**Functional requirement**

**Design requirements:**

1. Users can input the database or the link to which the database is located and choose the type of the input database file.

2. System can process the database and get the genetic variants data.

3. System can connect to the pharmGKB and use genetic variants data to retrieve the clinically relevant genetic variants data (disease, drugs, drug labels and so on) from it.

4. System can transfer the data to json type and input the json data to jsp.

5. System can print the data on the webpage.

6. System can generate a clinical report from the data.

7. Users can get the data by reading the webpage or downloading the clinical report.

**Graphics requirements**:

1. There is a place for users to select the type of the input database and input the database.

2. The output data shown on the webpage should be stored in lists or tables. The data is grouped by type and stored in several collapsible text boxes which can be click on to get the data.

3. There is a button which users can click on to get the clinical report.

**Operating system requirements:**

1. MySQL 8.0+ or other relational database / JDBC

2. Java SDK 11+

3. JetBrains IDEA or Eclipse (IDE)

4. Servlet & JSP (dynamic webpage)

5. JSTL (template)

6. SLF4J (logging framework)

7. Json/Gson (data passing mechanism)

**Constraints:**

There are requirements for the format of the database and unformatted data cannot be read.

## 4.External Interface Requirements

4.1 User Interfaces

The logic behind the interactions between the users and the software. This includes the sample screen layout, buttons and functions that would appear on every screen, messages to be displayed on each screen and the style guides to be used.

4.2 Hardware Interfaces

The software is implemented on a web page (website) on personal devices.

Connect to the pre-processed database: (not sure to put in which categories)

Input the seq analysis file: connect to the hardware device

Get analysis result: run the software on the serve (do we need to create or purchase one? Not sure) and connect to the database

4.3 Communications Interfaces

Determination of all the communication standards to be utilized by the software as a part of the project

4.4 Software Interfaces

The interaction of the software to be developed with other software components such as frontend and the backend framework to the used, the database management system and libraries describing the need and the purpose behind each of them.

Things in red means I did not have full confidence to say.

**External Interface Requirements**

1. User interfaces:
2. UI includes uploading interface, three display interfaces (Drugs, Drug Labels, Dosing Guideline). Those three display interfaces will show the users corresponding information(Drugs: serial numbers, name of drugs, drug URL, biomarker; Drug Labels: serial numbers, source, dosing Information, summary markdown; serial number, name, recommendation, drug ID, source, summary markdown). The uploading interface contains a “upload” button, an input box for name of submitter, a “select” button. Users can input the file after being annotated to this web page, then the web page will analyze the file and output a recommended drugs reports.
3. Hardware interfaces:
4. File uploaded from local disk to web site. (Supported devices: a computer connected to the internet)
5. Web site send the final file to the local disk. (If the resulting file is sent to the local area after system analysis)
6. Communication interfaces:
7. Hypertext Transfer Protocol (HTTP protocol)
8. Transmission Control Protocol/Internet Protocol (TCP/IP protocol)
9. Software interfaces:
10. Web site connect with postgreSQL. (It can be specific to the name of the database)

## 5. Non-Functional Requirements

**5.1 Performance requirements**

The performance requirements need to be specified for every functional requirement. The rationale behind it also needs to be elaborated upon.

Drugs: personal drugs based on the results of comparison input seq data.

Drug labels: corresponse to the drugs base

Dosing guideline:

(Occurrence: based on the Literature Occurrence to research special situations of variants that need to pay attention to)

(Could this software be applied to analysis the mutant animals and generate their medical treatment by adding the database? Or be utilized in research as there is a dataset of Pathways in PGKB)

**5.2 Safety requirements**

Users need to log in via their user name and passwords (maybe it is hard to implement this but we could ignore user name just focus on the passwords)

The way connecting to the database and input seq analysis needs algorithm to protect.

(to avoid temparing the database that may lead to misdiagnosis.)

The analysis results need protection.

**5.3 Security requirements**

There is no way to get access to the origainal data once the user put in and get data analyzed.

The analysis results could be refered to later by inputing passwards but cannot download to devices.

There is search and rank button on the interface helping users to make decisions. (Just thoughts)

**5.4 Software quality attributes**

Maintainability: Test work

(adaptability, flexibility, usability, reliability, portability etc.)

**5.5 Other requirements**

legal requirements: no idea

resource utilizations: (is there any need to utilize other database resource?)

future updates : monthly updates database based on the update of PGKB database via crawler

1. Safety requirement:
2. When uploading the local file, we can use regular expression to avoid the injection of computer viruses.
3. Software quality attributes:
4. Adaptability: this web site can run at different browsers and different hardware platform. (How to prove it in documentation?)