

**ADVANCED
DATABASES**

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TASK-1

ABSTRACT

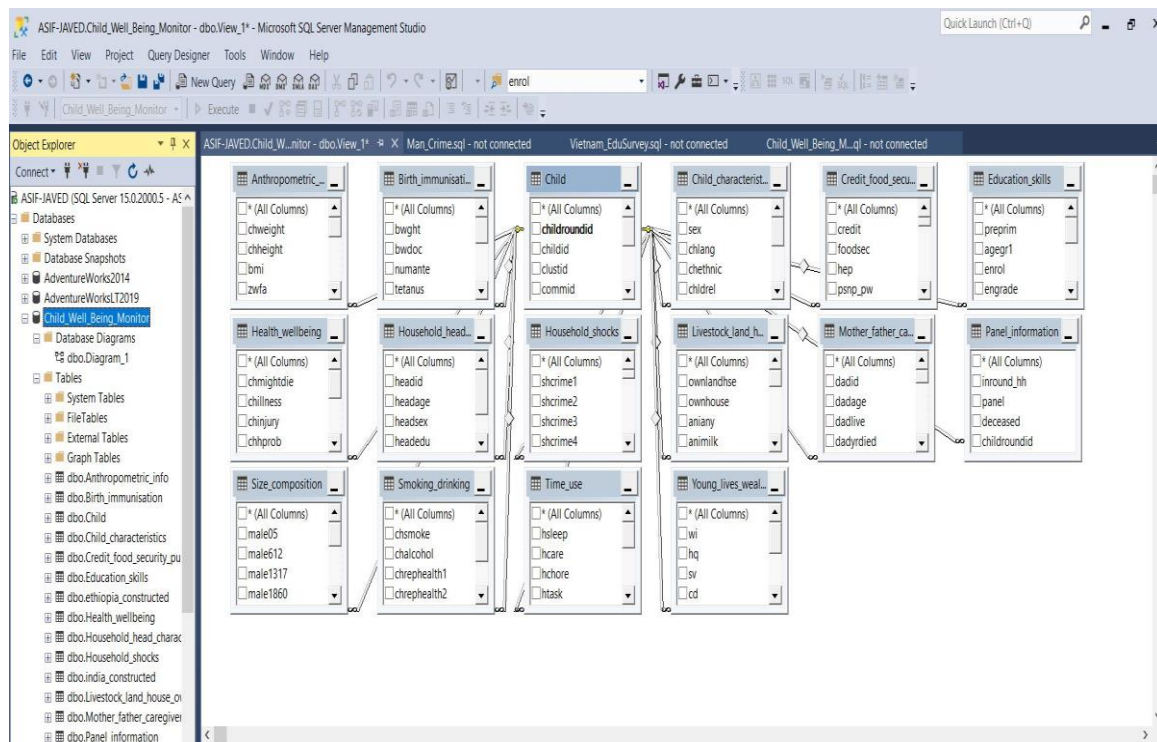
As a database developer to find the child poverty analysis in 4 countries (Ethiopia, India, Vietnam, Peru) a Child Well Being Monitor database framework is developed and implemented. This development is followed by different phases of data collection, logical design, physical design, implementation & loading phase, validating, reporting and visualization phase. This development involves collection and presentation of data into tables and maps of visualization to show the valuable information. This project seeks general and better understanding of child poverty in these countries.

INTRODUCTION

Child well being monitor is a low-cost effective tool which is used for child welfare to extract useful information. This allows to collect and display data from four countries to build reports which can help to investigate the changing nature of child poverty. The main aim of this project is to enhance awareness of the causes and effects of childhood deprivation and guides to make policies regarding childcare initiatives.

RELATIONAL SCHEMA

Relational database schema is a structural display of a database design that how data is arranged in tables. And it also shows the connections between tables. Here is the relational schema of the database 'Child_Well_Being_Monitor' which has 16 tables.



DESIGN RATIONALE

This database design rationale is composed of sixteen (16) tables.

TABLES:

Child
Panel_information
Child_characteristics
Anthropometric_info
Birth_immunisation
Health_wellbeing
Smoking_drinking
Time_use
Education_skills
Mother_father_caregiver_characteristics
Household_head_characteristics
Size_composition
Livestock_land_house_ownership
Credit_food_security_public_programmes
Household_shocks
Young_lives_wealth

DESIGN CONSIDRATION

Database Normalisation

In a database the data is stored electronically which allows to insert, manage, organize, and retrieve data. Its important to understand the structure of design for which it is being implemented. For Child_Well_Being_Monitor database the normalization is done into tables and columns. Data is gathered into its appropriate place to retrieve and update it without any failure.

```
CREATE TABLE Anthropometric_info
([chweight] NVARCHAR(max) NULL, [chheight] NVARCHAR(max) NULL,
[bmi] NVARCHAR(max) NULL, [zwfa] NVARCHAR(max) NULL,
[zhfa] NVARCHAR(max) NULL, [zbfa] NVARCHAR(max) NULL,
[zwfl] NVARCHAR(max) NULL, [fwfa] NVARCHAR(max) NULL,
[fhfa] NVARCHAR(max) NULL, [fbfa] NVARCHAR(max) NULL,
[fwfl] NVARCHAR(max) NULL, [underweight] NVARCHAR(max) NULL,
[stunting] NVARCHAR(max) NULL, [thinness] NVARCHAR(max) NULL,
[childroundid] NVARCHAR(500) FOREIGN KEY REFERENCES [dbo].[Child]([childroundid]));
```

Database Constraints

The main purpose of the database constraints is to maintain the integrity of the database. It makes the limitations to the data or type of data. Many NOT NULL, PRIMARY KEY, FOREIGN KEY and DATA TYPES are used to maintain the feasibility of data while inserting/deleting or updating.

Data Validation

Data validation is a step where data is checked while insertion into tables that either it makes sense or not. It doesn't tells about the data is correct or not.

Action:

```
--> Data insertion into Tables
--> Table-1
INSERT INTO [Child] (childroundid, childid, clustid, commid, typesite, region, dint, round, yc, chlocation)
SELECT childidround, childid, clustid, commid, typesite, region, dint, round, yc, childloc
FROM [Child_Well_Being_Monitor].[dbo].[ethiopia_constructed]
UNION ALL
SELECT childidround, childid, clustid, commid, typesite, region, dint, round, yc, childloc
FROM [Child_Well_Being_Monitor].[dbo].[india_constructed]
UNION ALL
SELECT childidround, childid, clustid, placeid, typesite, region, dint, round, yc, childloc
FROM [Child_Well_Being_Monitor].[dbo].[peru_constructed]
UNION ALL
SELECT childidround, childid, clustid, commid, typesite, region, dint, round, yc, childloc
FROM [Child_Well_Being_Monitor].[dbo].[vietnam_constructed];
```

Check:

```
SELECT * from [Child_Well_Being_Monitor].[dbo].[Child]
```

- If the number of rows affected during insertion and the rows during check are equal then data can be said to be validate.

