CS432/532: NoSQL Project - Report

Project Title: US police shootings analysis

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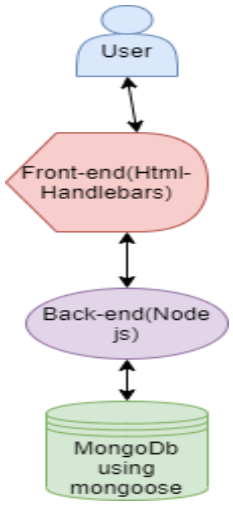
Problem

1.Inspired by the recent events happening all over the country, we came up with the topic of analyzing the police shootings in the US.

2. For this project, we have used non structured query language called mongoDB.

3. We will be using public dataset from Kaggle.

Software Design and NoSQL-Database and Tools Used



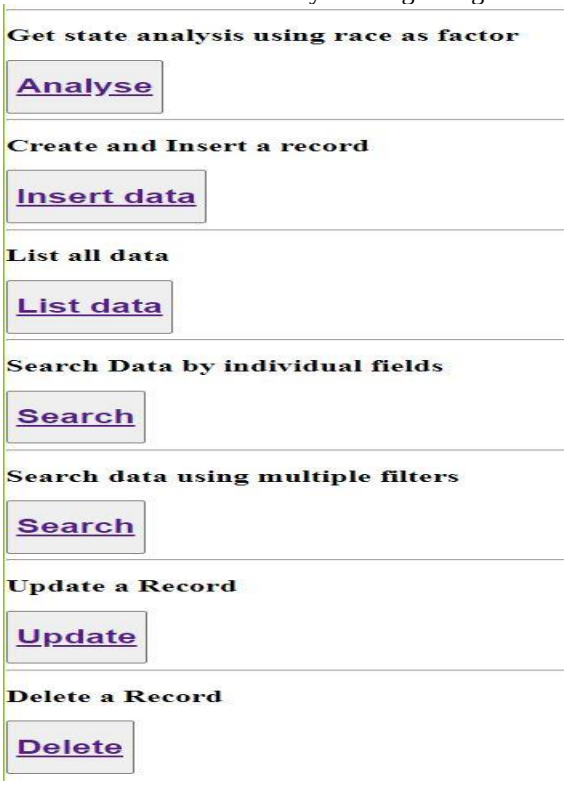
Design:

- The database query language we have used is non-structured query language that is mongoDB.
- For managing the database, we have used node js as our back end to interact with database and user.
- We have incorporated html5 with various template generating libraries to dynamically create webpages according to the user input or user choices.
- For server design, we have used express.js for deploying our project.
- We have used mongoose for our connection with the mongoDB database.
- We have used express-handlebars for rendering the dynamic pages.
- We have tried to make the front-end as user friendly as possible.

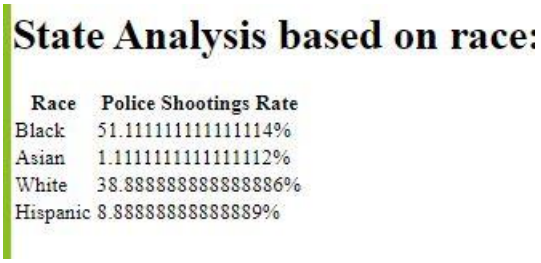
Supported Queries/Functionalities

1. *User Interface – Homepage :*

   The homepage is very simplistic in nature and caters to the needs of CRUD and analysis using a single factor.



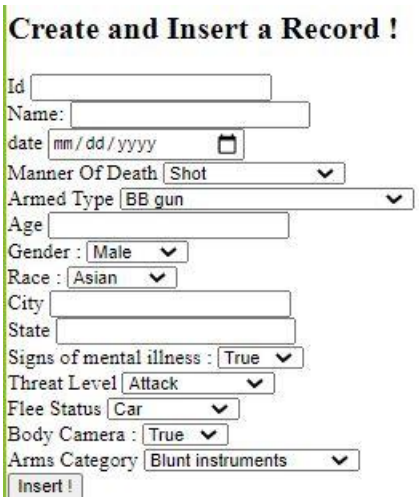
2. *State Analysis using 'race' as a factor:*



The analysis page asks for a state as input and displays the percentage of police shootings of that state with respect to state.

Due to recent incidents of 'Black Lives Matter', we took to analyze using the race factor. In the given image, we can see the black race had the highest percentage of 51% amongst all in NY state.

