

Database Design Document

Objectives -

To design a database for a dating app which should support the following features:

- Users should be able to login/signup.
- Users should be able to add details like their city, state, phone number, photos, etc. •
- Users should be able to like other users based on their gender and relationship type preference.
- Users should be able to rate another user, likewise also block someone they have matched with.
- Users should be able to chat with other users if they match.
- Users can take either free membership or premium membership.

Business Problem -

The business problem is to design a relational database for an online dating application. There are a few fundamental issues with online dating platforms where the rationale cannot be proven to be correct or incorrect. We'd like to address a few issues that could be resolved by making a few adjustments to the way data is collected, stored and used.

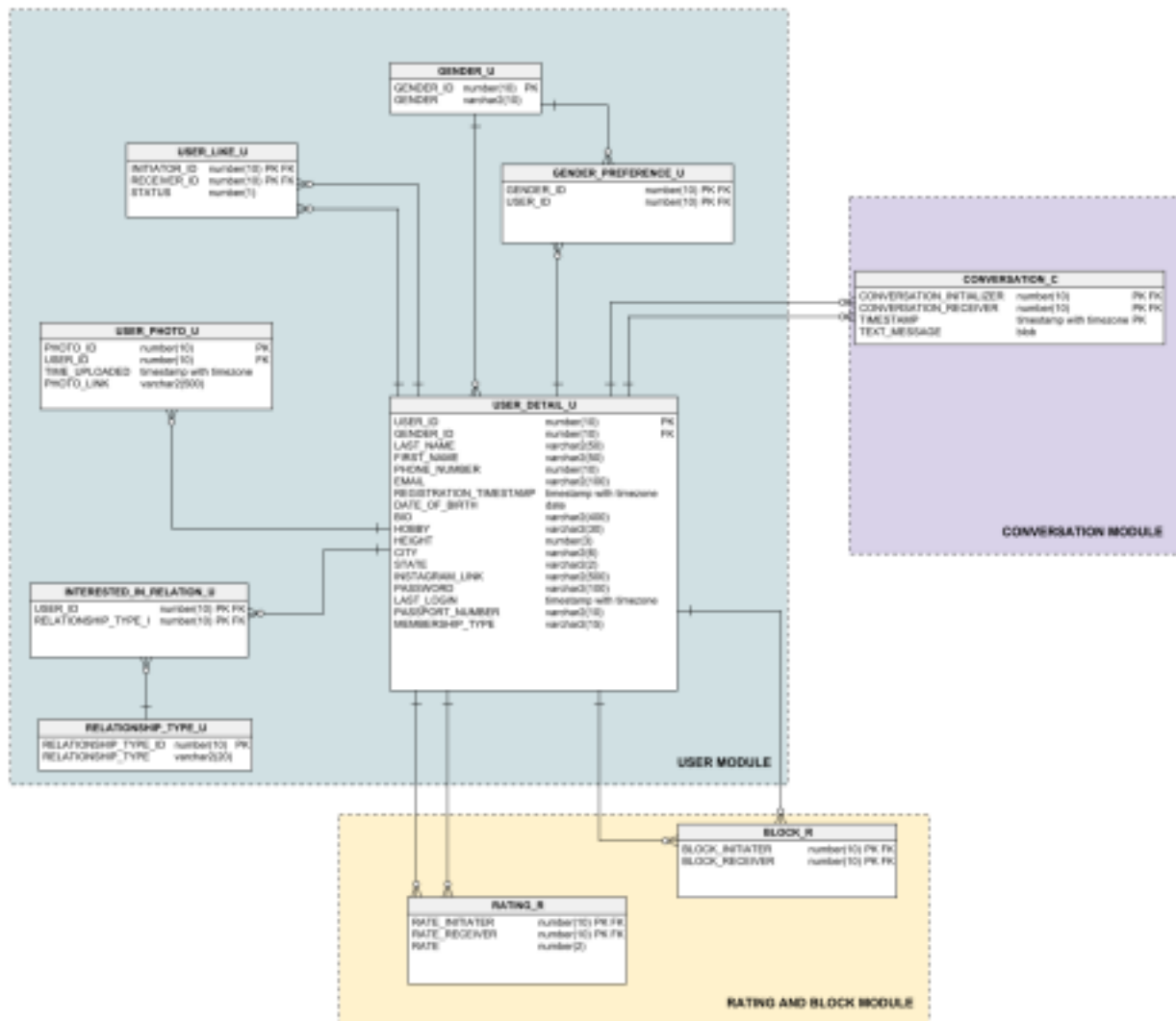
- The presence of an inactive customer database in the dating ecosystem results in a reduction in the total number of matches per day. Hence, resulting in a bad customer experience. Doing it manually is time consuming.
- The database of Dating Apps has few clients with terrible etiquette, which is resulting in a bad customer experience. As a result, these customer profiles need to be analyzed based on block actions and flagged.
- Unverified users and many accounts for a single user exist on matchmaking sites, which need to be governed. This causes data inconsistency.

