HOSPITAL CLAIM MANAGEMENT SYSTEM ANALYSIS

Created by Batch 75

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Contents

❖ Business Challenge / Requirement

This is a Hospital Claim Management System which has many databases stored like Patient information, Claim information, Insurance Company Names, Hospital Details etc. So, to correctly manipulate and analyse this huge sets of data, the authority has requested for our help in Big Data Analytics, for handling and analysing of this datasets.

❖ Goal of the Project

To meet our client requirements, we have to use many databases which store patient information, claim information, insurance company names etc. We need to do data cleansing to fix errors , duplicates and irrelevant data from the raw dataset. We have processed, filtered, transformed and analysed these data. Finally, we will plot a graph of 6months claim of patient and claims based on disease.

❖ Project Architecture

1. A linux file server receives 14 files in total in Comma Seperated Value (CSV) format from the Hospital, Insurance Company and other sources. These are the source files that we will be using for our project.

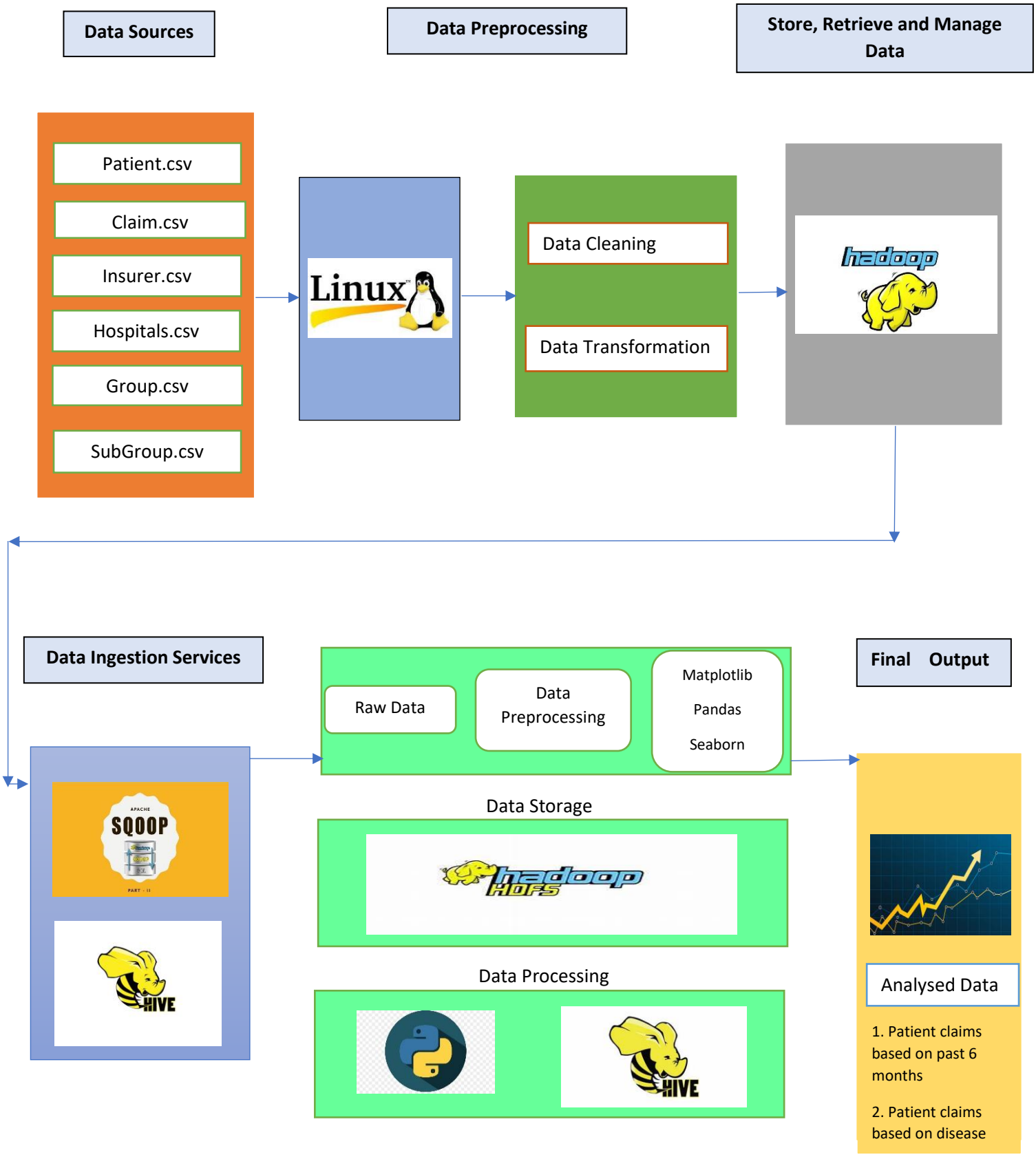
2. Then we use data filtering in python to filter out NULL and invalid values from our data sources.

3. Now transformational logic is applied on the cleansed files and the data are imported to MYSQL for storage.

4. The file data and tables are validated, enriched, analysed, processed before loading into HDFS and HIVE.

5. Finally, after analysing of the tables and datasets, we are able to visualize the graph we need to get the relation between insurance claims and age group.

HOSPITAL CLAIM MANAGEMENT SYSTEM ANALYSIS ARCHITECTURE



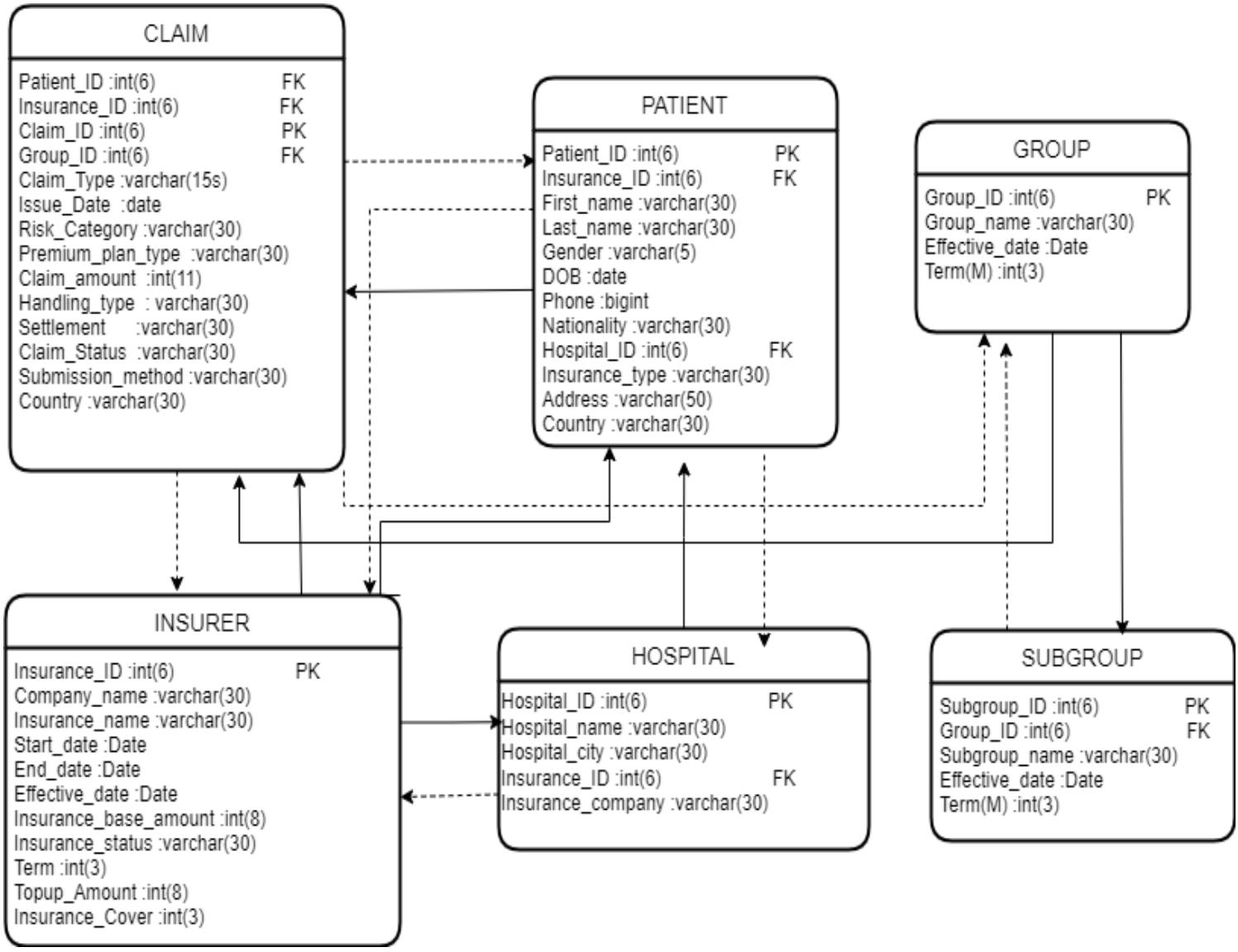
❖ Datasets and Schemas

1. Data coming from third party sources reside in our local directory of Unix and in CSV format.

2. A final master table is created from existing tables which is then inserted in HDFS using SQOOP.

3. Lastly, that table is analysed and visualized using python data analytical package, and matplotlib to map the datasets.

