Final Project - Technical Report

Application URL:

We have hosted application on Heroku PaaS (Platform as a Service) that allows to build, deploy, and operate applications in the cloud. Current hosting is under free period and would be available for limited period of 15 days.
URL: https://crime-stats-sp22.herokuapp.com

Full GitHub URL:

We have uploaded the application source code with github.iu.edu at following URL
URL: https://github.iu.edu/mvarshn/SQL-noSQL-FinalProject-/tree/main/final_project_code

Project Summary

This data driven web application will provide the visual and statistical analysis of all crimes reported in San Francisco city of California, United States. We will be using the "San Francisco(SF) Police Calls for Service and Incidents" data from Kaggle as an input to create the application. This web app will enable the authorities to categorize crimes and take appropriate actions as well as help residents/visitors to take decisions.

Project Objectives and Usefulness:

Through this project, we will achieve the below mentioned primary objectives:

- Glance and manage the crime data by authorities so that they can take actions.
- Provide features to understand crime statistics in the city to keep residents and visitors stay alert and protected.

We will also try to achieve few other objectives as observed time to time while working throughout the project duration.
This application can be useful in various ways, some of them are as follows:

- Explore crime data with text and visual statistics to help authorities to prepare them and have better control on the activities happening in the city.
- Help residents to lookout the safe areas in city to roam around, buy or rent properties, etc.
- Help visitors to lookout safe timings to roam around in the city, to locate safe night life spots, safe area to stay etc.
- Easy to rank different city area or locations based on safety index.
- Classify or label the crimes into specific category which can help plan the action supposed to be taken against it.

- Identity the safest or risky day of week/month
- To help in checking if any crime is associated with the property/area before buying or renting the property

Technical Description:

Data:

The identified crime incidents dataset(San Francisco(SF) Police Calls for Service and Incidents) is downloaded from Kaggle and it is hosted by City of San Francisco Police Department. This dataset is distributed under the Open Data Commons Public Domain Dedication and License. The main purpose of hosting this data is to avail city crime data public for their safety and awareness.

We loaded the csv data file into Pandas data frame and did the following preprocessing on the data:
1. Remove duplicates from the data
2. Converted the data into required data types
3. Split data into two different datasets, namely Incidents and Crimes

Tools:

We have implemented entire application with MVC (**M**odel **V**iew **C**ontroller) architecture pattern and Python language for server-side programming.

Model:
The model is developed using Flask RESTful APIs and PyMongo to deal with MongoDB

View:
The views are developed Flask render templated with HTML, JavaScript, Jinja2, datatable.js, CSS, Chart-JS

Controller:
The controllers are developed using Flask Web Application routers

Deployment Platform:
Heroku cloud-based PaaS platform which supports build and deploy web application.

Tools Used:
Front End: Flask/HTML/Chart-JS
Back End: PyMongo/Python
Database: MongoDB
Tools: Visual Studio Code, Spyder Python, MongoDB Atlas/Compass, Postman

User Functionalities:

Application supports following functionalities to manage the Crime incidents and charges data,

- Create new record –
    - While creating a new incident record, we will follow the uniqueness rule and perform basic validations to maintain data integrity
    - Restrict the type of value of fields
    - Make field mandatory to enter whenever required
- Read, Update or Delete existing record
    - Prompt user before deleting record
- View list of records with search and sort features
- View statistical reports
    - Bar/Area/Line Charts depicting the crimes per area/type/day
    - Search facility to see if address is associated with a crime

Teamwork: