

ANALYSIS OF THE CRIME
RATES AND TEMPERATURE IN
CHICAGO IN 2021 AND ITS
IMPACT ON THE CRIMES



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Chicago

HIGH CRIME RATES



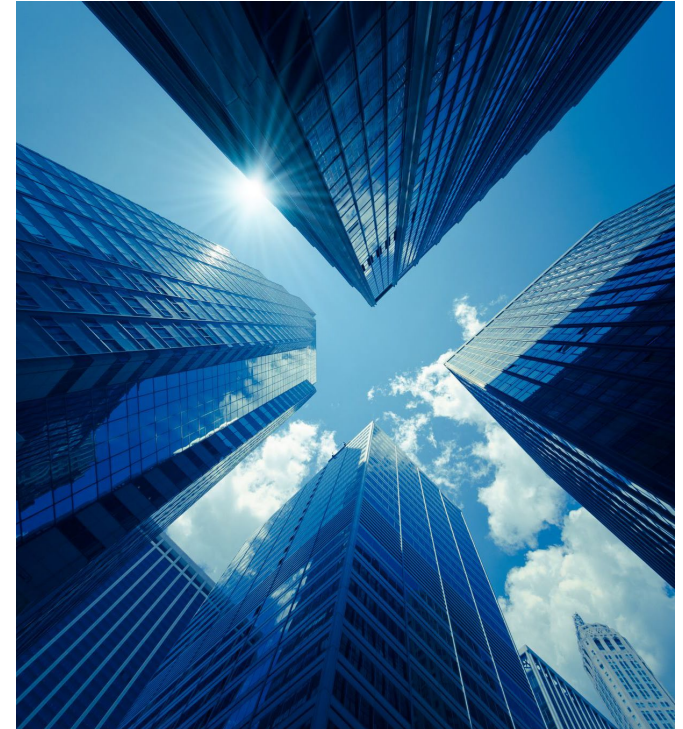
INTENSE WEATHER CONDITIONS



Objective

Chicago is often known for its high crime rates and intense weather conditions.

We would try to analyze if the weather conditions would cause any impact on the crimes that are reported along with figuring out the riskiest areas in the city by which the residents can be alerted and security in those areas could be improved .