❖ DATA MODEL


CLAIM
Patient_ID :int(6) FK
Insurance_ID :int(6) FK
Claim_ID :int(6) PK
Group_ID :int(6) FK
Claim_Type :varchar(15s)
Issue_Date :date
Risk_Category :varchar(30)
Premium_plan_type :varchar(30)
Claim_amount :int(11)
Handling_type : varchar(30)
Settlement :varchar(30)
Claim_Status :varchar(30)
Submission_method :varchar(30)
Country :varchar(30)
PATIENT
Patient_ID :int(6) PK
Insurance_ID :int(6) FK
First_name :varchar(30)
Last_name :varchar(30)
Gender :varchar(5)
DOB :date
Phone :bigint
Nationality :varchar(30)
Hospital_ID :int(6) FK
Insurance_type :varchar(30)
Address :varchar(50)
Country :varchar(30)
GROUP
Group_ID :int(6) PK
Group_name :varchar(30)
Effective_date :Date
Term(M) :int(3)
INSURER
Insurance_ID :int(6) PK
Company_name :varchar(30)
Insurance_name :varchar(30)
Start_date :Date
End_date :Date
Effective_date :Date
Insurance_base_amount :int(8)
Insurance_status :varchar(30)
Term :int(3)
Topup_Amount :int(8)
Insurance_Cover :int(3)
HOSPITAL
Hospital_ID :int(6) PK
Hospital_name :varchar(30)
Hospital_city :varchar(30)
Insurance_ID :int(6) FK
Insurance_company :varchar(30)
SUBGROUP
Subgroup_ID :int(6) PK
Group_ID :int(6) FK
Subgroup_name :varchar(30)
Effective_date :Date
Term(M) :int(3)

❖ Description of the data source files

Claim CSV file fields

- Claim_ID : Unique, not null Primary Key
- Patient_ID: Unique, not null Primary key for Patient table
- Insurance_ID : Unique, not null Primary Key for Insurer table
- Group_ID : Unique, not null Primary Key for Group table
- Claim_type : Shows the type of claim
- Issue_date : Issue date for the claim made by patient
- Risk_Category : Level of risk
- Premium_plan_type : Shows the frequency of subscription
- Claim_Amount : Amount of claim made
- Handling_type : Type of handling
- Settlement : Status of settlement of claim
- Claim_status : Status of the claim made
- Submission_method : Method of claim submission
- Country : Country

Patient CSV file fields

- Patient_ID : Unique, not null Primary Key
- Insurance_ID : Unique, not null Primary Key for Insurer table
- Hospital_ID : Unique, not null Primary Key for Hospital table
- First_name : First name of the patient
- Last_name : Last name of the patient
- Gender : Gender
- DOB : Date of birth of patient
- Phone : Contact number of patient
- Nationality : Nationality of patient
- Insurance_type : Term of the insurance covered
- Address : Full address of patient
- Country : Country in which the patient belong to

Insurer CSV file fields

- Insurance_ID : Unique, not null Primary Key for Insurer table
- Company_name : Name of Company providing insurance
- Insurance_name : Name of Insurance Plan
- Start_Date : Date of start of insurance plan in dd/mm/yyyy
- End_Date : End Date of the plan in dd/mm/yyyy
- Effective_Date : Effective Date of the plan in dd/mm/yyyy
- Insurance_Base_Amount : Basic Coverage amount of the plan
- Term : Validity time period of plan in Years
- Topup_Amount : Amount of topup that can be added
- Insurance_Cover : Head coverage under the plan

Hospital CSV file fields

- Hospital_ID : unique, not null Primary key
- Hospital_Name : Name of the Hospital
- Hospital_City : City where the hospital is located
- Insurance_ID : Unique ID of Insurance as foreign key
- Insurance_Company : Name of Insurance Company

Group CSV file fields

- Group_ID : Unique, not null Primary key of group table
- Group_Name : Name of the group of Disease
- Effective_Date : Effective_date
- Term : Term of validity in Months

SubGroup CSV file fields

- SubGroup_ID : Unique, not null primary key
- Group_ID : Unique , foreign key of table Group
- SubGroup_Name : Name of the disease under the parent disease
- Effective_Date : Effective date
- Term : Term of validity in months

❖ Description of the final file

Final CSV file fields

- Patient_name : Name of the Patients
- Patient_address : Address of the Patients
- Claim_id : Unique, not null primary key
- Insurance_details : Name of the insurance and insurance company
- Claim_status_details : Status of the claim made
- Claim_issue_date : Issue date for the claim made by patient
- Insurance_term : Validity time period of plan in Years
- Patient_age : Age of Patient
- Group_details : Name of the disease and group of disease
- Insurance_amount : Base amount and top up amount

❖ Problem Statement

From this huge dataset, we process and analyze the data carefully and find out the following pattern :

I. Insurance claims made by patient who are admitted in the Hospital from the past 6 months by the patient's age.
II. Claims of patient based on disease.
III. Claim uses and balance amount based on Insurance company.

❖ Code Templates

▪ Data Processing :

First we fetch all the raw source files and then cleanse it using python pandas, such as removing duplicate values, null values, then it gets converted to processed data. Here is some code snippets.

Cleansing of group.csv

```
In [1]: import pandas as pd
        import matplotlib.pyplot as plt
        import seaborn as sns

In [12]: df=pd.read_csv('raw_Group.csv')

In [13]: df.head()

Out[13]:
```

	Group ID	Group Name	Effective Date	Term(M)	Address
0	76891	Accident	12/12/2021	12	NaN
1	76892	Industrial Disease	3/1/2022	36	NaN
2	76893	Critical Illness	4/11/2021	30	NaN
3	76894	Surgeries	18/5/2022	24	NaN
4	76895	Genetic Illness	14/5/2022	26	NaN

```
In [14]: del df['Address']

In [15]: df.head()

Out[15]:
```

Group ID	Group Name	Effective Date	Term(M)

Cleansing of subgroup files by removing duplicates.

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Run Code

In [15]:
```
df.head()
```

Out[15]:

	Group ID	Group Name	Effective Date	Term(M)
0	76891	Accident	12/12/2021	12
1	76892	Industrial Disease	3/1/2022	36
2	76893	Critical Illness	4/11/2021	30
3	76894	Surgeries	18/5/2022	24
4	76895	Genetic Illness	14/5/2022	26

In [18]:
```
df.to_csv('Group.csv',index=False)
```

In [19]:
```
df=pd.read_csv('raw_Subgroup1.csv')
```

In [21]:
```
df.head(7)
```

Out[21]:

	Subgroup ID	Group ID	Subgroup Name	Effective Date	Term(M)
0	56431	76891	Road-traffic accident	12/4/2021	32
1	56432	76891	Fractures caused by falls	22/9/2021	23
2	56433	76891	Gun shot	5/5/2022	15
3	56434	76891	Burn Cases	27/4/2022	26
4	56435	76891	Current Shock	1/1/2022	10
5	56436	76891	Broken Arm	NaN	8

In [40]:
```
df=df.dropna()
```

In [41]:
```
df
```

Out[41]:

	Subgroup ID	Group ID	Subgroup Name	Effective Date	Term(M)
0	56431	76891	Road-traffic accident	12/4/2021	32
1	56432	76891	Fractures caused by falls	22/9/2021	23
2	56433	76891	Gun shot	5/5/2022	15
3	56434	76891	Burn Cases	27/4/2022	26
4	56435	76891	Current Shock	1/1/2022	10

In [42]:
```
df = df.reset_index(drop = True)
```

In [43]:
```
df
```

Cleansing of subgroup files by removing null values.

```
In [66]: df=pd.read_csv('raw_Subgroup5.csv')
```

```
In [67]: df
```

Out[67]:

	Subgroup ID	Goup ID	Subgroup Name	Effective Date	Term(M)
0	56470	768925	Autism	NaN	25
1	56471	768925	Down syndrome	23/1/2022	30
2	56472	768925	FragileX syndrome	22/9/2021	27
3	56473	768925	Turner syndrome	4/4/2022	20
4	56474	768925	Trisomy 18	27/4/2022	28
5	56475	768925	Trisomy 13	1/1/2022	14

```
In [68]: df=df.dropna()
```

```
In [69]: df
```

Out[69]:

	Subgroup ID	Goup ID	Subgroup Name	Effective Date	Term(M)
1	56471	768925	Down syndrome	23/1/2022	30
2	56472	768925	FragileX syndrome	22/9/2021	27

- **Processed data**

	Patient ID	Insurance ID	First name	Last name	Gender
0	45098.0	1003.0	Akriti	Singh	F
1	45099.0	1003.0	Pritam	Bannerjee	M
2	45100.0	1003.0	Salim	Khan	M
3	45101.0	1003.0	Yasoof	Akhtar	M
4	45102.0	1003.0	Wahida	Begum	F
5	45103.0	1003.0	Saheb	Chowdhury	M
6	45104.0	1003.0	Liza	Kusari	F
7	45105.0	1003.0	Rahul	Parmar	M
8	45106.0	1003.0	Koyel	Singh	F
9	45107.0	1003.0	Rai	Sen	F
10	45108.0	1003.0	Saina	Das	F
11	45109.0	1003.0	Saili	Goyel	F
12	45110.0	1003.0	Lianna	Reddy	F
13	45111.0	1003.0	Sanvi	Shetty	F
14	45112.0	1003.0	Sourav	Sanyal	M
15	45113.0	1003.0	Rounak	Bansal	M
16	45114.0	1003.0	Diya	Gupta	F

	Phone no	Nationality	Hospital ID	Insurance Type
0	7.405288e+09	American	70001.0	Long Term
1	4.014207e+09	American	70005.0	Short Term
2	3.206315e+09	American	70004.0	Long Term
3	4.057383e+09	American	70002.0	Long Term
4	7.852044e+09	American	70003.0	Short Term
5	8.567862e+09	American	70005.0	Short Term
6	2.033718e+09	American	70004.0	Long Term

7	6.176708e+09	American	70003.0	Short Term
8	7.087782e+09	American	70002.0	Short Term
9	6.204418e+09	American	70001.0	Short Term
10	6.263711e+09	American	70001.0	Long Term
11	3.472706e+09	American	70003.0	Short Term
12	6.172935e+09	American	70005.0	Short Term
13	9.319498e+09	American	70002.0	Long Term
14	2.679530e+09	American	70004.0	Short Term
15	8.136449e+09	American	70004.0	Long Term
16	6.192009e+09	American	70002.0	Short Term
17	4.804396e+09	American	70003.0	Long Term
18	3.014947e+09	American	70001.0	Long Term
19	7.142611e+09	American	70005.0	Short Term
20	8.125245e+09	American	70004.0	Short Term

	Address	Country
0	1660 Meadow DriveTennessee 27	USA
1	4427 Green hill road,Arkanas 08	USA
2	776 Harper street, kentucky 65	USA
3	53 Flynn Street Nebraska 16	USA
4	3085 simons road pennysylvania 34	USA
5	2929 forest drive kansas 05	USA
6	3 Herald New York 10001-3065 USA	USA
7	42 W 35TH New York 10001-2233	USA
8	213 W 35th New York NY	USA
9	350 W 31st New York	USA
10	939 Stadium Drive Massachusetts	USA
11	3319 HORSESHOE LANE CALIFORNIA	USA
12	4170 POPLAR STREET, ILLIOIS	USA
13	1135 NORMAN STREET, CALIFORNIA	USA
14	3432 SYCAMORE STREET,CALIFORNIA	USA

Insurer.csv after processing and cleansing

	Insurance ID	Company Name	Insurance Name	Start Date(dd/mm/yyyy)	End Date(dd/mm/yyyy)	Effective date(dd/mm/yyyy)	Insurance Base Amount	Insurance Status	Term(Yrs)	TopUp Amount
1	1001	Aegon Life Insurance Co. Ltd.	Individual Health Insurance	1/1/2020	1/1/2036	15/1/2020	200000.0	Active	15	200000
4	1002	Edelweiss Life Insurance Co.	Family Health Insurance	3/1/2020	3/1/2039	15/3/2020	300000.0	Active	18	300000
7	1003	Birla Sun Life Insurance Co.	Critical illness Insurance	5/2/2020	5/2/2041	17/05/2020	400000.0	Active	20	150000