Error Handling

The method in which error or systems failures are handled with proper message. A developer should know when and where an error can be occurred so he adds exceptions if any transaction fails then an informative message will be displayed.

Security

TO avoid illegal access/use or database leakage there is used multiple collective measures. Database security covers all the components of database such as data stored in database, server or any database management system.

Comments

Comments are usually started with '--'. Which are used to give information about the code for understanding it before header or start of query.

T-SQL STATEMENTS

Tables

Database Child_Well_Being_Monitor is created.

```
create database Child_Well_Being_Monitor;
```

```
CREATE TABLE Child
([childroundid] NVARCHAR(500) NOT NULL PRIMARY KEY,
[childid] NVARCHAR(max) NOT NULL, [clustid] NVARCHAR(max) NULL,
[commid] NVARCHAR(max) NULL,[typesite] NVARCHAR(max) NULL,
[region] NVARCHAR(max) NULL,[dint] NVARCHAR(max) NULL,
[round] NVARCHAR(max) NULL,[yc] NVARCHAR(max) NULL,
[chlocation] NVARCHAR(max) NULL);
```

Views

Different queries are used to collect the views from multiple tables. As it's a virtual table can be recalled using syntax of query.

```

--> 1- Urban & Rural Children Data using View
Drop View RuralUrbanChildren;
Create View RuralUrbanChildren AS
select childroundid,SUBSTRING(childroundid,1,2)as Country,childid,clustid,commid,typesite as typesite_code, typesite=CASE
WHEN typesite = 1 THEN 'Urban' WHEN typesite = 2 THEN 'Rural' ELSE 'Other'END,
region,dint,round,yc,chlocation
from dbo.child
Where typesite IN (1,2);
--Executing the View
GO
select * from RuralUrbanChildren;

--> 14- Summarized Report- Children frequency of smoking & consuming alcohol by TypeSite
DROP VIEW CHILD_SMOKING_AND_DRINKING;
CREATE VIEW CHILD_SMOKING_AND_DRINKING AS
select v.TypeSite,(select DISTINCT(count(child_ID)) from dbo.General_View b where b.Child_Smoke = 'Every day' and v.TypeSite=b.TypeSite)as [Smoke Daily],
(select DISTINCT(count(child_ID)) from dbo.General_View b where b.Child_Smoke = 'At least once a week' and v.TypeSite=b.TypeSite)as [Smoke Once a Week],
(select DISTINCT(count(child_ID)) from dbo.General_View b where b.Child_Smoke = 'At least once a month' and v.TypeSite=b.TypeSite)as [SmokeOnce a Month],
(select DISTINCT(count(child_ID)) from dbo.General_View b where b.Child_Smoke = 'Hardly ever' and v.TypeSite=b.TypeSite)as [Smoke Hardly Ever],
(select DISTINCT(count(child_ID)) from dbo.General_View b where b.Child_Smoke = 'I never smoke cigarettes' and v.TypeSite=b.TypeSite)as [Never Smoke],
(select DISTINCT(count(child_ID)) from dbo.General_View b where b.Child_Consume_Alcohol = 'Do not consume alcohol' and v.TypeSite=b.TypeSite)as [Don't Consume Alcohol],
(select DISTINCT(count(child_ID)) from dbo.General_View b where b.Child_Consume_Alcohol = 'Child consume alcohol everyday or at least once a week' and v.TypeSite=b.TypeSite)as [Consume Alcohol]
from dbo.General_View v where Country is not null group by TypeSite
--> Executing the View
GO
SELECT * FROM CHILD_SMOKING_AND_DRINKING;

--> 15- Summarized Report- Male & Female children enrolled in schools in all 4 countries
DROP VIEW CHILDREN_ENROLLED_IN_SCHOOL;
CREATE VIEW CHILDREN_ENROLLED_IN_SCHOOL AS
select v.TypeSite,(select DISTINCT(count(child_ID)) from dbo.General_View b where b.enrol = 'YES' and Gender = 'male' and v.TypeSite=b.TypeSite)as [Male Enrolled],
(select DISTINCT(count(child_ID)) from dbo.General_View b where b.enrol = 'YES' and Gender = 'female' and v.TypeSite=b.TypeSite)as [Female Enrolled],
(select DISTINCT(count(child_ID)) from dbo.General_View b where b.enrol = 'NO' and v.TypeSite=b.TypeSite)as [Not Enrolled]
from dbo.General_View v where Country is not null group by TypeSite
--> Executing the View
GO
SELECT * FROM CHILDREN_ENROLLED_IN_SCHOOL;

```

Store Procedures

A collection of SQL commands stored in database catalogue and it can be revoked by the program. The syntax or queries are used to retrieve data from database is as follows.

```

--> 2- Urban & Rural Total Children using Store Procedure
Drop PROCEDURE getChildbyResidence;
CREATE PROCEDURE getChildbyResidence @typesite nvarchar(30) AS
SELECT count(childroundid) as TotalChildren,typesite=CASE
WHEN typesite = 1 THEN 'Urban' WHEN typesite = 2 THEN 'Rural' ELSE 'Other' END
FROM dbo.child WHERE typesite = @typesite group by typesite
--Executing the procedure
GO
EXEC getChildbyResidence @typesite = '1'

```

User Define Functions

These are the functions to extract the information/data by adding, concatenating or by taking the input.

```

--> Adding 'childidround' in india_constructed
ALTER TABLE [Child_Well_Being_Monitor].[dbo].[india_constructed] ADD childidround NVARCHAR(500) Null;
UPDATE [Child_Well_Being_Monitor].[dbo].[india_constructed] SET childidround = CONCAT(childid,round);
Select childidround from [Child_Well_Being_Monitor].[dbo].[india_constructed];

```

DATABASE SECURITY

Database security are the measures to prevent the database to be accessed illegal or information leaks.

DATABASE BACKUP AND RESTORE STRATEGY

The most important thing is not to lose the data and make copy to prevent any failure or disaster. There are different types are database backups in SQL server but for this project a full database backup is used.