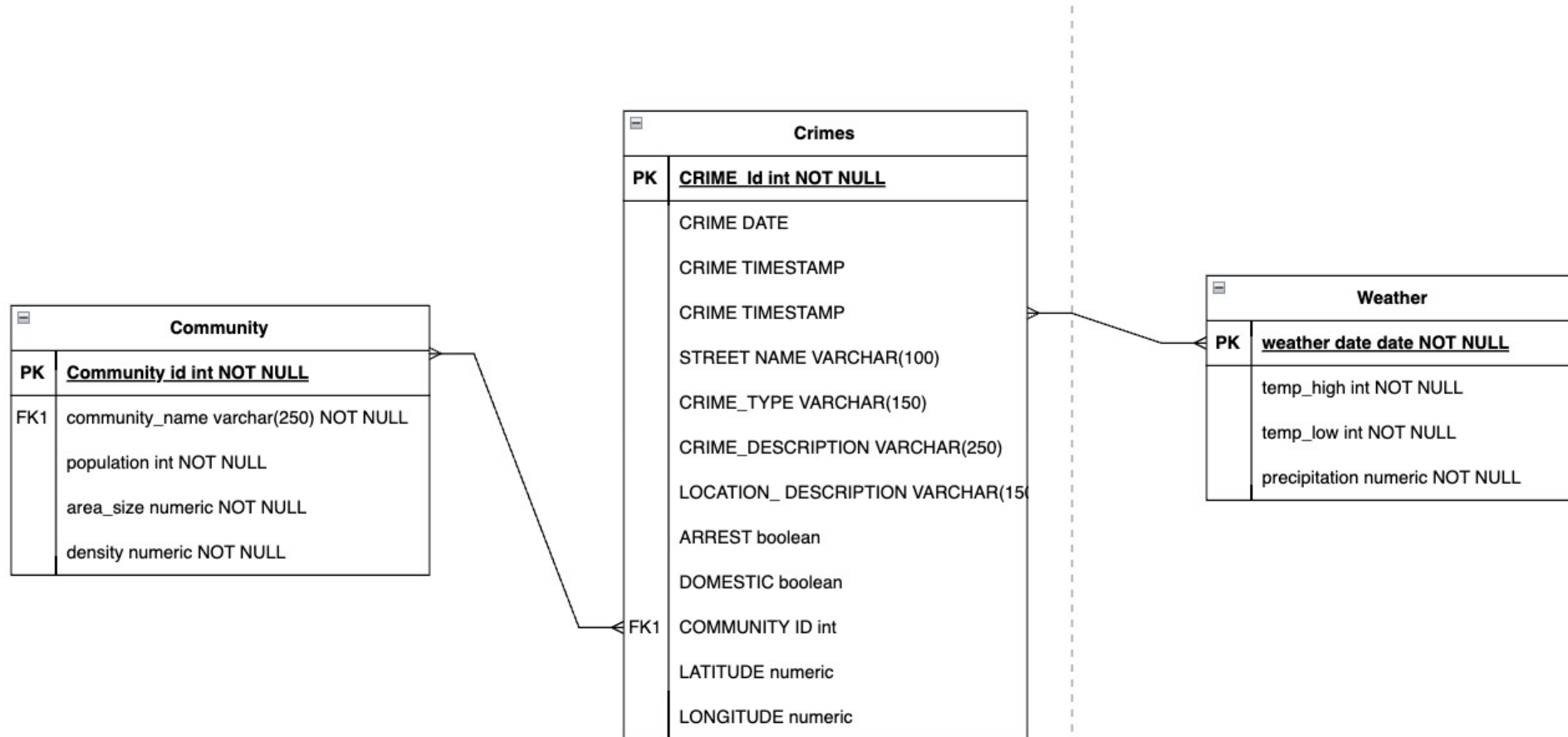
Dataset Used

**1) chicago_areas.csv:
Chicago neighbours and
areas**

**2)
chicago_crimes_2021.csv:
Reported crimes in 2021**

**3)
chicago_temps_2021.csv:
Average city temperature**

ER Diagram



Alteryx Designer x64 - New Workflow1_Autosave*

File Edit View Options Help

Search for tools, help, and resources...

Favorites Recommended In/Out Preparation Join Parse Transform In-Database Reporting Documentation Spatial Machine Learning Text Mining Computer Vision Interface Data Investigation

Browse Input Data Output Data Text Input Data Cleansing Filter Formula Sample Select Sort Join Union Text To Columns Summarize Comment

New Workflow1_Autosave* x + Run

chicago_temps_2021.csv

Convert date From: MM/dd/yyyy

weather_date - Ascending

chicago_crimes_2021_new.csv

Not IsNull ((latitude))

Convert crime_date From: MM-dd-yy

Convert crime_time From: HH:mm:ss

crime_date - Ascending

crime_time - Ascending

chicago_areas.csv

final_data.csv

Results - Workflow - Messages

All 0 Errors 0 Conv Errors 0 Warnings 6 Info 4 Files Last Run Configuration

Designer x64 The Designer x64 reported: This is AMP Engine; running 12 worker threads; memory limit 5426.0 MB.

Input Data (3) 77 records were read from "C:\Users\Darshil\Downloads\chicago_areas.csv"

Input Data (1) 365 records were read from "C:\Users\Darshil\Downloads\chicago_temps_2021.csv"

Input Data (2) 82088 records were read from "C:\Users\Darshil\Downloads\chicago_crimes_2021_new.csv"

Data Cleansing (5) 0 null rows were removed.

Filter (7) 81529 records were True and 559 were False

Join (23) 81529 records were joined with 221 un-joined left records and 0 un-joined right records

Join (24) 81529 records were joined with 0 un-joined left records and 0 un-joined right records

Output Data (25) 81529 records were written to "C:\Users\Darshil\Downloads\final_data.csv"

Designer x64 Finished running in 1.4 seconds using AMP engine.