- ## Importing Processed data to MYSQL

List of all tables, that are imported to MySQL from the processed files.

```
Database changed
mysql> show tables;
+-------------------+
| Tables_in_project |
+-------------------+
| Claim             |
| Hospital          |
| Insurer           |
| Patient           |
| groups            |
| subgroup          |
+-------------------+
6 rows in set (0.00 sec)
```

- **CLAIM TABLE**

```
mysql> describe Claim;
+--------------------+--------------+------+-----+---------+-------+
| Field              | Type         | Null | Key | Default | Extra |
+--------------------+--------------+------+-----+---------+-------+
| Patient_ID         | int(6)       | YES  | MUL | NULL    |       |
| Insurance_ID       | int(6)       | YES  | MUL | NULL    |       |
| Claim_ID           | int(6)       | NO   | PRI | NULL    |       |
| Group_ID           | int(6)       | YES  | MUL | NULL    |       |
| Claim_type         | varchar(15)  | YES  |     | NULL    |       |
| Issue_date         | date         | YES  |     | NULL    |       |
| Risk_Category      | varchar(30)  | YES  |     | NULL    |       |
| Premium_plan_type  | varchar(30)  | YES  |     | NULL    |       |
| Claim_amount       | int(11)      | YES  |     | NULL    |       |
| Handling_type      | varchar(30)  | YES  |     | NULL    |       |
| Settlement         | varchar(30)  | YES  |     | NULL    |       |
| Claim_status       | varchar(30)  | YES  |     | NULL    |       |
| Submission_method  | varchar(30)  | YES  |     | NULL    |       |
| Country            | varchar(30)  | YES  |     | NULL    |       |
+--------------------+--------------+------+-----+---------+-------+
14 rows in set (0.00 sec)
```

```
mysql> select * from Claim limit 15;
+------------+-------------+----------+----------+---------------+------------+---------------+------------------+-------------+---------
------+-----------+-------------+-----------+------------------+---------+
| Patient_ID | Insurance_ID | Claim_ID | Group_ID | Claim_type    | Issue_date | Risk_Category | Premium_plan_type | Claim_amount | Handling
_type | Settlement | Claim_status | Submission_method | Country |
+------------+-------------+----------+----------+---------------+------------+---------------+------------------+-------------+---------
------+-----------+-------------+-----------+------------------+---------+
|      45104 |         1003 |     4007 |    76895 | Cashless      | 2021-12-12 | High          | Monthly          |        20000 | Complex
 |    | In Process | ACTIVE       | Internet          | India
|      45106 |         1003 |     4009 |    76894 | Reimbursement | 2022-05-09 | High          | Semi-annualy     |        29000 | Acceler
 |d   | Invalid    | INVALID      | Mail              | India
|      45111 |         1003 |     4014 |    76893 | Cashless      | 2022-01-03 | Low           | Monthly          |        35000 | Standar
 |    | Settled    | RECOVERED    | Internet          | India
|      45113 |         1003 |     4016 |    76895 | Reimbursement | 2021-11-12 | High          | Monthly          |        20500 | Standar
 |    | Settled    | ACTIVE       | Internet          | India
|      45117 |         1003 |     4020 |    76891 | Reimbursement | 2021-11-04 | Low           | Quaterly         |        24100 | Standar
 |    | Settled    | RECOVERED    | Mail              | India
|      45121 |         1003 |     4024 |    76892 | Cashless      | 2022-04-30 | Low           | Quaterly         |        19999 | Express
 |    | In Process | ACTIVE       | Mail              | India
|      45123 |         1003 |     4026 |    76891 | Cashless      | 2022-05-18 | High          | Semi-annualy     |        49500 | Acceler
 |d   | In Process | ACTIVE       | Call              | India
|      45127 |         1003 |     4030 |    76894 | Cashless      | 2022-04-21 | High          | Semi-annualy     |        41000 | Standar
 |    | Invalid    | INVALID      | Mail              | India
|      45128 |         1003 |     4031 |    76892 | Reimbursement | 2022-05-14 | High          | Quaterly         |        32000 | Acceler
 |d   | In Process | ACTIVE       | Call              | India
|      45134 |         1003 |     4037 |    76891 | Reimbursement | 2022-04-07 | Low           | Semi-annualy     |        59000 | Standar
 |    | Settled    | RECOVERED    | Mail              | India
|      45135 |         1003 |     4038 |    76892 | Reimbursement | 2022-04-01 | Medium        | Monthly          |        20000 | Express
 |    | Invalid    | INVALID      | Mail              | India
|      45139 |         1003 |     4042 |    76891 | Cashless      | 0000-00-00 | Low           | Semi-annualy     |        45000 | Standar
 |    | In Process | ACTIVE       | Mail              | India
|      45142 |         1003 |     4045 |    76895 | Cashless      | 2022-03-31 | Medium        | Quaterly         |        50000 | Express
 |    | Invalid    | INVALID      | Internet          | India
|      45145 |         1003 |     4048 |    76894 | Cashless      | 2022-05-08 | Low           | Monthly          |        37000 | Standar
 |    | Settled    | RECOVERED    | Internet          | India
|      45147 |         1003 |     4050 |    76893 | Reimbursement | 2022-04-23 | Low           | Quaterly         |        22500 | Standar
 |    | In Process | RECOVERED    | Mail              | India
```

- **INSURER TABLE**

```
mysql> describe Insurer;
+------------------------+-------------+------+-----+---------+-------+
| Field                  | Type        | Null | Key | Default | Extra |
+------------------------+-------------+------+-----+---------+-------+
| Insurance_ID           | int(6)      | NO   | PRI | NULL    |       |
| Company_name           | varchar(30) | YES  |     | NULL    |       |
| Insurance_name         | varchar(30) | YES  |     | NULL    |       |
| Start_date             | date        | YES  |     | NULL    |       |
| End_date               | date        | YES  |     | NULL    |       |
| Effective_date         | date        | YES  |     | NULL    |       |
| Insurance_base_amount  | int(8)      | YES  |     | NULL    |       |
| Insurance_status       | varchar(30) | YES  |     | NULL    |       |
| Term                   | int(3)      | YES  |     | NULL    |       |
| Topup_Amount           | int(8)      | YES  |     | NULL    |       |
| Insurance_cover        | int(4)      | YES  |     | NULL    |       |
+------------------------+-------------+------+-----+---------+-------+
11 rows in set (0.00 sec)
```

```
mysql> select * from Insurer;
+--------------+-----------------------------+---------------------------+------------+------------+---------------+-----------------
-----+-----------------+------+--------------+-----------------+
| Insurance_ID | Company_name                | Insurance_name            | Start_date | End_date   | Effective_date | Insurance_base_am
ount | Insurance_status | Term | Topup_Amount | Insurance_cover |
+--------------+-----------------------------+---------------------------+------------+------------+---------------+-----------------
-----+-----------------+------+--------------+-----------------+
|         1001 | Aegon Life Insurance Co. Ltd. | Individual Health Insurance | 2020-01-01 | 2036-01-01 | 2020-01-15     |                20
0000 | Active           |   15 |       200000 |               4 |
|         1002 | Edelweiss  Life Insurance Co. | Family Health Insurance     | 2020-01-03 | 2039-01-03 | 2020-03-15     |                30
0000 | Active           |   18 |       300000 |               3 |
|         1003 | Birla Sun Life Insurance Co.  | Critical illness Insurance  | 2020-02-05 | 2041-02-05 | 2020-05-17     |                40
0000 | Active           |   20 |       150000 |               3 |
+--------------+-----------------------------+---------------------------+------------+------------+---------------+-----------------
-----+-----------------+------+--------------+-----------------+
3 rows in set (0.00 sec)
```

- **PATIENT TABLE**

```
mysql> describe Patient;
+----------------+-------------+------+-----+---------+-------+
| Field          | Type        | Null | Key | Default | Extra |
+----------------+-------------+------+-----+---------+-------+
| Patient_ID     | int(6)      | NO   | PRI | NULL    |       |
| Insurance_ID   | int(6)      | YES  | MUL | NULL    |       |
| First_name     | varchar(30) | YES  |     | NULL    |       |
| Last_name      | varchar(30) | YES  |     | NULL    |       |
| Gender         | varchar(5)  | YES  |     | NULL    |       |
| DOB            | date        | YES  |     | NULL    |       |
| Phone          | bigint(20)  | YES  |     | NULL    |       |
| Nationality    | varchar(30) | YES  |     | NULL    |       |
| Hospital_ID    | int(6)      | YES  | MUL | NULL    |       |
| Insurance_type | varchar(30) | YES  |     | NULL    |       |
| Address        | varchar(50) | YES  |     | NULL    |       |
| Country        | varchar(30) | YES  |     | NULL    |       |
+----------------+-------------+------+-----+---------+-------+
12 rows in set (0.00 sec)
```

```
mysql> select * from Patient limit 15;
+------------+-------------+------------+-------------+--------+-----------+------------+-------------+-------------+----------------+---
-----------------------------+---------+
| Patient_ID | Insurance_ID | First_name | Last_name   | Gender | DOB       | Phone      | Nationality | Hospital_ID | Insurance_type | Ad
dress                        | Country |
+------------+-------------+------------+-------------+--------+-----------+------------+-------------+-------------+----------------+---
-----------------------------+---------+
|      45098 |         1003 | Akriti     | Singh       | F      | 2002-05-09 | 8908908398 | Indian      |       90001 |  Longterm      | 23
  |sp road  kolkata 64         | India
|      45099 |         1003 | Pritam     | Bannerjee   | M      | 2001-02-02 | 9087988092 | Indian      |       90003 |   Short term   | 12
  |p Mukherjee road kolkata 87 | India
|      45100 |         1003 |   Salim    | Khan        | M      | 2001-06-09 | 9900887766 | Indian      |       90005 |   Long term    | 34
  |oy road howrah 34           | India
|      45101 |         1003 | Yasoof     | Akhtar      | M      | 2000-08-07 | 9988455767 | Indian      |       90002 |   Long term    | 34
  |ellam road Chennai 01       | India
|      45102 |         1003 | Wahida     | Begum       | F      | 2003-07-08 | 9090123467 | Indian      |       90003 |   Short term   | 46
  | roy road karnataka 04      | India
|      45103 |         1003 | Saheb      |   Chowdhury | M      | 1992-03-09 | 9807890979 | Indian      |       90004 |   Short term   | 36
  |urnadas road kolkata 67     | India
|      45104 |         1003 | Liza       | Kusari      | F      | 1990-04-10 | 9089757868 | Indian      |       90004 |   Long term    | 34
  |s sahani road. Mumbai 05    | India
|      45105 |         1003 | Rahul      | Parmar      | M      | 2000-09-06 | 9999977685 | Indian      |       90001 |   Short term   | 45
  |inson road kolkata 98       | India
|      45106 |         1003 | Koyel      | Singh       | F      | 2001-09-09 | 9999963667 | Indian      |       90005 |    Long term   | 23
  |oy road kolkata 98          | India
|      45107 |         1003 | Rai        |  Sen        | F      | 2002-09-08 | 9864680066 | Indian      |       90002 | Short term     | 88
  |M road Chennai 67           | India
|      45108 |         1003 | Saina      | Das         | F      | 1999-02-09 | 9876543210 | Indian      |       90003 | Long term      | 90
  |oy road kolkata 89          | India
|      45109 |         1003 | Saili      | Goyel       | F      | 1997-03-08 | 9638527410 | Indian      |       90001 | Short term     | 34
  |s road Bombay 01            | India
|      45110 |         1003 | Lianna     | Reddy       | F      | 1992-07-22 | 9518742360 | Indian      |       90002 | Long term      | 44
  |c road Malda 09             | India
|      45111 |         1003 | Sanvi      | Shetty      | F      | 1995-03-22 | 9638521470 | Indian      |       90003 | Long term      | 34
  | road punjab 99             | India
|      45112 |         1003 | Sourav     | Sanyal      | M      | 1980-09-13 | 9032165478 | Indian      |       90005 | Long term      | 44
  |uresh roy road kolkata 9    | India
```