DATA SCIENCE/BUISNESS INTEELIGENCE TECHNIQUES

Business intelligence techniques are mostly reports driven from the past data but data science is used to analyze the past report to predict something.

DATA PRIVACY, ETHICAL AND LEGAL ISSUES

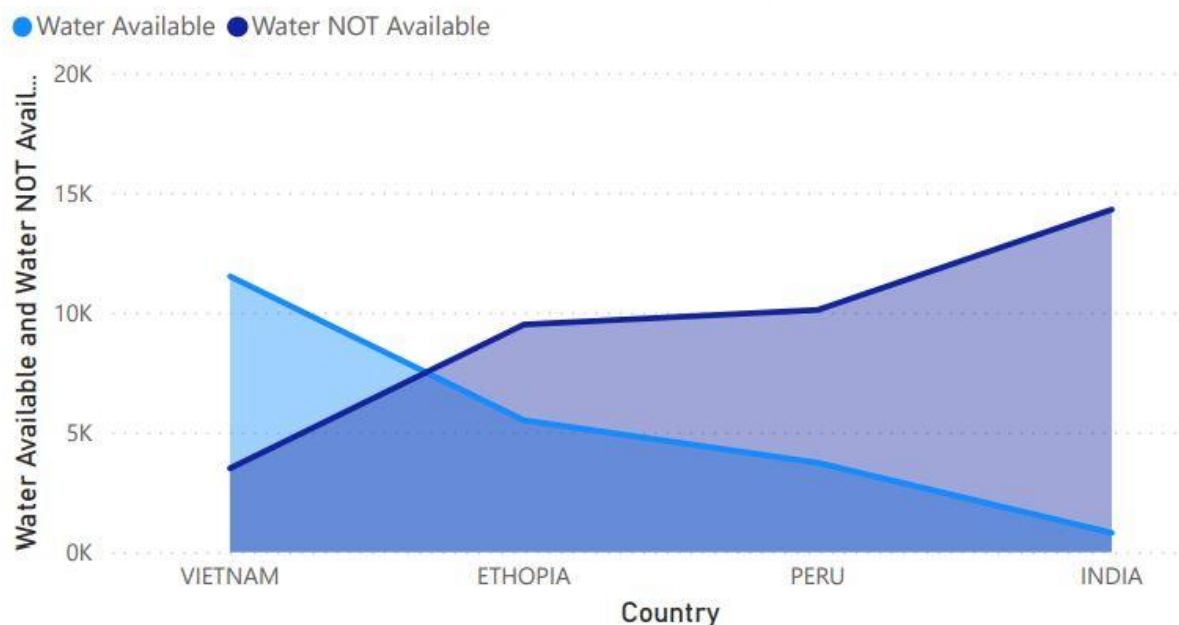
During collection, usage and sharing of research data the basic ethical and privacy concerns are followed. Appropriate means are used to acquire the data as it is stored in UK data services.

CONCLUSION

Reports Visualization

Following are the summarized visualization reports which are created with the help of Microsoft PowerBI tool.

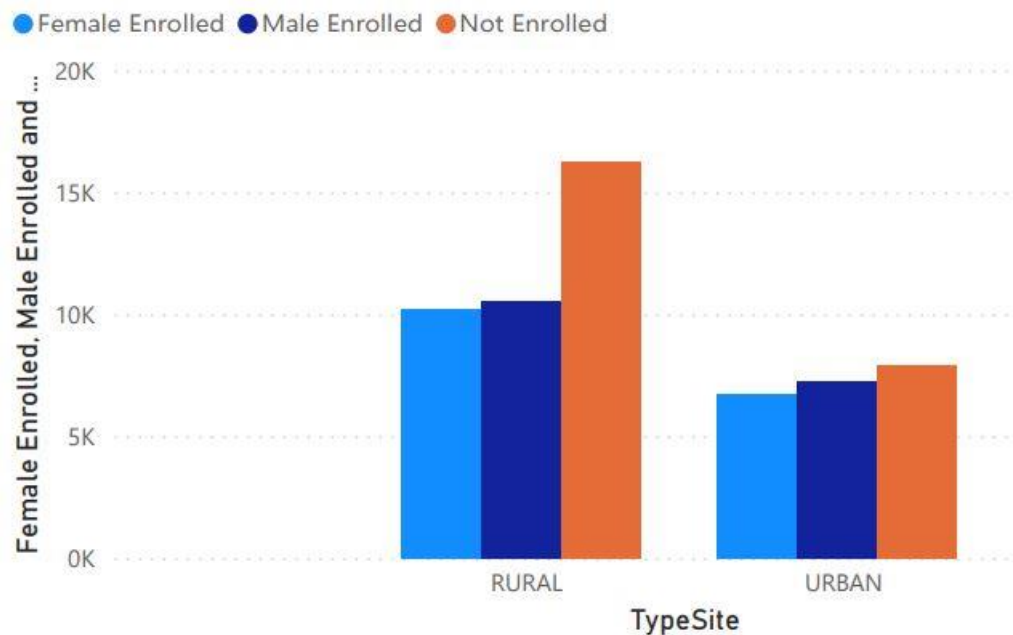
Water Available and Water NOT Available by Country



Water problem analysis report has been generated in the form of visualization country wise.

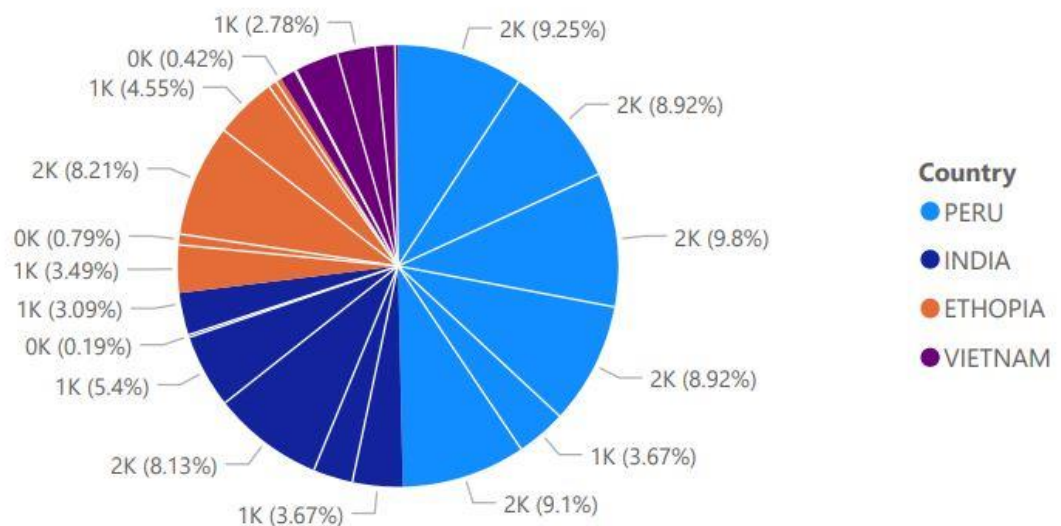
This visualization is based on Children enrollment in school type-site and gender wise.