51°F Rain 22:09 03-05-2023

Alteryx

MongoDB

- Imported data set with 81529 records to mongoDB
- Database name-ChicagoCrime
- Collection name- Final

ChicagoCrime.Final

Documents Aggregations Schema Explain Plan Indexes Validation

Filter Type a query: { field: 'value' } Reset Filter

ADD DATA EXPORT COLLECTION 1 - 20 of 81529

```
{
  "_id": ObjectId('644fdd303d6768f31316d701'),
  "Crime_id": 863,
  "Crime_date": "1/1/21",
  "Crime_date_time": 2021-01-01T05:00:00.000+00:00,
  "temp_high": 35,
  "temp_low": 19,
  "avg_temp": 27,
  "precipitation": 0.38,
  "city_block": "broadway",
  "crime_type": "deceptive practice",
  "crime_description": "financial identity theft over $ 300",
  "crime_location": "bar or tavern",
  "arrest": false,
  "domestic": false,
  "community_id": 77,
  "latitude": 41.99502563,
  "longitude": -87.66042042,
  "area_name": "edgewater",
  "population": 56296,
  "area_sq_mi": 1.74
}
```

```
{
  "_id": ObjectId('644fdd303d6768f31316d702'),
  "Crime_id": 864,
  "Crime_date": "1/1/21",
  "Crime_date_time": 2021-01-01T11:30:00.000+00:00,
  "temp_high": 35,
  "temp_low": 19,
  "avg_temp": 27,
  "precipitation": 0.38,
  "city_block": "ashland ave",
  "crime_type": "deceptive practice"
}
```

What is the count of Homicides, Battery and Assaults reported?

```
>_MONGOSH
> db.Final.aggregate([
  { $match: { crime_type: { $in: ["homicide", "battery", "assault"] } } },
  { $group: { _id: "$crime_type", n_crimes: { $sum: 1 } } },
  { $sort: { n_crimes: -1 } }
])
< {
  _id: 'battery',
  n_crimes: 16039
}
{
  _id: 'assault',
  n_crimes: 8138
}
{
  _id: 'homicide',
  n_crimes: 321
}
```



```
>_MONGOSH
> db.Final.aggregate([
  {$group: {_id: "$community_id", count: {$sum: 1}, community_name: {$first: "$area_name"}, population: {$first: "$population"}},
  {$sort: {count: -1}},
  {$limit: 10},
  {$project: {_id: 0, community_name: 1, population: 1}}
])
< {
  community_name: 'austin',
  population: 96557
}
{
  community_name: 'near north side',
  population: 105481
}
{
  community_name: 'south shore',
  population: 53971
}
{
  community_name: 'near west side',
  population: 67881
}
{
  community_name: 'north lawndale',
  population: 34794
}
{
  community_name: 'auburn gresham',
  population: 44878
}
{
  community_name: 'humboldt park',
  population: 31471
}
{
  community_name: 'greater grand crossing',
  population: 31710
}
{
  community_name: 'chatham',
  population: 31710
}
{
```

What are the ten areas that had the most crimes reported?

Query

```
>_MONGOSH
> db.Final.aggregate([
  {
    $group: {
      _id: { $dayOfWeek: "$Crime_date" },
      count: { $sum: 1 }
    }
  },
  {
    $sort: { _id: 1 }
  },
  {
    $project: {
      weekday: {
        $switch: {
          branches: [
            { case: { $eq: [ "$_id", 1 ] }, then: "Sunday" },
            { case: { $eq: [ "$_id", 2 ] }, then: "Monday" },
            { case: { $eq: [ "$_id", 3 ] }, then: "Tuesday" },
            { case: { $eq: [ "$_id", 4 ] }, then: "Wednesday" },
            { case: { $eq: [ "$_id", 5 ] }, then: "Thursday" },
            { case: { $eq: [ "$_id", 6 ] }, then: "Friday" },
            { case: { $eq: [ "$_id", 7 ] }, then: "Saturday" },
          ],
          default: "Unknown"
        }
      },
      count: 1,
      _id: 0
    }
  }
])
```

Output

```
< {
  count: 11779,
  weekday: 'Sunday'
}
{
  count: 11301,
  weekday: 'Monday'
}
{
  count: 11315,
  weekday: 'Tuesday'
}
{
  count: 11336,
  weekday: 'Wednesday'
}
{
  count: 11800,
  weekday: 'Thursday'
}
{
  count: 12803,
  weekday: 'Friday'
}
{
  count: 11195,
  weekday: 'Saturday'
}
```

What weekday were most crimes committed?