- **GROUPS TABLE**

```
mysql> describe groups;
+----------------+-------------+------+-----+---------+-------+
| Field          | Type        | Null | Key | Default | Extra |
+----------------+-------------+------+-----+---------+-------+
| Group_ID       | int(6)      | NO   | PRI | NULL    |       |
| Group_Name     | varchar(30) | YES  |     | NULL    |       |
| Effective_date | date        | YES  |     | NULL    |       |
| Term           | int(3)      | YES  |     | NULL    |       |
+----------------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

```
mysql> select * from groups;
+----------+--------------------+----------------+------+
| Group_ID | Group_Name         | Effective_date | Term |
+----------+--------------------+----------------+------+
|    76891 | Accident           | 2021-12-12     |   12 |
|    76892 | Industrial Disease | 2022-03-01     |   36 |
|    76893 | Critical Illness   | 2021-04-11     |   30 |
|    76894 | Surgeries          | 2022-05-18     |   24 |
|    76895 | Genetic Illness    | 2022-05-14     |   26 |
+----------+--------------------+----------------+------+
5 rows in set (0.00 sec)
```

- **HOSPITAL TABLE**

```
mysql> describe Hospital;
+--------------------+-------------+------+-----+---------+-------+
| Field              | Type        | Null | Key | Default | Extra |
+--------------------+-------------+------+-----+---------+-------+
| Hospital_ID        | int(6)      | NO   | PRI | NULL    |       |
| Hospital_name      | varchar(30) | YES  |     | NULL    |       |
| Hospital_City      | varchar(30) | YES  |     | NULL    |       |
| Insurance_ID       | int(6)      | YES  | MUL | NULL    |       |
| Insurance_Company  | varchar(30) | YES  |     | NULL    |       |
+--------------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

```
mysql> create table Hospital( Hospital_ID int(6) Primary Key, Hospital_name varchar(30), Hospital_City varchar(30), Insurance_ID in
t(6), Insurance_Company varchar(30) );
Query OK, 0 rows affected (0.04 sec)

mysql> load data local infile "Desktop/Project/Hospitals.csv" into table Hospital fields terminated by "," lines terminated by "\n"
 ignore 1 rows;
Query OK, 15 rows affected, 2 warnings (0.01 sec)
Records: 15  Deleted: 0  Skipped: 0  Warnings: 2

mysql> select * from Hospital;
+-------------+-------------------------------+-----------------+-------------+-------------------------------+
| Hospital_ID | Hospital_name                 | Hospital_City   | Insurance_ID | Insurance_Company             |
+-------------+-------------------------------+-----------------+-------------+-------------------------------+
|       70001 | The Johns Hopkins Hospital    | Baltimore MD    |        1001 | Aegon Life Insurance Co. Ltd. |
|       70002 | Massachusetts General Hospital | Boston MA       |        1001 | Aegon Life Insurance Co. Ltd. |
|       70003 | UCSF Medical Center           | San Francisco CA |        1001 | Aegon Life Insurance Co. Ltd. |
|       70004 | Mayo Clinic                   | Phoenix AZ      |        1001 | Aegon Life Insurance Co. Ltd. |
|       70005 | Brigham And Women's Hospital  | Boston MA       |        1001 | Aegon Life Insurance Co. Ltd. |
|       80001 | Rechts der Isar Hospital      | Munich          |        1002 | Edelweiss  Life Insurance Co. |
|       80002 | University Hospital Cologne   | Cologne         |        1002 | Edelweiss  Life Insurance Co. |
|       80003 | University Medical Center     | Freiburg        |        1002 | Edelweiss  Life Insurance Co. |
|       80004 | University Medical Center Schl | Keil            |        1002 | Edelweiss  Life Insurance Co. |
|       80005 | University Hospital Regensburg | Regensburg      |        1002 | Edelweiss  Life Insurance Co. |
|       90001 | Rainbow Hospitals             | Hyderabad       |        1003 | Birla Sun Life Insurance Co. |
|       90002 | Apollo Hospital               | Visakhapatnam   |        1003 | Birla Sun Life Insurance Co. |
|       90003 | Gauhati Medical College and Ho | Gauhati         |        1003 | Birla Sun Life Insurance Co. |
|       90004 | AIIMS                         | Patna           |        1003 | Birla Sun Life Insurance Co. |
|       90005 | Ruby General Hospital         | Kolkata         |        1003 | Birla Sun Life Insurance Co. |
+-------------+-------------------------------+-----------------+-------------+-------------------------------+
15 rows in set (0.00 sec)
```

- **SUBGROUP TABLE**

```
mysql> describe subgroup;
+----------------+-------------+------+-----+---------+-------+
| Field          | Type        | Null | Key | Default | Extra |
+----------------+-------------+------+-----+---------+-------+
| Subrgoup_ID    | int(6)      | NO   | PRI | NULL    |       |
| Group_ID       | int(6)      | YES  | MUL | NULL    |       |
| Subgroup_name  | varchar(30) | YES  |     | NULL    |       |
| Effective_date | date        | YES  |     | NULL    |       |
| Term           | int(3)      | YES  |     | NULL    |       |
+----------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

```
ignore 1 rows;
ERROR 2 (HY000): File '/Desktop/Project/Subgroup.csv' not found (Errcode: 2 - No such file or directory)
mysql> load data local infile "Desktop/Project/Subgroup.csv" into table subgroup fields terminated by "," lines terminated by "\n"
ignore 1 rows;
Query OK, 25 rows affected (0.01 sec)
Records: 25  Deleted: 0  Skipped: 0  Warnings: 0

mysql> select * from subgroup;
+-------------+----------+-------------------------+----------------+------+
| Subrgoup_ID | Group_ID | Subgroup_name           | Effective_date | Term |
+-------------+----------+-------------------------+----------------+------+
|       56431 |    76891 | Road-traffic accident   | 2021-12-04     |   32 |
|       56432 |    76891 | Fractures caused by falls | 2021-09-22     |   23 |
|       56433 |    76891 | Gun shot                | 2022-05-05     |   15 |
|       56434 |    76891 | Burn Cases              | 2022-04-27     |   26 |
|       56435 |    76891 | Current Shock           | 2022-01-01     |   10 |
|       56441 |    76892 | Industrial deafness     | 2022-01-23     |   32 |
|       56442 |    76892 | Respiratory Problems    | 2021-09-22     |   23 |
|       56443 |    76892 | Breathing Problems      | 2022-05-05     |   15 |
|       56444 |    76892 | Dermatitis              | 2022-04-27     |   26 |
|       56445 |    76892 | Musculoskeletal disorder | 2022-01-01     |   10 |
|       56451 |    76893 | Cancer                  | 2022-01-23     |   30 |
|       56452 |    76893 | Major organ transplant  | 2021-09-22     |   27 |
|       56453 |    76893 | Kidney failure          | 2022-05-05     |   15 |
|       56454 |    76893 | Paralysis               | 2022-04-27     |   26 |
|       56455 |    76893 | First heart attack      | 2022-01-01     |   10 |
|       56461 |    76894 | Neurological Surgery    | 2022-01-23     |   30 |
|       56462 |    76894 | Oncology                | 2021-09-22     |   27 |
|       56463 |    76894 | Chemotherapy            | 2022-04-04     |   20 |
|       56464 |    76894 | Hystoscopy              | 2022-04-27     |   15 |
|       56465 |    76894 | Nasal Concha            | 2022-01-01     |   10 |
|       56471 |    76895 | Down syndrome           | 2022-01-23     |   30 |
|       56472 |    76895 | FragileX syndrome       | 2021-09-22     |   27 |
|       56473 |    76895 | Turner syndrome         | 2022-04-04     |   20 |
|       56474 |    76895 | Trisomy 18              | 2022-04-27     |   28 |
|       56475 |    76895 | Trisomy 13              | 2022-01-01     |   14 |
+-------------+----------+-------------------------+----------------+------+
```

Final Table in MYSQL