Female Enrolled, Male Enrolled and Not Enrolled by TypeSite



Children Facing health problem country wise. This visualization is based on vaccination in four countries.

BCG NOT RECEIVED, DPT NOT RECEIVED, HIB NOT RECEIVED, Measles NOT RECEIVED, Mother Tetanus NOT RECEIVED and Polio NOT RECEIVED by Country



Note: More views/reports have been generated in database.

TASK-2

ABSTRACT

The client wants to help the children from low-income families in Vietnam and to find inequality in education system. So as a database developer my goal is to design and implement database with the data driven from the survey. Part of the project is to make quick and cost effective tool to find the child poverty. To implement this design a database named Vietnam_EduSurvey is established.

INTRODUCTION

The dataset involves 2 surveys and for this project 1st survey data is used to find different reports. The survey data is collected from Student Questionnaire, Teacher/Headmaster Questionnaire, Students Cognitive Tests and Student Roster. The data dictionary and technical guide is also provided to explain the variables names and variable labels.

DESIGN RATIONALE

This database design rationale is composed of five(05) tables.

TABLES:

General_INFO

Student_Quest

Student_CognitiveTest

Class_Roster

Principal_Quest

DESIGN CONSIDRATION

Database Normalization

Electronically stored data which allows to input, manage, and retrieve data in the forms of tables and columns. After normalization the further step of denormalization is done to put each piece of data into its right place.

```
CREATE TABLE Class_Roster
(GRLENRL NVARCHAR(max) NULL ,BOYENRL NVARCHAR(max) NULL ,TTLENRL NVARCHAR(max) NULL ,TGRLENRL NVARCHAR(max) NULL ,
TBOYENRL NVARCHAR(max) NULL ,TTTLENRL NVARCHAR(max) NULL ,ATDTMSY NVARCHAR(max) NULL ,ATDDFSY NVARCHAR(max) NULL ,
TGMTHENG NVARCHAR(max) NULL ,SCALLCT NVARCHAR(max) NULL ,GRPABLT NVARCHAR(max) NULL ,CLSORD1 NVARCHAR(max) NULL ,
CLSORD2 NVARCHAR(max) NULL ,SCAVLB1 NVARCHAR(max) NULL ,SCAVLB2 NVARCHAR(max) NULL ,SCAVLB3 NVARCHAR(max) NULL ,
SCAVLB4 NVARCHAR(max) NULL ,SCAVLB5 NVARCHAR(max) NULL ,SCAVLB6 NVARCHAR(max) NULL ,SCAVLB7 NVARCHAR(max) NULL ,
SCAVLB8 NVARCHAR(max) NULL ,SCAVLB9 NVARCHAR(max) NULL ,SCAVLB10 NVARCHAR(max) NULL ,SCPRDDAY NVARCHAR(max) NULL ,
SCLNONPR NVARCHAR(max) NULL ,SCMNMTIN NVARCHAR(max) NULL ,SCMNENIN NVARCHAR(max) NULL ,SCTXTMTH NVARCHAR(max) NULL ,
SCTXTENG NVARCHAR(max) NULL ,
UNIQUEID NVARCHAR(50) FOREIGN KEY REFERENCES dbo.General_INFO);
```

Database Constraints

These are the rules defined while creation of a database model which are enforced to followed when the data is inserted, updated, or deleted in a database. Different constraints are used like Primary Key, Foreign Key, Null/Not Null Value by default.

Data Validation

Since data is being queried consistently in a database so it is compulsory to ensure the validity of the data at all the stages. The check statements ensure that data statements are correct for all rows in a table.

```

Insert INTO General_INFO
(UNIQUEID ,SCHOOLID,CLASSID,STUDENTID ,YLCHILDID,PROVINCE ,DISTRICTCODE,LOCALITY )
select UNIQUEID ,SCHOOLID,CLASSID,STUDENTID ,YLCHILDID,PROVINCE ,DISTRICTCODE,LOCALITY
from [dbo].[vietnam_wave1];

```

GO

```
SELECT * FROM [dbo].[General_INFO]
```

- The inserted data rows and the extracting data rows are to be equal for the validity of the data.

Error Handling

To describe the error and failures in SQL query code is used so that developer or user can understand the error. To avoid errors developer puts the different checks at different stages so if there something goes wrong then error message should display.

Security

Database has data which should be avoided to have access illegally. Database security is the main objective of a database design. It ensures that the only authenticated persons can retrieve the data from the database.

Comments

Comments are the message or text used to give information of the code and usually starts with '--'. It gives the understanding to the developer that for what purpose this piece of code is written.

T-SQL STATEMENTS

Tables

Database Vietnam_EduSurvey is created.

```
create database Vietnam_EduSurvey;
```

```
CREATE TABLE Class_Roaster
```

```

(GRLNRL NVARCHAR(max) NULL ,BOYENRL NVARCHAR(max) NULL ,TTLENRL NVARCHAR(max) NULL ,TGRLENRL NVARCHAR(max) NULL ,
TBOYENRL NVARCHAR(max) NULL ,TTTLENRL NVARCHAR(max) NULL ,ATDTMSY NVARCHAR(max) NULL ,ATDDFSY NVARCHAR(max) NULL ,
TGMTHENG NVARCHAR(max) NULL ,SCALLCT NVARCHAR(max) NULL ,GRPABLT NVARCHAR(max) NULL ,CLSORD1 NVARCHAR(max) NULL ,
CLSORD2 NVARCHAR(max) NULL ,SCAVLB1 NVARCHAR(max) NULL ,SCAVLB2 NVARCHAR(max) NULL ,SCAVLB3 NVARCHAR(max) NULL ,
SCAVLB4 NVARCHAR(max) NULL ,SCAVLB5 NVARCHAR(max) NULL ,SCAVLB6 NVARCHAR(max) NULL ,SCAVLB7 NVARCHAR(max) NULL ,
SCAVLB8 NVARCHAR(max) NULL ,SCAVLB9 NVARCHAR(max) NULL ,SCAVLB10 NVARCHAR(max) NULL ,SCPRDDAY NVARCHAR(max) NULL ,
SCLNONPR NVARCHAR(max) NULL ,SCNMNTIN NVARCHAR(max) NULL ,SCNMENIN NVARCHAR(max) NULL ,SCTXTMTH NVARCHAR(max) NULL ,
SCTXTENG NVARCHAR(max) NULL ,
UNIQUEID NVARCHAR(50) FOREIGN KEY REFERENCES dbo.General_INFO);

