



**AY 2022/23 Semester 1**

**IFS4205 Information Security Capstone Project Group 3**

**Database Design Report**

**Crowd Sensing Medical Application**

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# 1. Database Design

## 1.1 Overview

Our database records vital information for our medical facility crowd-controlling application. It mainly comprises 3 parts: user information (data of patients, doctors, medical helpers and researchers), health data (general health records, anonymised patient health records and unique session health records) and our IoT data (Crowd Data) which stores the data collected from our IoT device. In our application, it will store the number of crowds at each specific timestamp. The ER Diagram can be seen in Figure 1.

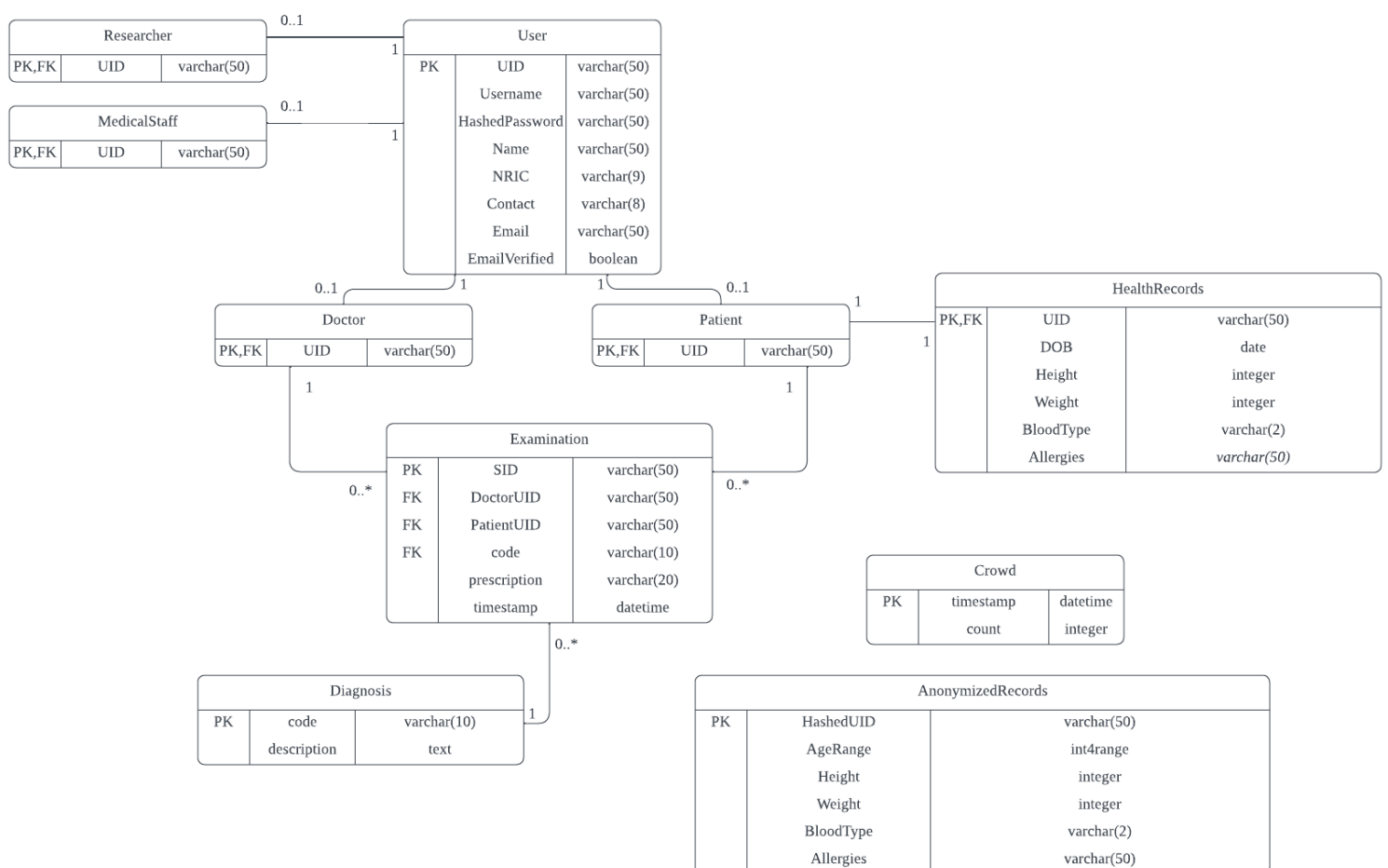


Figure 1: ER Diagram

## 1.2 Descriptions of tables

### 1.2.1 User Table

This table is for all users using our web application. This stores the user's login credentials and basic information like their NRIC, name, contact number and email address. The primary key is the unique UID field which is generated every time an account is created.

### 1.2.2 Patient Table

This table stores the UID of users who are a patient in the facility. UID refers to a unique identifier that will be used to identify each patient. UID will be auto-generated.

### 1.2.3 Doctor Table

This table stores the UID of doctors working in the facility. UID refers to a unique identifier that will be used to identify each doctor. UID will be auto-generated.

### 1.2.4 MedicalStaff Table

This table stores the UID of medical staff working in the facility. UID refers to a unique identifier that will be used to identify each medical staff. UID will be auto-generated.

### 1.2.5 Researchers Table

This table stores the UID of researchers who wish to access the anonymized database. UID refers to a unique identifier that will be used to identify each researcher. UID will be auto-generated.

### 1.2.6 HealthRecords Table

This table is used to record the general health records of patients such as height, weight, allergies, age and blood type. The primary key is the patient identifier (UID). When a patient creates an account, they are prompted to add in their general health records which is then added as a record to this table.

### 1.2.7 AnonymisedRecords Table

This table is used to store all anonymised general health records. The primary key is the hashed patient identifier. When a user creates an account, they are prompted to add their health records such as weight, height, allergies, blood type and date of birth. When a record is added to the Health Record table, a process in the SQL server will automatically anonymize the health records and insert it into the anonymised patient health record which can be viewed only by Researchers.

### 1.2.8 Examinations Table

This table is used to store all patient visits to the facility. The primary key is the session identifier which is generated by the backend, the foreign key is the UID of the doctor, the patient as well as the diagnosis code. When a patient visits a doctor for a medical checkup,

the patient will generate a session identifier which is used by the doctor to insert a new record of the session details such as timestamp, prescription given and diagnosis code to the table.

### 3.2.9 Diagnosis Table

The table is to store the diagnosis codes that doctors will use when attending to a patient. Each diagnosis code will also have its description.

### 3.2.10 Crowd Data Table

The table is to store all crowd data measured by the crowd-sensing IoT device. The primary key is timestamp. When the crowd-sensing IoT is live, the crowd-sensing IoT device will measure the amount of people in the medical facility every 10 minutes interval and insert the record to the table.