```
mysql> select * from Final_table limit  15;
+-------------------+----------------------------------------+----------+-----------------------------------------------------+-----------
-----------+------------------+--------------+-------------+-----------------------------------------+------------------+
| Patient_name      | Patient_address                        | Claim_ID | Insurance_details                                   | Claim_stat
us_details | Claim_issue_date | Insurer_term | Patient_age | Group_details                           | Insurance_amount |
+-------------------+----------------------------------------+----------+-----------------------------------------------------+-----------
-----------+------------------+--------------+-------------+-----------------------------------------+------------------+
| Liza Kusari       | 34- ks sahani road. Mumbai 05 India    |     4007 | Critical illness Insurance,Birla Sun Life Insurance Co. | In Process
,ACTIVE    | 2021-12-12       |           20 |          32 | Genetic Illness,Down syndrome           |           550000 |
| Liza Kusari       | 34- ks sahani road. Mumbai 05 India    |     4060 | Critical illness Insurance,Birla Sun Life Insurance Co. | In Process
,ACTIVE    | 2022-01-14       |           20 |          32 | Accident,Road-traffic accident          |           550000 |
| Sanvi Shetty      | 34-yk road punjab 99 India             |     4014 | Critical illness Insurance,Birla Sun Life Insurance Co. | Settled,RE
COVERED    | 2022-01-03       |           20 |          27 | Critical Illness,Kidney failure         |           550000 |
| Sanvi Shetty      | 34-yk road punjab 99 India             |     4069 | Critical illness Insurance,Birla Sun Life Insurance Co. | Settled,RE
COVERED    | 2022-03-03       |           20 |          27 | Industrial Disease,Dermatitis           |           550000 |
| Khushi Khan       | 9- ss roy road  Delhi 09 India         |     4020 | Critical illness Insurance,Birla Sun Life Insurance Co. | Settled,RE
COVERED    | 2021-11-04       |           20 |          32 | Accident,Burn Cases                     |           550000 |
| Khushi Khan       | 9- ss roy road  Delhi 09 India         |     4073 | Critical illness Insurance,Birla Sun Life Insurance Co. | Settled,RE
COVERED    | 2022-01-23       |           20 |          32 | Critical Illness,First heart attack     |           550000 |
| Mollika Singhania | 7- kk road Chennai 09 India            |     4026 | Critical illness Insurance,Birla Sun Life Insurance Co. | In Process
,ACTIVE    | 2022-05-18       |           20 |          20 | Accident,Current Shock                  |           550000 |
| Mollika Singhania | 7- kk road Chennai 09 India            |     4074 | Critical illness Insurance,Birla Sun Life Insurance Co. | In Process
,ACTIVE    | 2022-01-15       |           20 |          20 | Surgeries,Nasal Concha                  |           550000 |
| Rohan Ghose       | 9- linkon street kolkata 9 India       |     4031 | Critical illness Insurance,Birla Sun Life Insurance Co. | In Process
,ACTIVE    | 2022-05-14       |           20 |          29 | Industrial Disease,Musculoskeletal disorder |           550000 |
| Rohan Ghose       | 9- linkon street kolkata 9 India       |     4090 | Critical illness Insurance,Birla Sun Life Insurance Co. | Invalid,IN
VALID      | 2022-07-03       |           20 |          29 | Accident,Fractures caused by falls      |           550000 |
| Lokesh Ghose      | 2- sr road Pune 4 India                |     4038 | Critical illness Insurance,Birla Sun Life Insurance Co. | Invalid,IN
VALID      | 2022-04-01       |           20 |          26 | Industrial Disease,Respiratory Problems |           550000 |
| Lokesh Ghose      | 2- sr road Pune 4 India                |     4081 | Critical illness Insurance,Birla Sun Life Insurance Co. | In Process
,ACTIVE    | 2022-11-02       |           20 |          26 | Surgeries,Oncology                      |           550000 |
| Rani Chakraborty  | 6 - Fort William street kolkata 9 India |     4042 | Critical illness Insurance,Birla Sun Life Insurance Co. | In Process
,ACTIVE    | 0000-00-00       |           20 |          30 | Accident,Burn Cases                     |           550000 |
| Afzal Alam        | 7- ju colony kolkata 7 India           |     4045 | Critical illness Insurance,Birla Sun Life Insurance Co. | Invalid,IN
VALID      | 2022-03-31       |           20 |          23 | Genetic Illness,Trisomy 13              |           550000 |
| Shravan Ghosal    | 7- cu road Chennai 8 India             |     4048 | Critical illness Insurance,Birla Sun Life Insurance Co. | Settled,RE
COVERED    | 2022-05-08       |           20 |          27 | Surgeries,Neurological Surgery          |           550000 |
+-------------------+----------------------------------------+----------+-----------------------------------------------------+-----------
-----------+------------------+--------------+-------------+-----------------------------------------+------------------+
15 rows in set (0.00 sec)
```

▪ DATA TRANSFORMATION

In [12]:
```
df=pd.read_sql_query("SELECT * FROM PATIENT",connection)
(df.head())
```

```
/home/ubh01/anaconda3/lib/python3.9/site-packages/pandas/io/sql.py:761: UserWarning: pandas only supp
ort SQLAlchemy connectable(engine/connection) ordatabase string URI or sqlite3 DBAPI2 connectionother
DBAPI2 objects are not tested, please consider using SQLAlchemy
  warnings.warn(
```

Out[12]:

	Patient_ID	Insurance_ID	Hospital_ID	First_name	Last_name	Gender	DOB	Phone	Nationality	Insurance_type	Address	C
0	45098	1003	90001	Akriti	Singh	F	2002-05-09	8908908398	Indian	Longterm	23- asp road kolkata 64	
1	45099	1003	90003	Pritam	Bannerjee	M	2001-02-02	9087988092	Indian	Short term	12- sp Mukherjee road kolkata 87	
2	45100	1003	90005	Salim	Khan	M	2001-06-09	9900887766	Indian	Long term	34- roy road howrah 34	
3	45101	1003	90002	Yasoof	Akhtar	M	2000-08-07	9988455767	Indian	Long term	34 chellam road Chennai 01	
4	45102	1003	90003	Wahida	Begum	F	2003-07-08	9090123467	Indian	Short term	46 bb roy road karnataka 04	

In [13]:
```
cursor=connection.cursor()
```

In [14]:
```
df["Name"]=df["First_name"]+" "+df["Last_name"]
```

In [18]:
```
df.head()
df2=df.drop('First_name',axis=1)
df2=df2.drop('Last_name',axis=1)
df2.head()
```

Out[18]:

	Patient_ID	Insurance_ID	Hospital_ID	Gender	DOB	Phone	Nationality	Insurance_type	Address	Country	Name
0	45098	1003	90001	F	2002-05-09	8908908398	Indian	Longterm	23- asp road kolkata 64	India\r	Akriti Singh
1	45099	1003	90003	M	2001-02-02	9087988092	Indian	Short term	12- sp Mukherjee road kolkata 87	India\r	Pritam Bannerjee
2	45100	1003	90005	M	2001-06-09	9900887766	Indian	Long term	34- roy road howrah 34	India\r	Salim Khan
3	45101	1003	90002	M	2000-08-07	9988455767	Indian	Long term	34 chellam road Chennai 01	India\r	Yasoof Akhtar
4	45102	1003	90003	F	2003-07-08	9090123467	Indian	Short term	46 bb roy road karnataka 04	India\r	Wahida Begum

[1]:
```
import pymysql
import pandas as pd
import sqlalchemy
```

[2]:
```
conn=pymysql.
↪connect(host='localhost',port=int(3306),user='root',passwd='password',db='Hospital_DB')
```

[3]:
```
df=pd.read_sql_query("SELECT * FROM Insurer",conn)
print(df.head())
```

```
   InsuranceID                    CompanyName                InsuranceName  \
0         1001  Aegon Life Insurance Co. Ltd.  Individual Health Insurance
1         1002  Edelweiss  Life Insurance Co.      Family Health Insurance
2         1003   Birla Sun Life Insurance Co.   Critical illness Insurance

    StartDate     EndDate EffectiveDate  InsuranceBaseAmount InsuranceStatus  \
0  2020-01-01  2036-01-01    2020-01-15               200000          Active
1  2020-01-03  2039-01-03    2020-03-15               300000          Active
2  2020-02-05  2041-02-05    2020-05-17               400000          Active

   Term  TopupAmount  InsuranceCover
0    15       200000               4
1    18       300000               3
2    20       150000               3
```

[4]:
```
cursor=conn.cursor()
```

[5]:
```
data=pd.DataFrame({
    'Insurance_amount':df["InsuranceBaseAmount"]+df["TopupAmount"]
})
```

[6]:
```
data
```

[6]:
```
   Insurance_amount
0            400000
1            600000
2            550000
```

38	In Process , ACTIVE
39	In Process , ACTIVE
40	Invalid , INVALID
41	In Process , ACTIVE
42	In Process , RECOVERED
43	In Process , ACTIVE
44	Settled , RECOVERED
45	Invalid , INVALID
46	Settled , RECOVERED
47	Settled , ACTIVE
48	Settled , RECOVERED
49	In Process , ACTIVE
50	In Process , ACTIVE
51	In Process , ACTIVE
52	Invalid , INVALID
53	In Process , ACTIVE REVIEW
54	Invalid , INVALID
55	Settled , RECOVERED
56	Invalid , INVALID

In [26]:

```
CLAIMS=pd.DataFrame({'Claim': df['Claim_ID']})
```

In [27]:

```
CLAIMS
```

Out[27]:

	Claim
0	4007
1	4009
2	4014
3	4016
4	4020
5	4024
6	4026
7	4030
8	4031
9	4037
10	4038
11	4042
12	4045
13	4048
14	4050
15	4051
16	4053
17	4055
18	4059
19	4060
20	4061
21	4066
22	4069
23	4070
24	4072
25	4073
26	4074
27	4077
28	4080
29	4081
30	4086
31	4089
32	4090
33	4096
34	4098
35	4100
36	4101
37	4103
38	4105
39	4107
40	4109
41	4110
42	5003

13	2022-05-08
14	2022-04-23
15	2021-12-31
16	2021-05-22
17	2022-02-02
18	2021-09-16
19	2022-01-14
20	2022-01-21
21	2021-12-08
22	2022-03-03
23	2022-03-01
24	2021-12-11
25	2022-01-23
26	2022-01-15
27	2022-01-02
28	2022-01-01
29	2022-11-02
30	2022-01-22
31	2022-01-02
32	2022-07-03
33	2021-03-11
34	2022-06-05
35	2022-12-05
36	2021-09-08
37	2022-05-04
38	2021-03-09
39	2021-09-29
40	2022-02-02
41	2022-04-02
42	2022-04-23
43	2021-12-02
44	2022-01-05
45	2022-06-05
46	2021-10-10
47	2021-11-12
48	2021-04-12
49	2022-04-19
50	2022-03-10
51	2022-05-05
52	2022-01-01
53	2022-03-29
54	2022-03-19
55	2022-05-10
56	2022-09-05

In [30]:

```
df=pd.read_sql_query("SELECT * FROM INSURER",connection)
print(df.head())
```

```
   Insurance_ID                   Company_name               Insurance_name  \
0          1001  Aegon Life Insurance Co. Ltd.  Individual Health Insurance
1          1002  Edelweiss  Life Insurance Co.      Family Health Insurance
2          1003   Birla Sun Life Insurance Co.   Critical illness Insurance

   Start_date    End_date Effective_date Insurance_Status  Term  Topup_amount  \
0  2020-01-01  2036-01-01     2020-01-15           200000     0            15
1  2020-01-03  2039-01-03     2020-03-15           300000     0            18
2  2020-02-05  2041-02-05     2020-05-17           400000     0            20

   Insurance_Cover
0           200000
1           300000
2           150000
/home/ubh01/anaconda3/lib/python3.9/site-packages/pandas/io/sql.py:761: UserWarning: pandas only supp
ort SQLAlchemy connectable(engine/connection) ordatabase string URI or sqlite3 DBAPI2 connectionother
DBAPI2 objects are not tested, please consider using SQLAlchemy
  warnings.warn(
```

In [89]:

```
df=pd.read_sql_query("SELECT * FROM INSURER",connection)
print(df.head())
```

