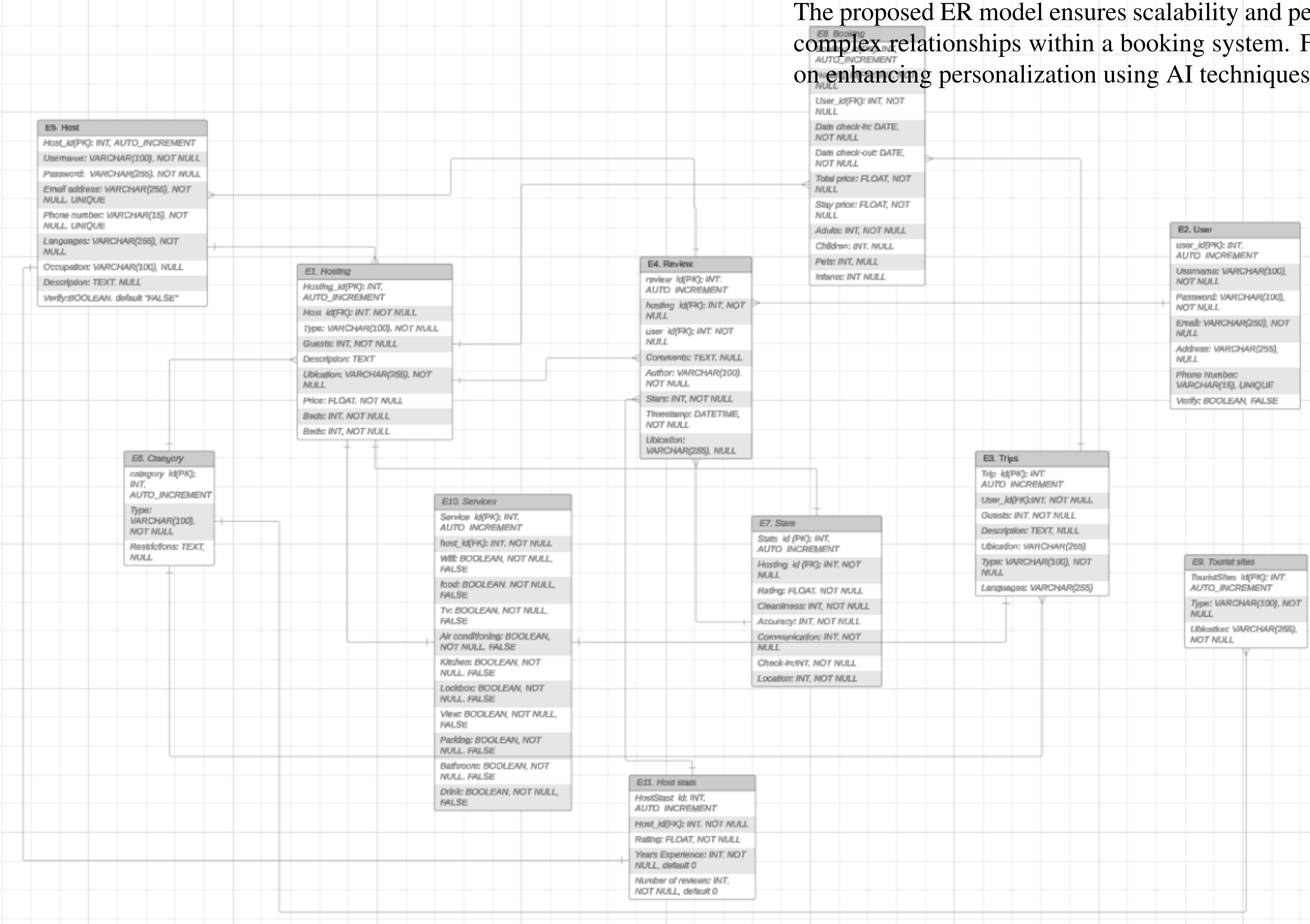
Entity Definitions

- **Hosting:** Type, guests, description, location.
- **User:** Username, password, email, phone number.
- **Trips:** Duration, languages, guests.
- **Booking:** Check-in, check-out, total price.
- **Review:** Author, stars, comments, timestamp.

Relationship Mapping

- **Hosting to Review:** One-to-many.
- **Trips to Tourist Sites:** One-to-many.
- **Booking to Services:** One-to-one.

ER Diagram



Breaking Down Many-to-Many Relationships

Many-to-many relationships are transformed into one-to-many relationships using intermediary entities. The **Booking** entity, for example, connects users and hosts while storing important details such as check-in/check-out dates and services used. This method enhances system efficiency and scalability.

Conclusion

The proposed ER model ensures scalability and performance by simplifying complex relationships within a booking system. Future research may focus on enhancing personalization using AI techniques.