```

Views

A virtual tables which is used to collect and retrieve the information/data from the multiple tables.

```
CREATE VIEW STD_HealthProblems
```

```
AS
```

```

select v.PROVINCE,(select DISTINCT(count(UNIQUEID)) from dbo.Student_INFORMATION_VIEW b where b.SightProblem = 'YES' and v.PROVINCE=b.PROVINCE)as [Sight Problem],
(select count(UNIQUEID)from dbo.Student_INFORMATION_VIEW b where b.HearingProblem = 'YES' and v.PROVINCE=b.PROVINCE)as [Hearing Problem],
(select count(UNIQUEID)from dbo.Student_INFORMATION_VIEW b where b.Headaches = 'YES' and v.PROVINCE=b.PROVINCE)as [Headaches],
(select count(UNIQUEID)from dbo.Student_INFORMATION_VIEW b where b.Fever = 'YES' and v.PROVINCE=b.PROVINCE)as [Fever],
(select count(UNIQUEID)from dbo.Student_INFORMATION_VIEW b where b.StomachProblem = 'YES' and v.PROVINCE=b.PROVINCE)as [Stomach Problem],
(select count(UNIQUEID)from dbo.Student_INFORMATION_VIEW b where b.OtherProblem = 'YES' and v.PROVINCE=b.PROVINCE)as [Other Problem]
from dbo.Student_INFORMATION_VIEW v
group by PROVINCE

```

```

--> Executing the view
GO
SELECT * FROM STD_HealthProblems;

```

Store Procedures

These are the commands which are stored in database catalog and on the basis of given input it recalls the query to extract and display the data.

```
--> 5- Students attendance during the survey Locality and Province Wise
DROP PROCEDURE Student_Attendance;
Create Procedure Student_Attendance @Locality NVARCHAR(30), @Province NVARCHAR(30), @StudentAttendance nvarchar(30)
As
Select DISTINCT(a.UNIQUEID), STD_Attendance= CASE
WHEN b.ATDTMSY= '1' THEN 'Normal' WHEN b.ATDTMSY='2' THEN 'Higher Than Normal' WHEN b.ATDTMSY='3' THEN 'Lower Than Normal'
END,
PROVINCE= CASE
When a.PROVINCE =1 Then 'Ben Tre'
When a.PROVINCE =2 Then 'Da Nang'
When a.PROVINCE =3 Then 'Hung Yen'
When a.PROVINCE =4 Then 'Lao Cai' ELSE 'Phu Yen' END,
LOCALITY= CASE
When a.LOCALITY=1 Then 'RURAL' When a.LOCALITY=2 Then 'URBAN' END
FROM General_INFO a inner join Class_Roaster b on a.UNIQUEID=b.UNIQUEID
WHERE ATDTMSY= @StudentAttendance and LOCALITY= @Locality and PROVINCE=@Province
--> Executing the procedure
GO
EXEC Student_Attendance @StudentAttendance='1', @Locality='2', @Province='2'
```

DATABASE SECURITY

The security of a database is to ensure that data is accessed by the authorized person only and data privacy is integrated.

DATABASE BACKUP AND RESTORE STRATEGY

To save and not to lose the data copies of database is made. For this purpose SQL server has the functionality of database backup which allows to store the backup of design, data and everything.

DATA SCIENCE/BUISNESS INTELIGENCE TECHNIQUES

Business intelligence techniques are the reports in the forms of views tables and the data science is the analysis of the reports.

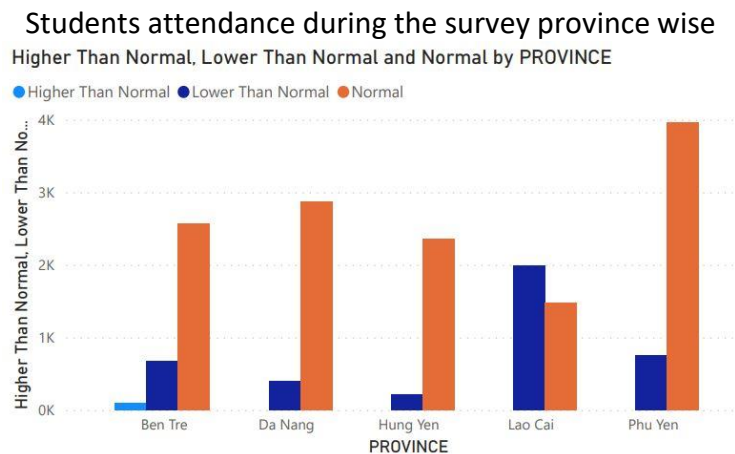
DATA PRIVACY, ETHICAL AND LEGAL ISSUES

To collect and use the data the data privacy is the major part either the data is accessed by fair means or not. And the personal information is kept private or not like names etc.

CONCLUSION

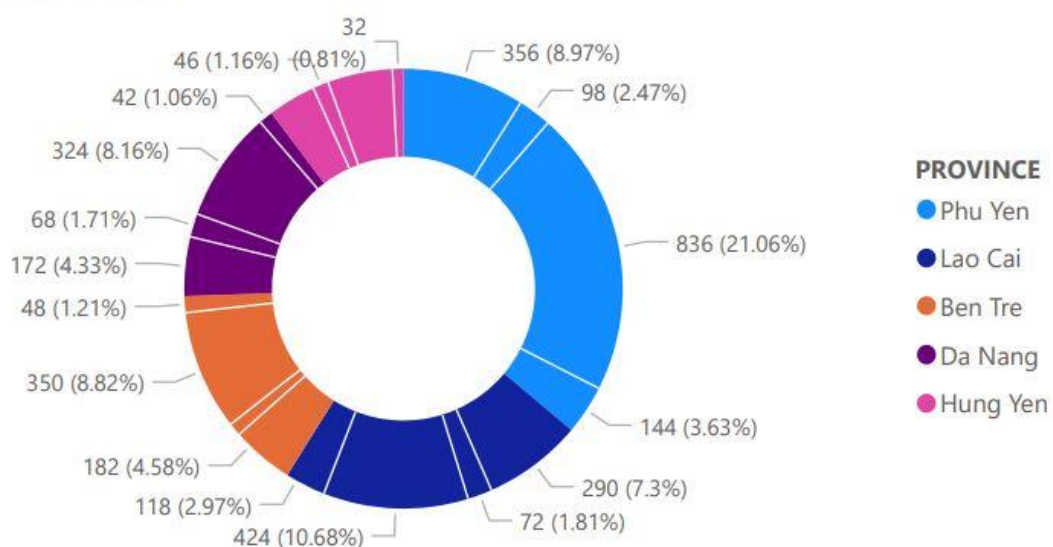
Reports Visualization

Following are the summarized visualization reports which are created with the help of Microsoft PowerBI tool.