```
   Insurance_ID                   Company_name               Insurance_name  \
0          1001  Aegon Life Insurance Co. Ltd.  Individual Health Insurance
1          1002  Edelweiss  Life Insurance Co.      Family Health Insurance
2          1003   Birla Sun Life Insurance Co.   Critical illness Insurance

   Start_date    End_date Effective_date Insurance_Status  Term  Topup_amount  \
0  2020-01-01  2036-01-01     2020-01-15           200000     0            15
1  2020-01-03  2039-01-03     2020-03-15           300000     0            18
2  2020-02-05  2041-02-05     2020-05-17           400000     0            20
```

▪ SQOOP and HIVE and HDFS

All tables are imported to HDFS from MYSQL

```
ubh01@ubh01:~$ hdfs dfs -ls
22/06/07 15:25:55 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applica
ble
Found 8 items
drwxr-xr-x   - ubh01 supergroup          0 2022-06-07 15:19 Claim
drwxr-xr-x   - ubh01 supergroup          0 2022-06-07 14:58 Final_table
drwxr-xr-x   - ubh01 supergroup          0 2022-06-07 15:21 Hospital
drwxr-xr-x   - ubh01 supergroup          0 2022-06-07 15:23 Insurer
drwxr-xr-x   - ubh01 supergroup          0 2022-06-07 15:22 Patient
drwxr-xr-x   - ubh01 supergroup          0 2022-06-07 15:24 groups
drwxr-xr-x   - ubh01 supergroup          0 2022-06-07 15:25 subgroup
drwxr-xr-x   - ubh01 supergroup          0 2022-06-07 11:11 ubh01
ubh01@ubh01:~$ hdfs dfs -ls Final_table
22/06/07 15:26:32 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applica
ble
Found 2 items
-rw-r--r--   1 ubh01 supergroup          0 2022-06-07 14:58 Final_table/_SUCCESS
-rw-r--r--   1 ubh01 supergroup      10229 2022-06-07 14:58 Final_table/part-m-00000
ubh01@ubh01:~$
```

We have used Sqoop for the import from HDFS to HIVE

```
ubh01@ubh01:~$ sqoop import --connect jdbc:mysql://ubh01/project -table Final_table --fields-terminated-by '|' --username root --password passwo
rd -m 1
Warning: /home/ubh01/sqoop-1.4.7.bin__hadoop-2.6.0/../hcatalog does not exist! HCatalog jobs will fail.
Please set $HCAT_HOME to the root of your HCatalog installation.
Warning: /home/ubh01/sqoop-1.4.7.bin__hadoop-2.6.0/../accumulo does not exist! Accumulo imports will fail.
Please set $ACCUMULO_HOME to the root of your Accumulo installation.
Warning: /home/ubh01/sqoop-1.4.7.bin__hadoop-2.6.0/../zookeeper does not exist! Accumulo imports will fail.
Please set $ZOOKEEPER_HOME to the root of your Zookeeper installation.
22/06/07 14:57:36 INFO sqoop.Sqoop: Running Sqoop version: 1.4.7
22/06/07 14:57:36 WARN tool.BaseSqoopTool: Setting your password on the command-line is insecure. Consider using -P instead.
22/06/07 14:57:36 INFO manager.MySQLManager: Preparing to use a MySQL streaming resultset.
22/06/07 14:57:36 INFO tool.CodeGenTool: Beginning code generation
Loading class `com.mysql.jdbc.Driver'. This is deprecated. The new driver class is `com.mysql.cj.jdbc.Driver'. The driver is automatically regis
tered via the SPI and manual loading of the driver class is generally unnecessary.
22/06/07 14:57:37 INFO manager.SqlManager: Executing SQL statement: SELECT t.* FROM `Final_table` AS t LIMIT 1
22/06/07 14:57:37 INFO manager.SqlManager: Executing SQL statement: SELECT t.* FROM `Final_table` AS t LIMIT 1
22/06/07 14:57:37 INFO orm.CompilationManager: HADOOP_MAPRED_HOME is /home/ubh01/hadoop-2.7.1
Note: /tmp/sqoop-ubh01/compile/bbfb98d630adc271fc0b148d42042c24/Final_table.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.
22/06/07 14:57:40 INFO orm.CompilationManager: Writing jar file: /tmp/sqoop-ubh01/compile/bbfb98d630adc271fc0b148d42042c24/Final_table.jar
22/06/07 14:57:40 WARN manager.MySQLManager: It looks like you are importing from mysql.
22/06/07 14:57:40 WARN manager.MySQLManager: This transfer can be faster! Use the --direct
22/06/07 14:57:40 WARN manager.MySQLManager: option to exercise a MySQL-specific fast path.
22/06/07 14:57:40 INFO manager.MySQLManager: Setting zero DATETIME behavior to convertToNull (mysql)
22/06/07 14:57:40 INFO mapreduce.ImportJobBase: Beginning import of Final_table
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/home/ubh01/hadoop-2.7.1/share/hadoop/common/lib/slf4j-log4j12-1.7.10.jar!/org/slf4j/impl/StaticLoggerBinder.c
lass]
SLF4J: Found binding in [jar:file:/home/ubh01/hbase-1.1.2/lib/slf4j-log4j12-1.7.5.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
22/06/07 14:57:40 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applica
ble
22/06/07 14:57:40 INFO Configuration.deprecation: mapred.jar is deprecated. Instead, use mapreduce.job.jar
22/06/07 14:57:41 INFO Configuration.deprecation: mapred.map.tasks is deprecated. Instead, use mapreduce.job.maps
22/06/07 14:57:41 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032
```

Like this, we have created the schema for every table in HIVE

```
hive> use project;
OK
Time taken: 0.038 seconds
hive> create table final_table (
    > Patient_name string,Patient_address string,Claim_ID int,Insurance_details string,
    > Claim_status_details string,Claim_issue_date Date,Insurer_term int,Patient_age int,Group_details string,Insurance_amount int )

    > row format delimited
    > fields terminated by '|'
    > location '/user/ubh01/Final_table';
OK
Time taken: 0.413 seconds
hive> select * from final_table;
OK
Liza Kusari     34- ks sahani road. Mumbai 05 India     4007    Critical illness Insurance,Birla Sun Life Insurance Co. In Process,ACTIVE    202
1-12-12      20      32      Genetic Illness,Down syndrome   550000
Liza Kusari     34- ks sahani road. Mumbai 05 India     4060    Critical illness Insurance,Birla Sun Life Insurance Co. In Process,ACTIVE    202
2-01-14      20      32      Accident,Road-traffic accident  550000
Sanvi Shetty    34-yk road punjab 99 India      4014    Critical illness Insurance,Birla Sun Life Insurance Co. Settled,RECOVERED    2022-01-03
      20      27      Critical Illness,Kidney failure 550000
Sanvi Shetty    34-yk road punjab 99 India      4069    Critical illness Insurance,Birla Sun Life Insurance Co. Settled,RECOVERED    2022-03-03
      20      27      Industrial Disease,Dermatitis   550000
Khushi Khan     9- ss roy road  Delhi 09 India  4020    Critical illness Insurance,Birla Sun Life Insurance Co. Settled,RECOVERED    2021-11-04
      20      32      Accident,Burn Cases     550000
Khushi Khan     9- ss roy road  Delhi 09 India  4073    Critical illness Insurance,Birla Sun Life Insurance Co. Settled,RECOVERED    2022-01-23
      20      32      Critical Illness,First heart attack     550000
Mollika Singhania       7- kk road Chennai 09 India     4026    Critical illness Insurance,Birla Sun Life Insurance Co. In Process,ACTIVE    202
2-05-18      20      20      Accident,Current Shock  550000
Mollika Singhania       7- kk road Chennai 09 India     4074    Critical illness Insurance,Birla Sun Life Insurance Co. In Process,ACTIVE    202
2-01-15      20      20      Surgeries,Nasal Concha  550000
Rohan Ghose     9- linkon street kolkata 9 India        4031    Critical illness Insurance,Birla Sun Life Insurance Co. In Process,ACTIVE    202
2-05-14      20      29      Industrial Disease,Musculoskeletal disorder     550000
Rohan Ghose     9- linkon street kolkata 9 India        4090    Critical illness Insurance,Birla Sun Life Insurance Co. Invalid,INVALID      202
2-07-03      20      29      Accident,Fractures caused by falls      550000
Lokesh Ghose    2- sr road Pune 4 India 4038    Critical illness Insurance,Birla Sun Life Insurance Co. Invalid,INVALID 2022-04-01   20      26
      Industrial Disease,Respiratory Problems 550000
Lokesh Ghose    2- sr road Pune 4 India 4081    Critical illness Insurance,Birla Sun Life Insurance Co. In Process,ACTIVE   2022-11-02       20
      26      Surgeries,Oncology      550000
Rani Chakraborty        6 - Fort William street kolkata 9 India 4042    Critical illness Insurance,Birla Sun Life Insurance Co.      In Process,
ACTIVE       NULL    20      30      Accident,Burn Cases     550000
Afzal Alam      7- ju colony kolkata 7 India    4045    Critical illness Insurance,Birla Sun Life Insurance Co. Invalid,INVALID      2022-03-31
      20      23      Genetic Illness,Trisomy 13      550000
```

We have imported the tables : claim, final_table, groups, hospital, insurer, patient and subgroup to HIVE.

```
hive> show tables;
OK
claim
dept
dummy
dummy2
emp
final_table
groups
hospital
insurer
mydevices
patient
salgrade
subgroup
webpage
webpage_titanic
Time taken: 0.064 seconds, Fetched: 15 row(s)
```

▪ Final processing from data

Analyzing data from Final table to plot the final Graphs.

❖ Claims based on last 6 months.