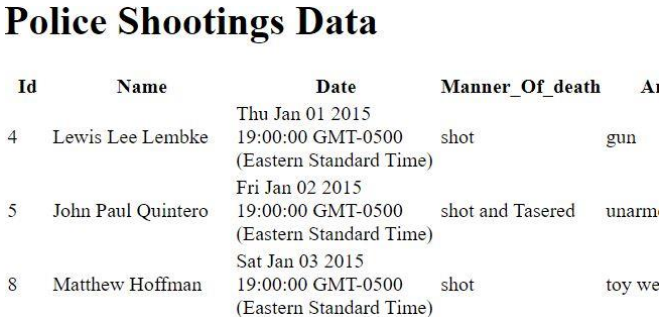
2. *Create and Insert Data*



Using the **Insert Data** option given on the home page, we can insert data into the dataset by the given options.

When inserting the data, the id is checked, as it is unique, and if it is present in the database, it rejects the insert query.

3. *List Data*



(We could only insert partial image here)

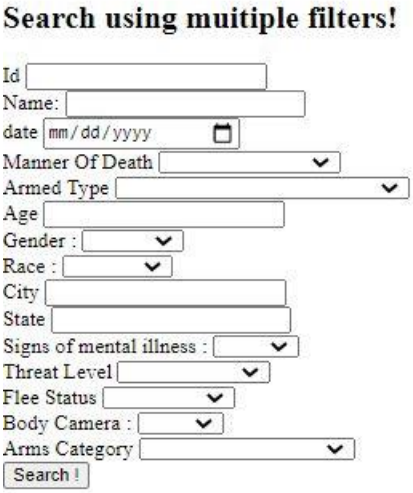
This option lists the data in the dataset. It doesn't check for any given parameters. It just simply returns all the data. However, this template is used for all other functions for displaying the data as a use case for other things such as search individual and search using multiple filters.

4. Search by individual fields:

This option takes us to another page:

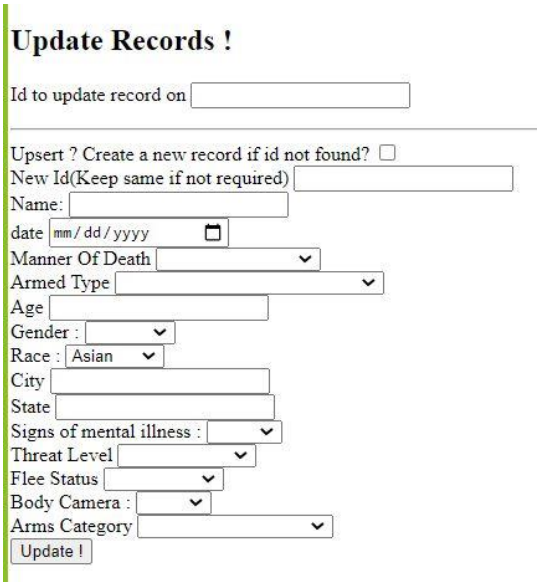
This page gives us options to search by individual parameters such as id, name, gender, date, etc.

5. Search by multiple filters:



Using this option, as the name states , we can search by inputting multiple parameters. If we leave some parameters blank, the functions at backend, do not consider it and thus only those parameters which are given are considered.

6. Update Records:



This option updates the records with id given as primary key to check on.

An 'upsert' option is given to with a check box so as to upsert the record if it doesn't exist.

7. Delete Record:

Delete record option deletes a record based on the given id.

Only id is selected so that multiple documents do not get deleted, since id is chosen to be unique.

Design Implementation

1. We have used node js as the backend to handle the server requests from the client.
2. Server was provided by the 'express' by node js.
3. We have also used other node libraries such as mongoose, nodemon, body-parsers,etc
4. Routing mechanism was handled manually using controllers.
5. When we issue a request to the server, the server responds with the homepage.
6. The client can then click the buttons as per his/her choice.
7. For handling the dynamic rendering of the webpage, we have used mongoose.
8. We first had to define a schema in mongoose which made it a lot easier to get the query results and then render it onto the webpage.
9. For the analysis part, we used aggregate functions to get the counts and analyze it.

DATASET

- https://www.kaggle.com/ahsen1330/us-police-shootings

PROJECT OUTCOMES

- https://github.com/shubhampatwa30/Database

REFERENCES

- https://www.youtube.com/watch?v=JnvKXcSI7yk&ab_channel=edureka%21
- https://www.youtube.com/watch?v=erfN7fH7A6s&ab_channel=EsterlingAccime
- https://www.youtube.com/watch?v=WDrU305J1yw&ab_channel=Academind