Solution Strategy -

The proposed solution to the problems include -

- Using Database Design concepts, a FK reference with the ON DELETE CASCADE property is being used by us to delete all records associated with a user whose records are deleted from the user_detail table.
- Maintaining a block table to track the number of times a user gets blocked. A threshold can be decided based on which highly blocked users can be filtered and removed from the platform.
- To maintain data integrity at every level, we are using UNIQUE along with NOT NULL constraints to prevent users signing up with the same phone number and passport number. This also validates the genuineness of the user.
- For fast retrieval of the various types of information related to a user - we have divided it into smaller tables which can be joined using various PK-FK relationships.

Entity Relationship Diagram -



USER_DETAIL_U - This is the driving table of the database which stores the information regarding all the users of the platform. The attributes of the table includes -

Attributes	Data Type	Key Constraint & Comments
USER_ID	NUMBER(10)	PRIMARY AUTO GENERATED
GENDER_ID	NUMBER(10)	FOREIGN FOREIGN Key which references GENDER_ID from GENDER_U. This is used to fetch the details of the gender of the user. NOT NULL - References

LAST_NAME	VARCHAR2(50)	
FIRST_NAME	VARCHAR2(50)	NOT NULL
PHONE_NUMBER	NUMBER(10)	NATURAL UNIQUE AND NOT NULL KEY
EMAIL	VARCHAR2(100)	NATURAL UNIQUE KEY
REGISTRATION_TIMESTAMP	TIMESTAMP WITH TIMEZONE	NOT NULL
DATE_OF_BIRTH	DATE	NOT NULL
BIO	VARCHAR2(400)	
HOBBY	VARCHAR2(30)	
HEIGHT	NUMBER(3)	
CITY	VARCHAR2(6)	NOT NULL
STATE	VARCHAR2(2)	NOT NULL
INSTAGRAM_LINK	VARCHAR2(500)	UNIQUE
PASSWORD	VARCHAR2(100)	NOT NULL
LAST_LOGIN	TIMESTAMP WITH TIMEZONE	NOT NULL
PASSPORT_NUM	VARCHAR2(10)	NATURAL UNIQUE AND NOT NULL KEY
MEMBERSHIP_TYPE	VARCHAR2(15)	NOT NULL CAN BE ONLY FREE OR PREMIUM

GENDER_PREFERENCE_U - This is the table where users' gender preference will be stored. For example: a single user can have multiple preferences like Male, Female.

Attributes	Data Type	Key Constraint & Comments
GENDER_ID	NUMBER(10)	PRIMARY, FOREIGN FOREIGN Key which references GENDER_ID from GENDER_U.

		This is used to fetch the details of the gender in which the user is interested. NOT NULL
USER_ID	NUMBER(10)	PRIMARY, FOREIGN FOREIGN Key which references USER_ID from USER_DETAIL_U. This is used to fetch the details of the user. NOT NULL

GENDER_U - This table stores the gender of a user - **MALE, FEMALE, TRANSGENDER, PANGENDER, POLYGENDER AND OTHERS.**

Attributes	Data Type	Key Constraint & Comments
GENDER_ID	NUMBER(10)	PRIMARY AUTO GENERATED
GENDER	VARCHAR2(10)	NOT NULL, UNIQUE

USER_PHOTO_U - It stores the information of the photos uploaded by the user. PHOTO_ID is used to identify each picture for a distinct user linked through USER_ID.

