1-A

      a. Crime Hotspots Identification: Detects and visualizes regions in Kansas City with higher crime rates. This includes identifying specific areas where certain types of crimes are more prevalent.
      b. Seasonal Crime Trends Understanding: Analyze and compare crime occurrences across different times of the year to uncover any seasonal patterns or trends in crime rates.
      c. Impact of COVID-19 on Crime Rates: Assess how the COVID-19 pandemic has influenced crime rates and patterns in Kansas City. This involves correlating crime data with COVID-19 case data by ZIP code.
      d. Demographic Correlation with Crime: Examine how crime rates correlate with demographic variables such as race, gender, and age, providing insights into the socio-demographic aspects of crime.

1-B

Addressing crime patterns and hotspots in Kansas City is crucial for enhancing public safety, informing policy making, and increasing community awareness. By understanding where and when crimes occur, law enforcement can allocate resources more effectively and develop targeted crime prevention strategies. This insight also aids policymakers in creating tailored policies to address specific community issues. Additionally, sharing this information with the public boosts awareness and encourages community participation in safety initiatives, contributing to a safer and more informed community overall.

1-C

I want to achieve a thorough understanding of crime dynamics in Kansas City through various visualization tasks, identifying trends, and correlating them with socio-demographic and pandemic data. Enable law enforcement and city officials to make data-driven decisions in addressing crime-related issues. In order to accomplish the above objectives, I'm going to create a dashboard with appropriate visualizations showing the comparisons among the crime descriptions. Basically highlighting the impact of covid on the crime rate visually.

1-D

Law Enforcement Agencies will benefit from data-driven insights for effective deployment of resources and formulation of crime prevention strategies. Public and Community Groups can gain a better understanding of crime patterns and risks, empowering them to participate in community safety efforts and make informed decisions about personal safety. Researchers and Academics can utilize the analysis for further studies on crime trends and their correlations with socio-economic factors and public health crises like COVID-19.

2-A

Dataset	Link	Rows	Columns
KCPD Crime Data 2016	KCPD Crime Data 2016	127877	26
KCPD Crime Data 2017	KCPD Crime Data 2017	132139	25
KCPD Crime Data 2018	KCPD Crime Data 2018 - Kansas City	128938	25
KCPD Crime Data 2019	KCPD Crime Data 2019	103772	23
KCPD Crime Data 2020	KCPD Crime Data 2020	96220	24
KCPD Crime Data 2021	KCPD Crime Data 2021	92127	24
KCPD Crime Data 2022	KCPD Crime Data 2022	101848	24
Covid-19 Data by ZIP Code	COVID-19 Data by ZIP Code	50	4

2-B

Datasets	2016	2017	2018	2019	2020	2021	2022	Covid_Zipcode
	Report_No	Report_No	Report_No	Report_No	Report_No	Report_No	Report_No	ZipCode
	Reported_Date	Reported_Date	Reported_Date	Reported_Date	Reported_Date	Reported_Date	Reported_Date	Cases
	Reported_Time	Year	Year	Reported_Time	Year	Reported_Time	Reported_Time	Crude Rate per 100,000
	From_Date	Reported_Time	Reported_Time	From_Date	Reported Time	From_Date	From_Date	Two-Week Total Cases
	From_Time	From_Date	From_Date	From_Time	From_Date	From_Time	From_Time	
	To_Date	From_Time	From_Time	To_Date	From Time	To_Date	To_Date	
	To_Time	To_Date	To_Date	To_Time	To_Date	To_Time	To_Time	
	Offense	To_Time	To_Time	Offense	To Time	Offense	Offense	
	IBRS	Offense	Offense	IBRS	Offense	IBRS	IBRS	
	Description	IBRS	IBRS	Description	IBRS	Description	Description	
	Beat	Description	Description	Beat	Description	Beat	Beat	
	Address	Beat	Beat	Address	Beat	Address	Address	
	City	Address	Address	City	Address	City	City	
	Zip Code	City	City	Zip Code	City	Zip Code	Zip Code	
	Rep_Dist	Zip Code	Zip Code	Rep_Dist	Zip Code	Rep_Dist	Rep_Dist	
	Area	Rep_Dist	Rep_Dist	Area	Rep_Dist	Area	Area	
	DVFlag	Area	Area	DVFlag	Area	DVFlag	DVFlag	
	Invl_No	DVFlag	DVFlag	Involvement	DVFlag	Involvement	Involvement	
	Involvement	Invl_No	Invl_No	Race	Involvement	Race	Race	
	Race	Involvement	Involvement	Sex	Race	Sex	Sex	
	Sex	Race	Race	Age	Sex	Age	Age	
	Age	Sex	Sex	Firearm Used Fla	Age	Firearm Used Fla	Fire Arm Used Flag	
	Firearm Used Fla	Age	Age	Location	Firearm Used Fla	Location	Location	
	Latitude	Firearm Used Fla	Firearm Used Flag		Location	Age_Range	Age_Range	
	Longitude	Location	Location					
ATTRIBUTES	Location 1							