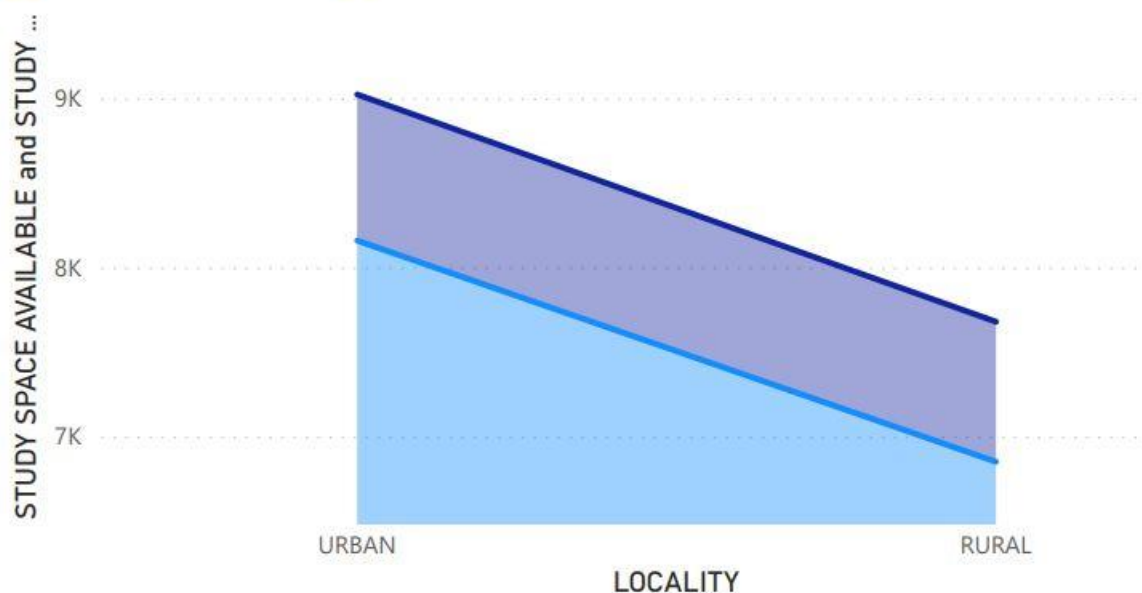
Health Problem to children province Wise

Other Problem, Hearing Problem, Headaches, Fever, Sight Problem and Stomach Problem by PROVINCE



STUDY SPACE AVAILABLE and STUDY SPACE NOT AVAILABLE by LOCALITY

● STUDY SPACE AVAILABLE ● STUDY SPACE NOT AVAILABLE



Note: More views/reports have been generated in database.

TASK-3

ABSTRACT

As a database developer I have been given task to help find the crime profiler. To assist find crimes with population wise. The main object is to create and develop a cost effective tool which find computational criminology report containing lower layer super output area (LSOA). The reporting system is consists of Microsoft SQL server, PoweBI and QGIS reporting tool.

INTRODUCTION

The dataset for this project has been retrieved from UK Police website and accessed with right means. This consists of crimes which has been recorded over the period of Jan 2017 to Dec 2018. To find the criminality report LSOA wise a database tool is used. Crime reports have also been generated with the population of the Manchester counties.

DESIGN RATIONALE

This database design rationale is composed of Three (03) tables. Which basically consists of the main crime file and other 2 files of population in Manchester. These files were in .csv format and imported in the forms of table.

TABLES:

ManCrimeData 17-18

ManPopulation17

ManPopulation18

DESIGN CONSIDRATION

Database Normalization

The dataset is stored electronically in the forms of tables and columns. Removing duplicate data, data anomalies and repetition systematically approach has been used.

```
--> Adding new Column id with serial number (Following Lab Week 8 instructions)
ALTER TABLE Man_Crime.[dbo].[ManCrimeData 17-18]
ADD ID INT IDENTITY;

--> Making Primary key
ALTER TABLE Man_Crime.[dbo].[ManCrimeData 17-18]
ADD CONSTRAINT PK_Id PRIMARY KEY NONCLUSTERED (ID);
GO
```

Database Constraints

The database constraints are the rules which are defined while creating the design and enforced to be followed when data is inserted, updated, or deleted. Primary Key, Foreign Key, Null/Not Null Column value these factor has been setup to be followed.

Data Validation

To ensure the consistency of the database data validation is the major step. It ensure the data which is queried is in valid state. The rows affected at insertion time and after that while in retrieving time must be the same so to be sure that data is valid.

Error Handling

Error handling is the major aspect in a database tool. Developer keeps in mind that whether the error can be occurred at which stage of the database. So developer makes some checks to avoid the database failure and errors.

Security

The database security is a key to its durability. As a database developer it is compulsory to make sure that data is accessed by only authorized authority and there is no data or information leakage in the tool.

Comments

Comments guide the reader or any other developer and used before the code snippet. It helps to understand the part of the code that what this code is being used for and what is the functionality of it. Comments are mostly start with '--'.