Query

```
> db.Final.aggregate([
  {
    $match: {
      crime_type: "homicide"
    }
  },
  {
    $group: {
      _id: {
        month: { $month: "$Crime_date" }
      },
      count: { $sum: 1 },
      avg_temp: { $avg: "$avg_temp" },
      median_temp: { $push: "$avg_temp" }
    }
  },
  {
    $sort: { count: 1 }
  },
  {
    $project: {
      _id: 0,
      month: {
        $let: {
          vars: {
            monthsInStrings: [
              null,
              "January", "February", "March",
              "April", "May", "June",
              "July", "August", "September",
              "October", "November", "December"
            ]
          }
        }
      }
    }
  }
])
```

```
{
  "month": "January",
  "count": 31,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "February",
  "count": 29,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "March",
  "count": 29,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "April",
  "count": 27,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "May",
  "count": 32,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "June",
  "count": 21,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "July",
  "count": 29,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "August",
  "count": 27,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "September",
  "count": 29,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "October",
  "count": 27,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "November",
  "count": 29,
  "avg_temp": 27,
  "median_temp": 27
},
{
  "month": "December",
  "count": 24,
  "avg_temp": 27,
  "median_temp": 27
}
```

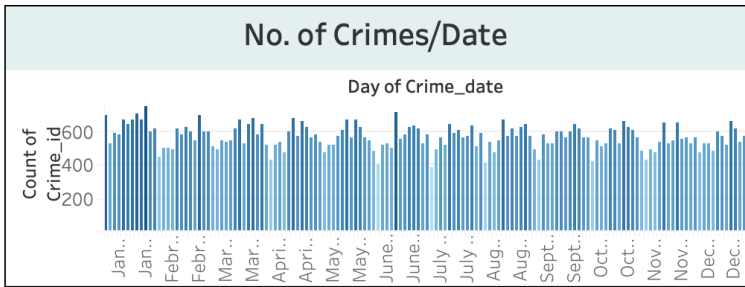
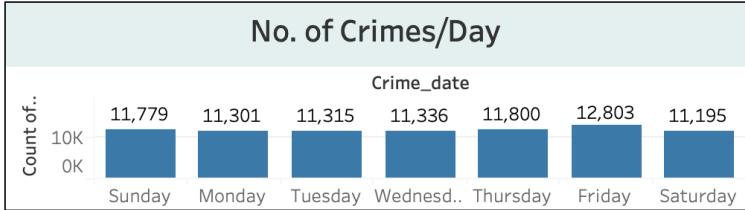
Output

```
{
  "count": 31,
  "avg_temp": 27,
  "month": "February",
  "median_temp": 27
},
{
  "count": 32,
  "avg_temp": 27,
  "month": "May",
  "median_temp": 27
},
{
  "count": 29,
  "avg_temp": 27,
  "month": "November",
  "median_temp": 27
},
{
  "count": 29,
  "avg_temp": 27,
  "month": "July",
  "median_temp": 27
},
{
  "count": 29,
  "avg_temp": 27,
  "month": "September",
  "median_temp": 27
},
{
  "count": 27,
  "avg_temp": 27,
  "month": "October",
  "median_temp": 27
},
{
  "count": 27,
  "avg_temp": 27,
  "month": "August",
  "median_temp": 27
},
{
  "count": 27,
  "avg_temp": 27,
  "month": "April",
  "median_temp": 27
},
{
  "count": 24,
  "avg_temp": 27,
  "month": "December",
  "median_temp": 27
},
{
  "count": 21,
  "avg_temp": 27,
  "month": "June",
  "median_temp": 27
},
{
  "count": 23,
  "avg_temp": 27,
  "month": "March",
  "median_temp": 27
}
```

What month had the most homicides and what was the average and median temperature?