```
[1]: import pymysql
     import pandas as pd
     import sqlalchemy
```

```
[2]: conn=pymysql.
      ↪connect(host='localhost',port=int(3306),user='root',passwd='password',db='Hospital_DB')
```

```
[3]: import matplotlib.pyplot as pl
```

```
[4]: mycursor = conn.cursor()
```

```
[5]: mycursor.execute("select Claim_issue_date,Patient_age from FinalTable where␣
      ↪Claim_issue_date >=now()-interval 6 month;")
     result = mycursor.fetchall
```

```
[6]: IssueDate = []
     Age = []

     for i in mycursor:
         IssueDate.append(i[0])
         Age.append(i[1])

     print("Claim issue date = ", IssueDate)
     print("Patient age = ", Age)
```

```
Claim issue date =  [datetime.date(2021, 12, 12), datetime.date(2022, 5, 9),
datetime.date(2022, 1, 3), datetime.date(2022, 4, 30), datetime.date(2022, 5,
18), datetime.date(2022, 4, 21), datetime.date(2022, 5, 14), datetime.date(2022,
4, 7), datetime.date(2022, 4, 1), datetime.date(2022, 3, 31),
datetime.date(2022, 5, 8), datetime.date(2022, 4, 23), datetime.date(2021, 12,
31), datetime.date(2022, 2, 2), datetime.date(2022, 1, 14), datetime.date(2022,
1, 21), datetime.date(2021, 12, 8), datetime.date(2022, 3, 3),
datetime.date(2022, 3, 1), datetime.date(2021, 12, 11), datetime.date(2022, 1,
23), datetime.date(2022, 1, 15), datetime.date(2022, 1, 2), datetime.date(2022,
1, 1), datetime.date(2022, 1, 22), datetime.date(2022, 1, 2),
datetime.date(2022, 5, 4), datetime.date(2022, 2, 2), datetime.date(2022, 4, 2),
datetime.date(2022, 4, 23), datetime.date(2022, 1, 5), datetime.date(2022, 4,
19), datetime.date(2022, 3, 10), datetime.date(2022, 5, 5), datetime.date(2022,
1, 1), datetime.date(2022, 3, 29), datetime.date(2022, 3, 19),
datetime.date(2022, 5, 10)]
Patient age =  [32, 21, 27, 18, 20, 26, 29, 28, 26, 23, 27, 23, 21, 10, 32, 26,
28, 27, 29, 27, 32, 20, 38, 39, 39, 35, 10, 28, 21, 27, 33, 36, 21, 24, 22, 23,
35, 30]
```

```
]: pl.rcParams['figure.figsize']=[20,8]
   pl.bar(IssueDate, Age,width=3)
   pl.xlabel("Claims based on last 6 months")
   pl.ylabel("Patient Age")
   pl.title("Claim Details")
   pl.show()
```

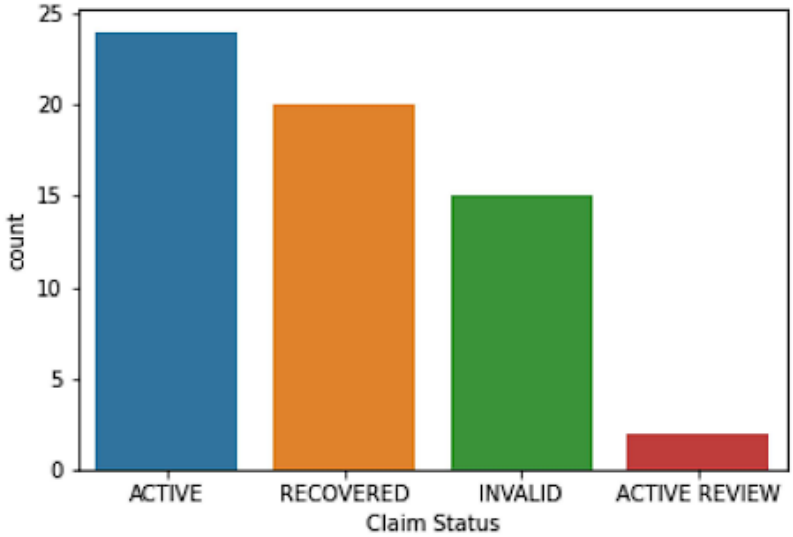
❖ **Patient claims based on disease.**