T-SQL STATEMENTS

Tables

Database Man_Crime is created.
`create database Man_Crime;`

ManCrimeData 17-18

ManPopulation17

ManPopulation18

Views

To get reports and extract information virtual tables has been created to show the valuable information.

```
--> 1- Viewing Highest Crimes in Manchester
Drop view Highest_ManCrimes;
Create View Highest_ManCrimes AS
SELECT [Crime type] ,count(ID)as TotalNumberOfCrimes
from Man_counties
Group By [Crime type]
--> Executing the view
Select * from Highest_ManCrimes order by TotalNumberOfCrimes desc;

--> 2- Counties Data where Crime Offender has sent to prison
Drop view Counties_OffenderPrison;
Create View Counties_OffenderPrison AS
SELECT County_name AS Counties,count([Last outcome category]) As [Offender sent to prison]
from Man_counties
Where [Last outcome category] = 'Offender sent to prison'
Group by County_name
--> Executing the view
Select * from Counties_OffenderPrison;

--> 3- Counties Data where Crime Offender has sent to prison
DROP VIEW Counties_CrimeLocation;
Create View Counties_CrimeLocation AS
SELECT County_name AS Counties,count([Location]) As [On/Near Parking Area Crimes]
from Man_counties
Where [Location] = 'On or near Parking Area'
Group by County_name
--> Executing the view
GO
Select * from Counties_CrimeLocation;
```



```

--> 4- Creating view to check 'Public order Cime' in Manchester
DROP VIEW Public_order;
CREATE VIEW Public_order AS
SELECT * FROM Man_counties
WHERE [Crime type]='Public order'
AND [GeoLocation] IS NOT NULL;
--> Executing the view
GO
Select * from Public_order;

--> 5- Creating view to check 'Criminal damage and arson' in Manchester
DROP VIEW Criminal_damage_arson;
CREATE VIEW Criminal_damage_arson AS
SELECT * FROM Man_counties
WHERE [Crime type]='Criminal damage and arson'
AND [GeoLocation] IS NOT NULL;
--> Executing the view
GO
Select * from Criminal_damage_arson;

--> 6- Creating view to check 'Burglary' in Manchester
DROP VIEW Burglary_Crime;
CREATE VIEW Burglary_Crime AS
SELECT * FROM Man_counties
WHERE [Crime type]='Burglary'
AND [GeoLocation] IS NOT NULL;
--> Executing the view
GO
Select * from Burglary_Crime;

```

DATABASE SECURITY

To avoid the illegal access and database data/information leakage database security plays the important role. Database developer makes sure that data is being accessed by the authorized users and there is no leakage of data.

DATABASE BACKUP AND RESTORE STRATEGY

Database developer remains aware of any misshape. To avoid data lost or system failure there is functionality in Microsoft SQL server that developer can makes a copy/backup of the database.

DATA SCIENCE/BUISNESS INTELIGENCE TECHNIQUES

Business intelligence techniques are the reports which are generated by using the dataset. But the data sciences is the analysis on that reports to extract more valuable information and predict for future. It helps to compare the graph and variety in the data.

DATA PRIVACY, ETHICAL AND LEGAL ISSUES

Data is collected and used but its privacy is more important. Data for this database has been accessed by rightful means and the private information has been kept and not to show at the front end.

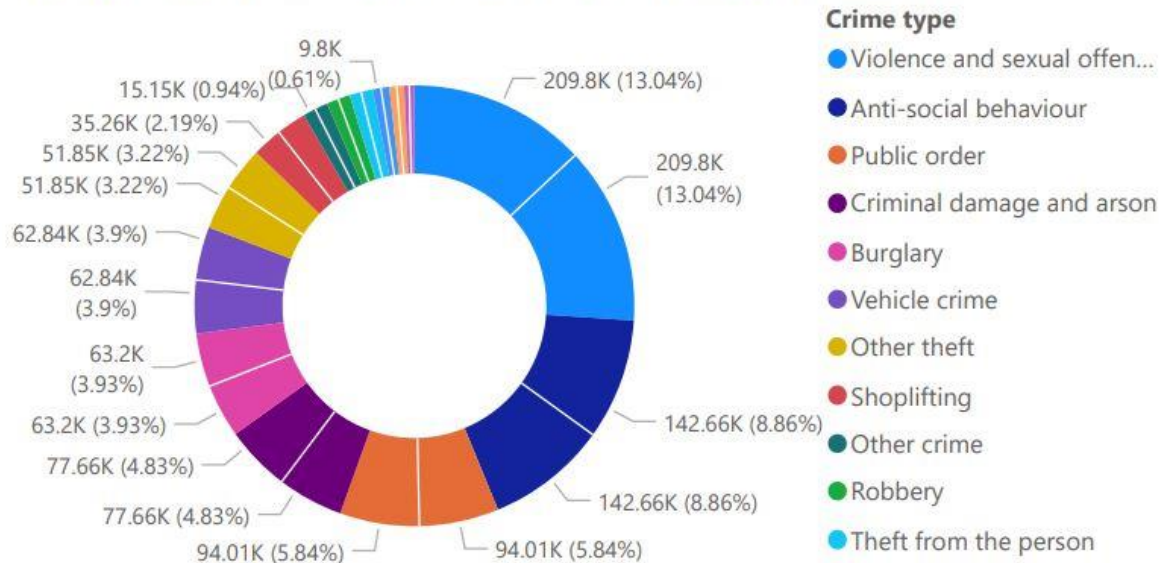
CONCLUSION

Reports Visualization

Many meaningful reports has been generated to show the valuable information from the dataset. And here the summarized reports in the form of visualization which has been created with the help of Microsoft PowerBI.

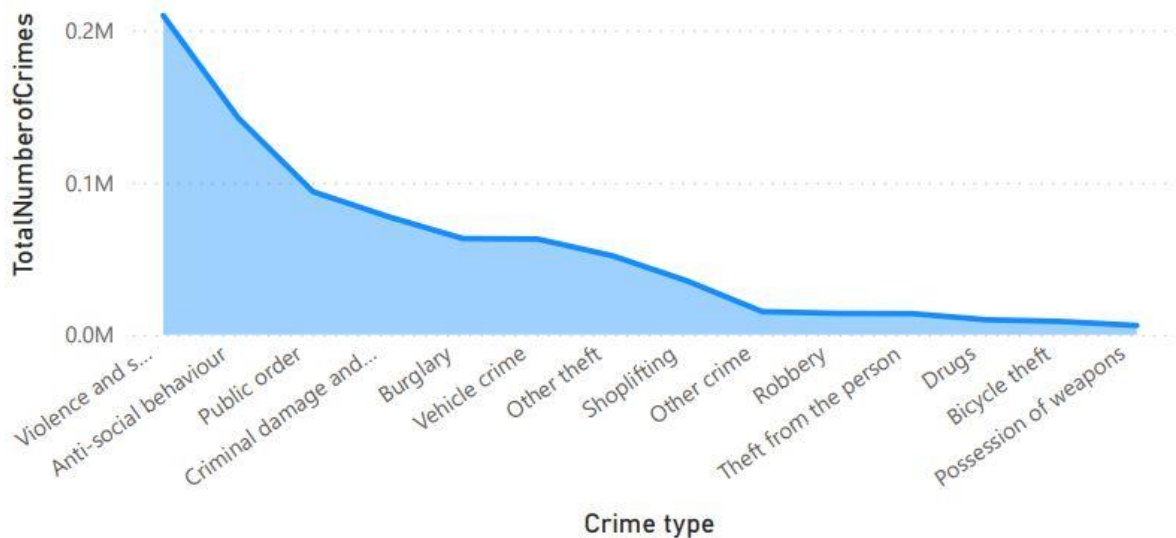
In this view crimes have been visualized with respect to population in the Manchester counties.