Attributes	Data Type Key Constraint & Comments
PHOTO_ID	NUMBER(10) PRIMARY AUTO GENERATED

USER_ID	NUMBER(10) FOREIGN FOREIGN Key which references USER_ID from USER_DETAIL_U. This is used to fetch the details of the user. NOT NULL
TIME_UPLOADED	TIMESTAMP NOT NULL WITH TIMEZONE
PHOTO_LINK	VARCHAR2(500) NOT NULL

INTERESTED_IN_RELATION_U - This table stores which user is interested in which type of relation in the form of ids.

Attributes	Data Type	Key Constraint & Comments
USER_ID	NUMBER(10)	PRIMARY, FOREIGN FOREIGN Key which references USER_ID from USER_DETAIL_U. This is used to fetch the details of the user.
RELATIONSHIP_TY PE_ID	NUMBER(10)	PRIMARY, FOREIGN FOREIGN Key which references RELATION_TYPE_ID from RELATION_TYPE_U. This is used to fetch the details of the relation preferences. NOT NULL

RELATION_TYPE_U - This table stores the different types of relationships users may be interested in like - **CASUAL, SERIOUS, COMMITMENT, NO STRINGS ATTACHED AND NOT SURE.**

Attributes	Data Type	Key	Constraint & Comments
RELATIONSHIP_TY PE_ID	NUMBER(10)	PRIMARY	AUTO GENERATED

RELATIONSHIP_TYPE	VARCHAR2(20)		UNIQUE AND NOT NULL CAN BE ONLY - CASUAL, SERIOUS, COMMITMENT, NO STRINGS ATTACHED AND NOT SURE.
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USER_LIKE_U - This table stores the Likes of the users.

Attributes	Data Type	Key	Constraint & Comments
INITIATOR_ID	NUMBER(10)	PRIMARY, FORIEGN	AUTO GENERATED
RECEIVER_ID	NUMBER(10)	PRIMARY, FORIEGN	UNIQUE NOT NULL
STATUS	NUMBER(1)		CAN BE ONLY 1 OR 0.

CONVERSATIONS Module :

The Conversations Module will store the important information regarding the chats of the dating app users. This module consists of a total of 1 table -

CONVERSATION

The tables in the Conversations Module will end with _C as CONVERSATION_C.

Let us discuss each of these tables in details -

CONVERSATION_C - This table contains information about who is initiating the conversation and also with whom.

Attributes	Data Type	Key Constraint & Comments
CONVERSATION_INITIALIZER	NUMBER(10)	PRIMARY, FOREIGN FOREIGN Key which references USER_ID from USER_DETAIL. This is used to fetch the details of the chat initiator. NOT NULL

CONVERSATION_ RE CEIVER	NUMBER(10)	PRIMARY, FOREIGN FOREIGN Key which references USER_ID from USER_DETAIL. This is used to fetch the details of the person with whom the chat has been initiated. NOT NULL
TIMESTAMP	TIMESTAMP WITH TIMEZONE	PRIMARY
TEXT_MESSAGE	CLOB	NOT NULL

RATE & BLOCK Module :

The Rate & Block Module will store the important information regarding the rating and blocking metrics of the dating app users. This module consists of a total of 2 table - **RATING_R**
BLOCK_R

The tables in the RATE & BLOCK Module will end with _R in the table name like -
RATING_R, BLOCK_R.

Let us discuss each of these tables in details -

RATING_R - This table contains the details of the ratings which are given by users.

Column	Data Type	Key Constraint & Comments
RATE_INITIATER	NUMBER(10)	PRIMARY, FOREIGN FOREIGN Key which references USER_ID from USER_DETAIL_U. This is used to fetch the details of the user who wants to rate someone. NOT NULL
RATE_RECEIVER	NUMBER(10)	PRIMARY, FOREIGN FOREIGN Key which references USER_ID from USER_DETAIL_U. This is used to fetch the details of the user who is getting the rating.

		NOT NULL
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RATE NUMBER(2) NOT NULL **CAN BE ONLY - 1, 2, 3, 4, 5, 6, 7, 8, 9 AND 10.**

BLOCK - This table contains the information of the users getting blocked.