Data Items description :
For "KCPD 2017-22" datasets, the data items are crime information
For "Covid-19 Data by ZIP Code" dataset, data items are zipcode wise covid cases

Data Attributes description :
For "KCPD 2017-22" datasets :
Report_No : Unique number assigned to a case, throughout the life of a case numerous reports can be written
Reported_Date : Date the offense was reported
Reported_Time : Time the offense was reported
From_Date : Earliest date the incident could have occurred (From Date - To Date is the date range the incident could have occurred. If no range is used, then the From Date is when the incident occurred and the From Time is the time the incident occurred)
From_Time : Earliest time the incident could have occurred
To_Date : Latest date the incident could have occurred (From Date - To Date is the date range the incident could have occurred. If no range is used, then the From Date is when the incident occurred and the From Time is the time the incident occurred)
To_Time : Latest time the incident could have occurred
Offense : Offense code
IBRS : National Incident Based Reporting System offense code
Description : Short description of the offense
Beat : Area where offense occurred
Address : Cross streets of address where offense occurred
City : City where offense occurred
Zip Code : Zip Code where offense occurred
Rep_Dist : Area where offense occurred
Area : Division the offense occurred in (Central, East, Metro, South, North, and Shoal Creek)
DVFlag : Indicates if it was a domestic violence offense
Invl_No : On the report the involvement number of the persons listed ex; (Suspect # 1, Suspect #2 etc)
Involvement : Person's involvement in the case (sus-suspect, vic-victim, arr-arrestee)
Race : • A – Asian • B – Black or African American • I – American Indian or Alaska Native • P – Native Hawaiian or Other Pacific Islander • U - Unknown • W – White
Sex : M-Male, F-Female, U- Unknown
Age : Age of victim/suspect/arrestee. If the victim/suspect/arrestee is a juvenile, the age is left blank
Firearm Used Flag : Indicates if a firearm was used in the offense
Latitude,Longitude

For "Covid-19 Data by ZIP Code" dataset :
Zip Code : Zip Code where offense occurred
Cases : Number of residents who tested positive for active COVID-19 infection
Crude Rate per 100,000 : Number of COVID19 cases, normalized to the population of the ZIP code

Two-Week Total Cases : Number of residents who tested positive for active COVID-19 infection during the two weeks indicated in the dataset overview

2-C

Attributes of Interest :

For "KCPD 2017-22" datasets :
Month(Derived Attribute from Reported_Date attribute), Description, Age, Sex, Race, Zip Code, Invl_No, Location, Involvement

For "Covid-19 Data by ZIP Code" dataset :
Zip Code, Cases, Crude Rate per 100,000

Linking Attributes : Age, Sex, Race, Zip Code

I would like to join the datasets using linking attributes listed above so that I can check how Covid has impacted the crime rate in Kansas City. For example, after joining 2018 & 2020 Kansas City crime datasets, I can see whether the crime rate has fallen in a selected zip code based on looking at the "Zip code", count of "Description" attributes, I can see which quarter/month has recorded higher number of cases based on "Zip code", "Month" & count of "Description" attributes, I can see which types of offenses committed have been increased/ decreased before and after covid using the "Description" "year" attributes. I can see the Victim demographics. The covid by zip code and crime datasets can be combined using zip code attribute and I can check whether the increased number of cases in a certain zip code affected the number of crimes committed in the year 2020 using the "zip code", "Cases", "Crude Rate per 100,000"'

3

Visualization is needed to solve the problem of identifying crime hotspots, understanding seasonal crime trends, and assessing the impact of COVID-19 on crime rates in Kansas City, Missouri. I think the data tables and/or manual/automated methods are insufficient to solve the problem because of the below points.

a. They are not effective for identifying patterns and trends in large datasets and it is very difficult to interpret.
b. Visualization can help to communicate complex information in a clear and concise way.
c. Visualization can help to generate new insights and ideas.

Even though automated methods are the best at processing large amounts of datasets, visualization helps the reader to comprehend the data in a better way. For example, with the help of automated methods, I can detect the outliers, trends/patterns but with the help of visualization I can understand the context behind the outliers, how the trends change over time/

detect the subtle,underlying patterns rather than the statistical patterns derived from the automated methods. To be precise, let's say the automated methods show us that there is an increased crime report in a particular year, but with visualizations I can create a time-series where I can see the quarterly or monthly comparison of the crimes. These visualizations might reveal that there is a significant rise in crime in summer months compared to winter. I can draw such feedback with the help of visualizations and human interaction.

Visualization Tasks :

Detect :
   a. Detect the hotspot regions of Kansas city with more crimes.
   b. Detect the long-term trends in crime data over several years

Compare :
   a. Compare the different quarters of the year with the Crime count to identify which quarter has the most number of crimes.
   b. Compare how crime rates relate to demographic variables like race, gender, and age.

Identify :
   a. Identify the areas of Kansas city that are most affected by Crime.
   b. Identifying the locations within Kansas City are most susceptible to which types of crimes.

Communicate :
   a. Communicate the correlation about the number of crimes reduced or increased during covid through effective visualization through dashboard to help us understand the effect of covid.

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