Count of CrimePopFile17 and Count of CrimePopFile18 by Crime type



In this view quantity of the crimes has been identified within the given period of times.

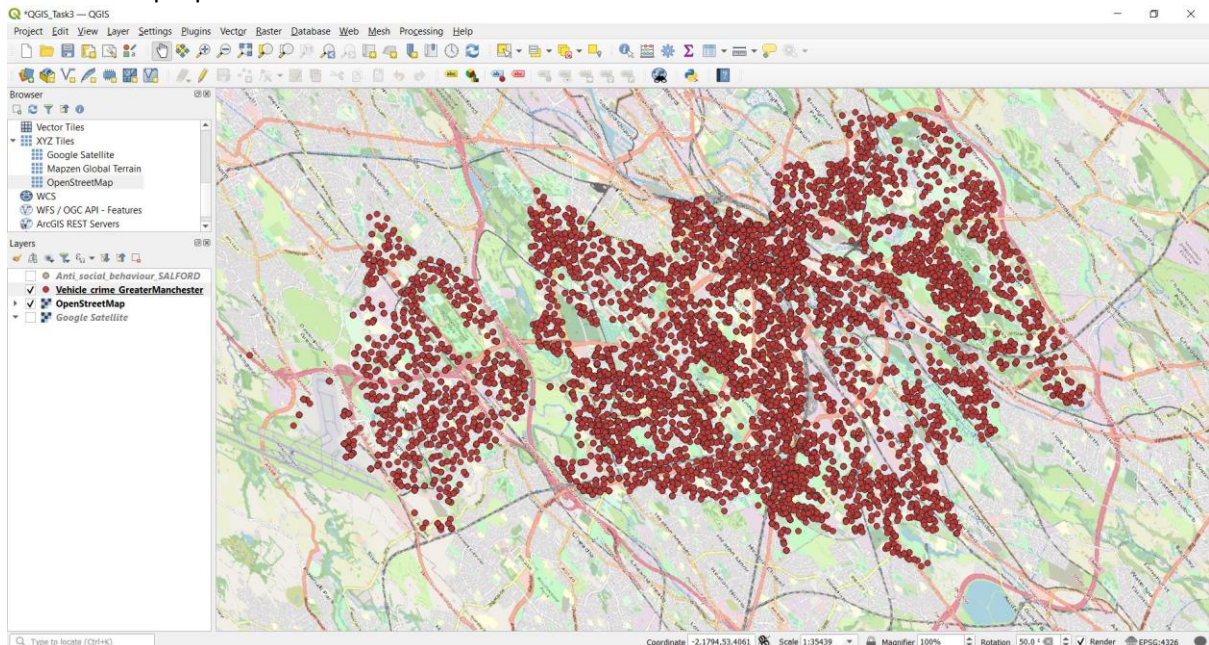
TotalNumberOfCrimes by Crime type



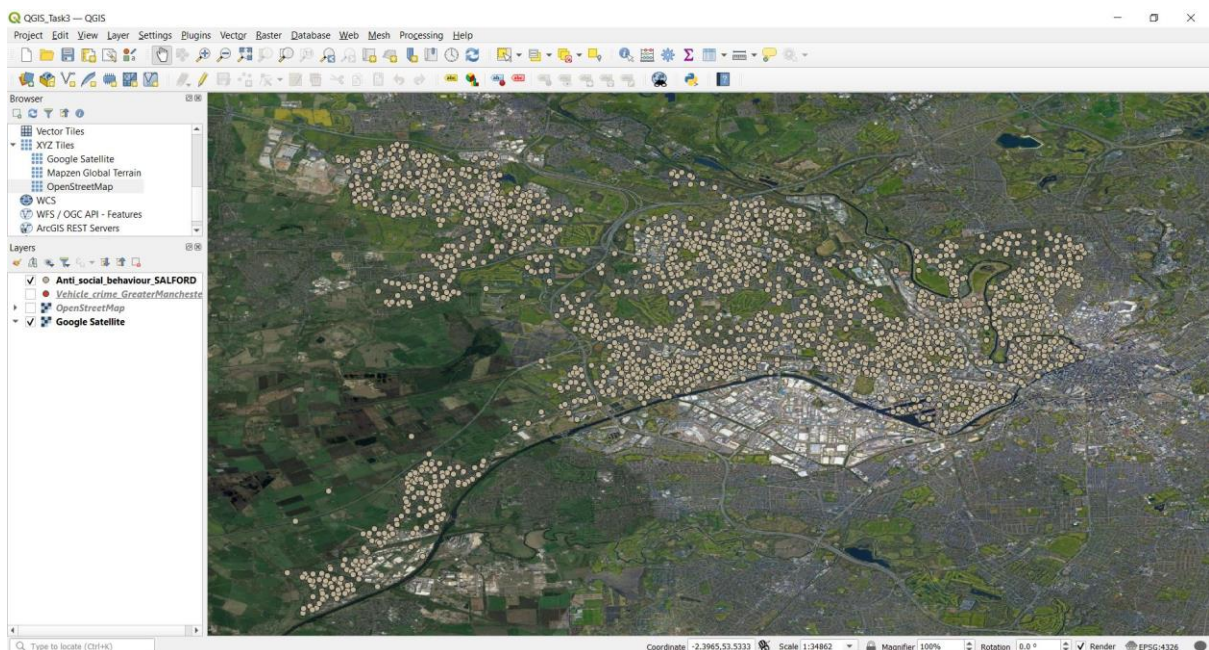
Note: More views/reports have been generated in database.

Visualization using QGIS

- 1- As per clients requirement Vehicle Crime in Greater Manchester has been visualized with the help of QGIS using MSSQL Connector. OpenStreetMap is used as OpenLayers Plugin for this purpose.



- 2- As per clients requirement Anti-Social Behaviour crimes in Greater Manchester has been visualized with the help of QGIS using MSSQL Connector. Google Satellite is used as OpenLayers Plugin for this purpose.



Note: More views/reports have been generated in database.

REFERENCES

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