Column	Data Type	Key	Constraint & Comments
BLOCK_INITIATER	NUMBER(10)	PRIMARY, FOREIGN	FOREIGN Key which references USER_ID from USER_DETAIL_U. This is used to fetch the details of the user who wants to block someone. NOT NULL
BLOCK_RECEIVER	NUMBER(10)	PRIMARY, FOREIGN	FOREIGN Key which references USER_ID from USER_DETAIL_U. This is used to fetch the details of the user who is getting blocked. NOT NULL

Business Rules -

- 1. USERS CAN LIKE OTHER USERS.**
- 2. A USER CAN LIKE NO PERSON, ONE PERSON OR MORE THAN ONE PERSON.**
- 3. TWO USERS HAVE TO LIKE EACH OTHER TO CONVERSE. THIS IS CALLED A MATCH.**
- 4. USERS WILL CREATE THEIR PROFILE WHEN THEY SIGN UP FOR THE FIRST TIME.**
- 5. THE SIGN UP TIMESTAMP WILL BE AUTOMATICALLY STORED IN REGISTRATION_TIMESTAMP.**
- 6. THE LAST LOGIN TIMESTAMP WILL BE STORED IN LAST_LOGIN.**
- 7. USER ACCOUNT WILL BE FLAGGED AS INACTIVE IF SYS_DATE - LAST_LOGIN IS >= 30 DAYS.**
- 8. USERS HAVE TO BE A MINIMUM OF 18 YEARS OF AGE TO SIGN UP FOR THE APPLICATION.**
- 9. A USER HAS TO BE INTERESTED IN ONE OR MORE TYPES OF RELATIONSHIPS -**

CASUAL, SERIOUS, COMMITMENT, NO STRINGS ATTACHED AND NOT SURE. 10. A USER CAN HAVE ONLY ONE GENDER AMONG - MALE, FEMALE, TRANSGENDER, PANGENDER, POLYGENDER AND OTHERS.

11. A USER HAS TO BE INTERESTED IN ONE OR MORE TYPES OF GENDERS - MALE, FEMALE, TRANSGENDER, PANGENDER, POLYGENDER AND OTHERS. 12. A USER HAS TO UPLOAD A MINIMUM OF 1 PHOTO AND A MAXIMUM OF 5 PHOTOS.

13. IF USER TRIES TO UPLOAD MORE THAN 5 PICTURES ERROR MESSAGE WILL BE SHOWN, AND EARLIEST UPLOADED PICTURE(MIN TIMESTAMP) WILL BE DELETED.

14. USERS CANNOT LIKE THEMSELVES.

15. USERS CAN ONLY RATE USERS THEY HAVE MATCHED WITH.

16. USERS CAN ONLY BLOCK USERS THEY HAVE MATCHED WITH.

17. USERS CAN ONLY CONVERSE WITH USERS THEY HAVE MATCHED

WITH. 18. USERS CANNOT CONVERSE WITH USERS WHO HAVE BLOCKED THEM. 19. USERS CANNOT RATE USERS WHO HAVE BLOCKED THEM.

20. ONE USER CAN RATE ANOTHER USER ONLY ONCE.

21. ONE USER CAN BLOCK ANOTHER USER ONLY ONCE.

22. IF A USER GETS BLOCKED >= TO 10 TIMES, HIS PROFILE WILL BE FLAGGED AS HIGH ALERT.

23. THE RATING WILL BE ON A 10 POINT SCALE, WITH 1 BEING THE MINIMUM AND 10 BEING THE MAXIMUM RATING.

24. MESSAGES WILL BE STORED IN THE CHAT TABLE BETWEEN USERS.

25. USERS CAN ONLY READ MESSAGES SENT/RECEIVED BY THEM. 26.

THE APPLICATION IS ONLY DESIGNED FOR USA.

27. THE STATE AND CITY WILL BE US STATES AND CITIES FOR THE USERS.

Views -

1. MEMBERSHIP_TYPE_VIEW - A view which shows the distribution in percentage of the users based on which membership type they belong to.

2. AVERAGE_RATING_RECEIVED_VIEW - A view which calculates the average rating USERS have received from all other users.

3. RATING_RANKING_BY_CITY_VIEW - A view which ranks USERS based on their RATING, compared to other users in their CITY.

4. RATING_RANKING_BY_STATE_VIEW - A view which ranks USERS based on their RATING, compared to other users in their STATE.