```
gender_dict= dict(zip(Patient_df.Patient_ID, Patient_df.Gender))
Claim_df["Gender"]=Claim_df.apply(lambda x:gender_dict[x[0]], axis=1)
print(Claim_df)
gendf=pd.DataFrame()
gendf=pd.pivot_table(Claim_df, index=['Group'], columns=['Gender'], values=['Patient_ID'], aggfunc='count')
print(gendf)
plt.figure()
gendf.plot.bar(title='STACKED BAR CHART', stacked=True)
plt.xlabel('Types of Group')
plt.ylabel('No.of Customers')
plt.savefig("groupgenderanalysis.png",bbox_inches='tight')
```

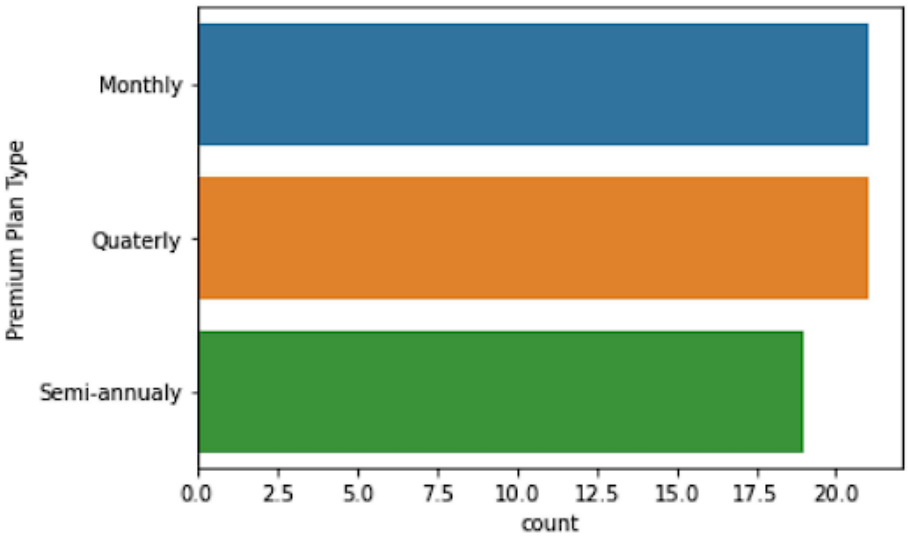
```
gdf= pd.DataFrame()
gdf=Claim_df["Group"].value_counts()
print(gdf)
plt.figure()
gdf.plot.bar(title='Patient and Group Analysis',color='red')
plt.xlabel('Types of Group')
plt.ylabel('No of patients')
plt.savefig("groupanalysis.png",bbox_inches='tight')
```

❖ OUTPUT SCREEN

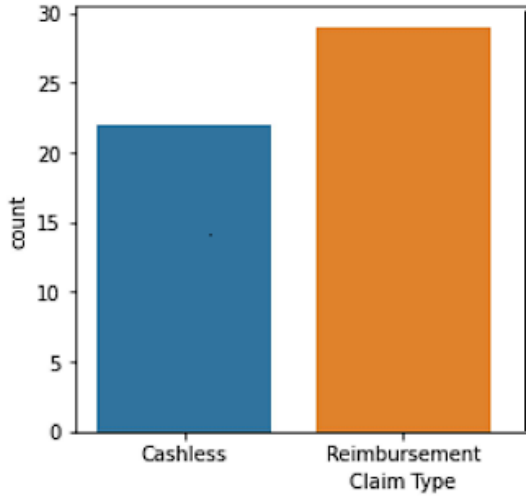
Different claims made and the claim status



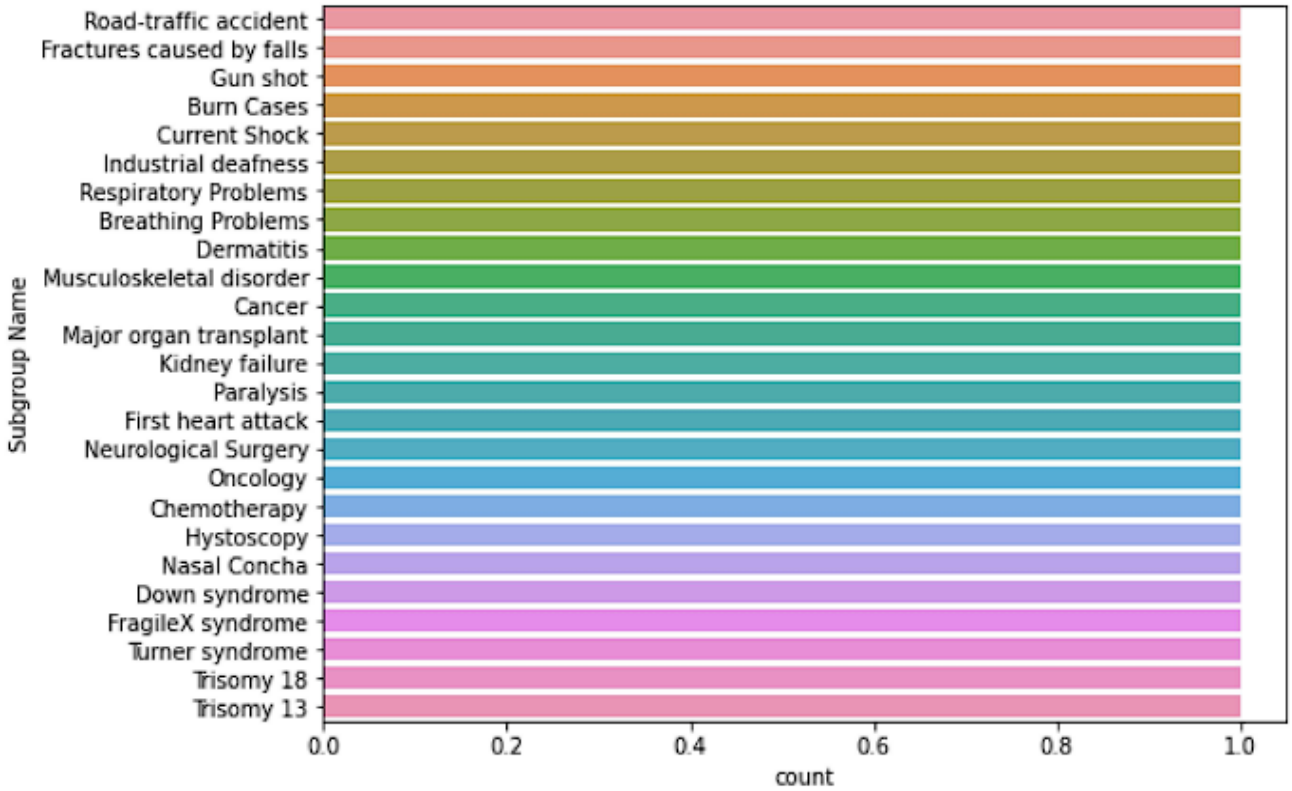
Insurance Premium Plan Type



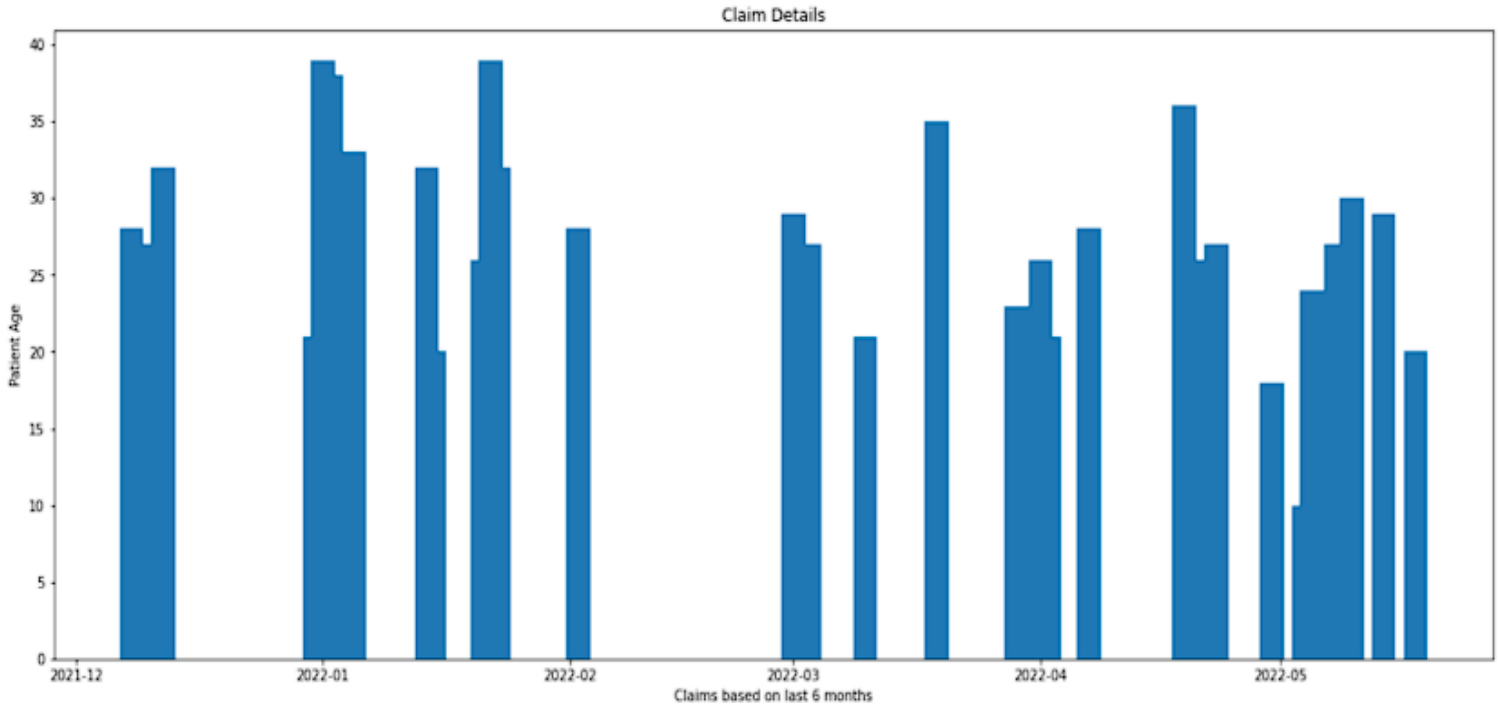
Type of claim request Cashless or Reimbursement



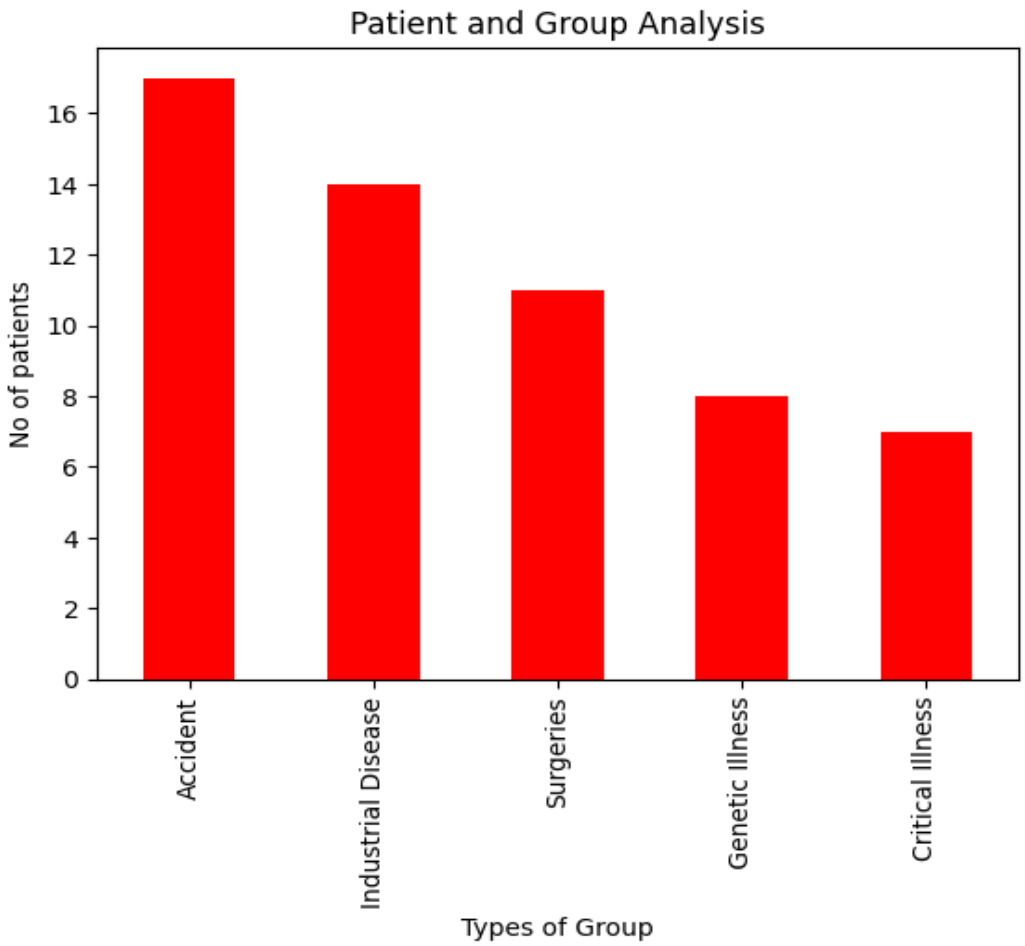
Subgroups of Disease



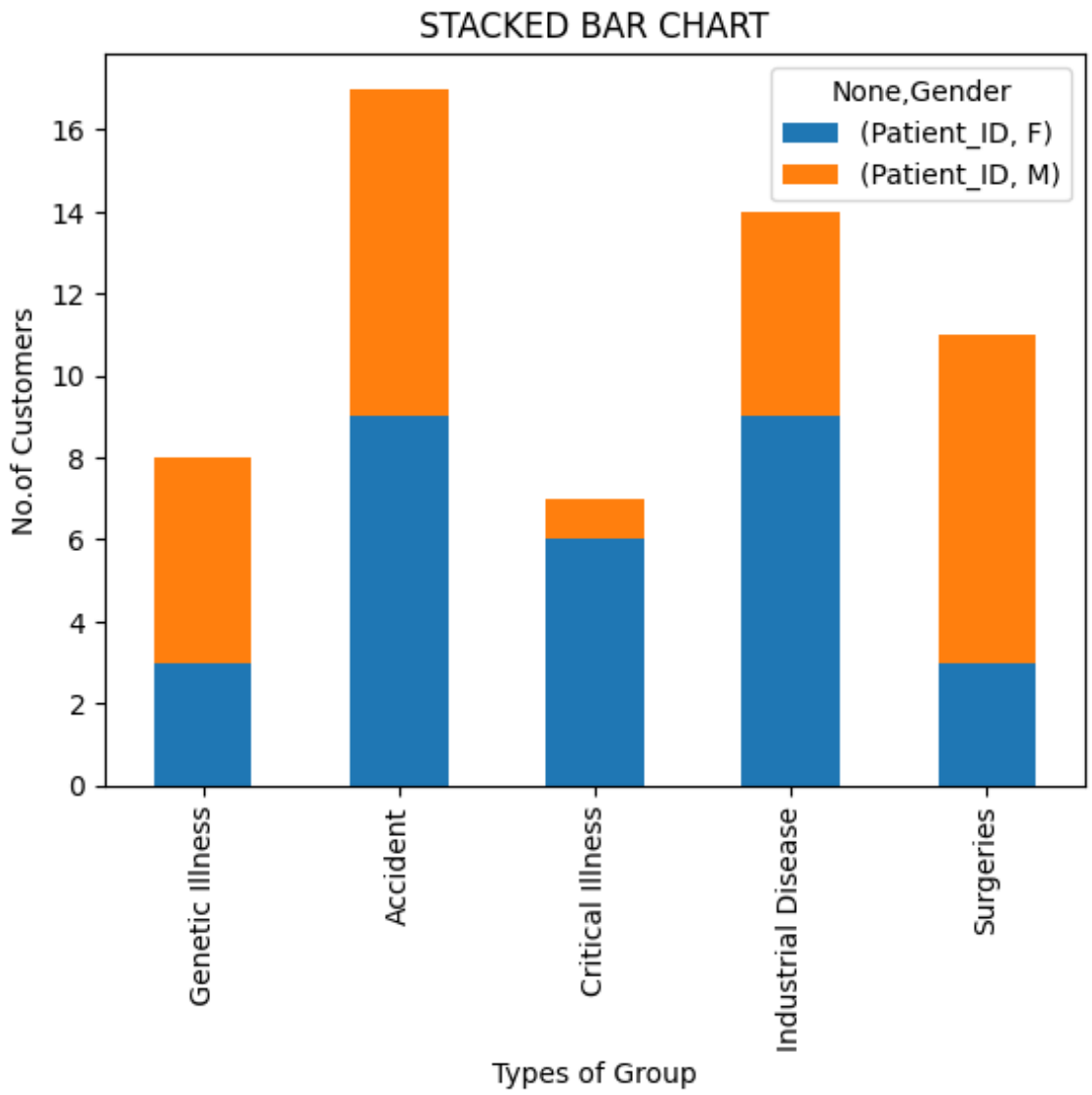
Patient claims based on past 6 months



Patient claims based on disease



Patient claims based on disease, classified by Gender



❖ Business Benefits/Conclusion

The company is facing challenges to get the insights they need to improve their services as the dataset is on a much bigger scale and may contain missing records. So the company wants to take the help of Data Analytics using Big Data Ecosystem in order to evaluate the quality of care provided by health care providers. To do this, we have been assigned to identify patterns of past claims made for insurance in order to understand the customers better, and provide targeted experience and improve customer retention.

❖ Further Enhancements/Recommendations

This project has a vast scope in future for all the Insurance Companies. Companies can get detailed analysis of data from this project and can serve the customers according to their special needs and benefits. They can also change their insurance plans and business needs for maximum profits and also provide with the optimal service to patients.

❖ References/Bibliography

i. Python Data analytics
ii. DrawIO
iii. GeeksforGeeks
iv. Hive
v. Jupyter
vi. Hadoop

❖ GitHub Link

BigData-Project-Hospital-Claim-Management