5. NUMBER_OF_TOTAL_BLOCKS - A view which calculates the total number of blocks USERS have received from all other users.

6. BLOCKED_PROFILES_PER_CITY_VIEW - A view which counts the blocked USERS by their CITY.

7. BLOCKED_PROFILES_PER_STATE_VIEW - A view which counts the blocked USERS by their STATE.

8. CUSTOMER_RETENTION_VIEW - A view which shows the count of USERS, who have not logged into their account in the last 30 days from sysdate and USERS who have logged into their account in the last 30 days.

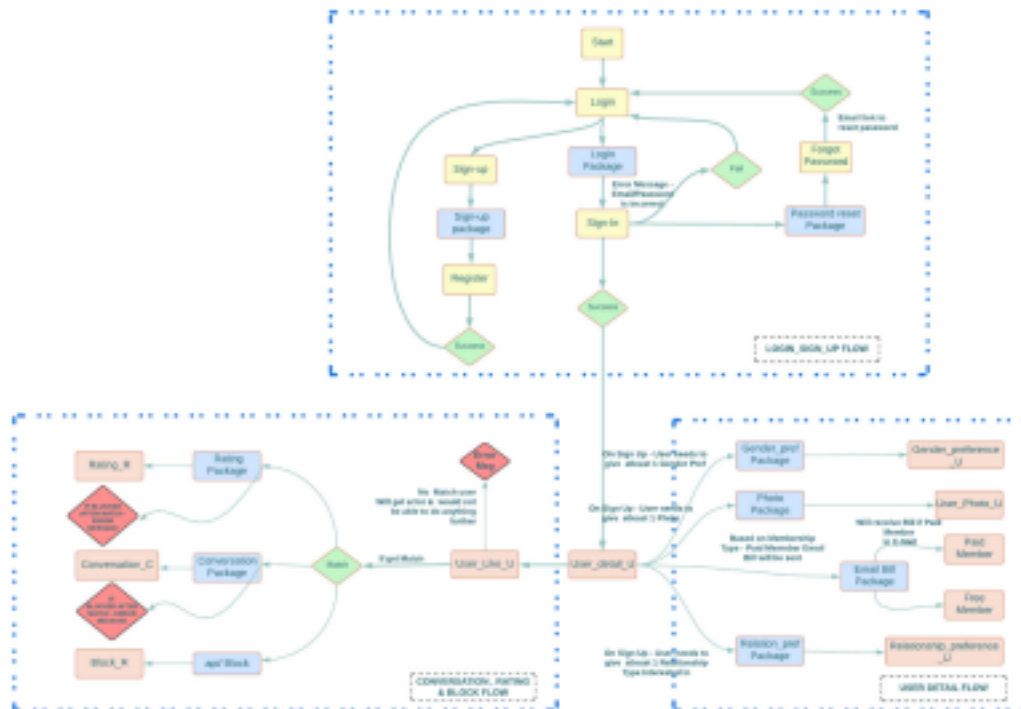
9. USERS_AGE_REPORT_VIEW - A view which shows the count of USERS in different

age brackets

**TEENS(18-19),TWENTIES(20-29),THIRTIES(30-39),FORTIES(40-49),FIFTIES(50-59)
AND OTHERS.**

10. USER_GENDER_REPORT_VIEW - A view which shows the count of **USERS** from different **genders**.

DATA FLOW DIAGRAM



USER LEVEL ACCESS PERMISSION

ADMIN - Has full access to all the entities in the database.

USER -

1. Has **INSERT/UPDATE/DELETE** access to only his/her own record in **USER_DETAILS_U**, **INTERESTED_IN_RELATION_U**, **GENDER_PREFERENCE_U**, **USER_PHOTO_U** through stored procs.
2. Has **INSERT/READ ONLY ACCESS** to messages sent to other users in **CONVERSATION_C** through stored procs.
3. Has **READ ONLY ACCESS** to messages sent from other users in **CONVERSATION_C**.

DATA_OPERATOR -

1. Has **INSERT/UPDATE/DELETE** access to table **GENDER_U**, **RELATION_TYPE_U** to insert the detail tables for gender and relation types.

REPORTING_ANALYST -

1. Only has access to views for reporting and analysis purposes.