Crime Stats & Geography



Total Number of Crimes / Month

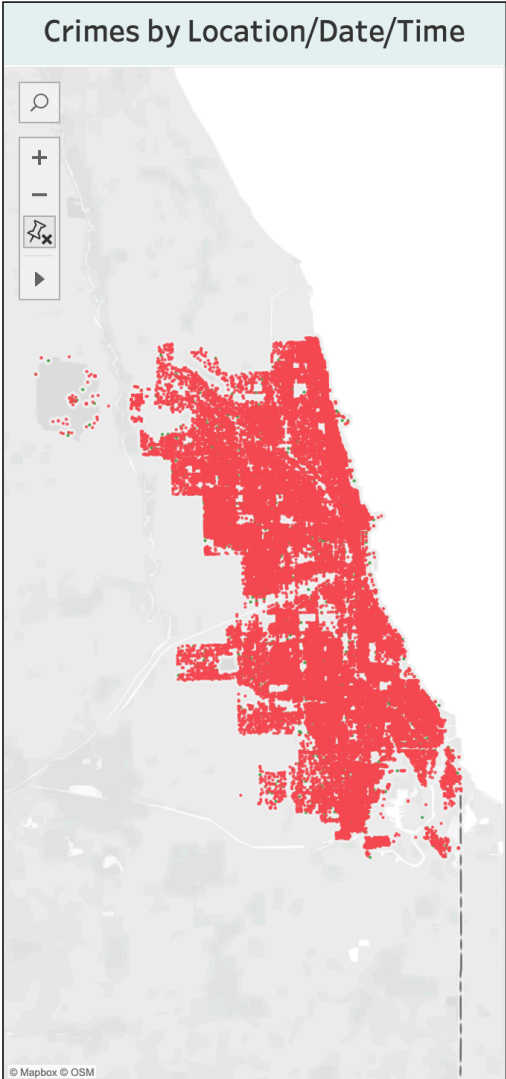
Crime_date	Count
January	7,674
February	6,783
March	6,962
April	6,737
May	6,814
June	6,655
July	6,613
August	6,802

Arrest (%) / Month

Crime_date	Arrest (%)
January	11.233
February	12.281
March	12.381
April	13.344
May	12.709
June	12.126
July	11.402
August	12.126

Total Number of Arrest / Month

Crime_date	Count
January	7,674
February	6,783
March	6,962
April	6,737
May	6,814
June	6,655
July	6,613
August	6,802



Crime Point Location
 (All) [v]

Crime Street
 (All) [v]

Crime Area
 (All) [v]

Crime Type
 (All) [v]

Crimes by Hours
 (All) [v] [range]

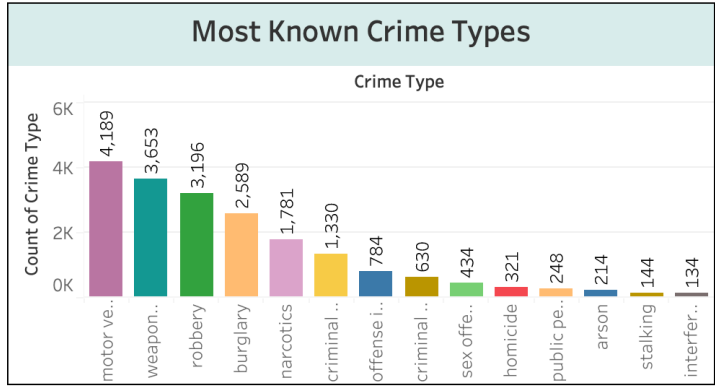
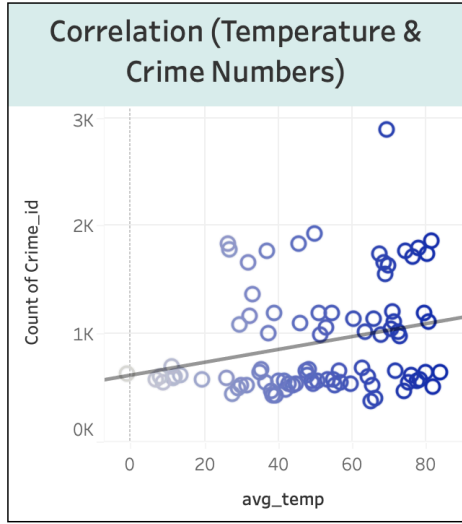
Crimes by Date
 January 1, December [range]

Arrest
 (All)
 False
 True

Domestic
 (All)
 False
 True

Tableau

Correlation & Most Knowns



avg_temp

-1.00 84.00

Count of Crime_id

96 4,706

Count of Crime Type

2 16,039

Count of Crime Point Loc..

0 20,740

Crime Street

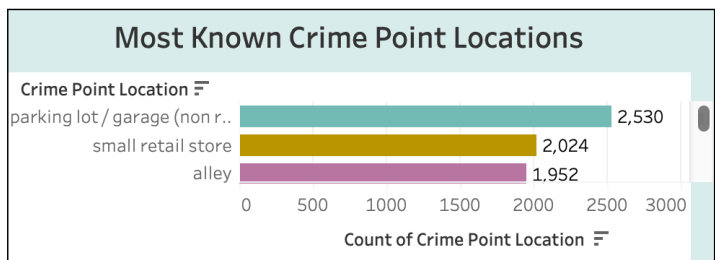
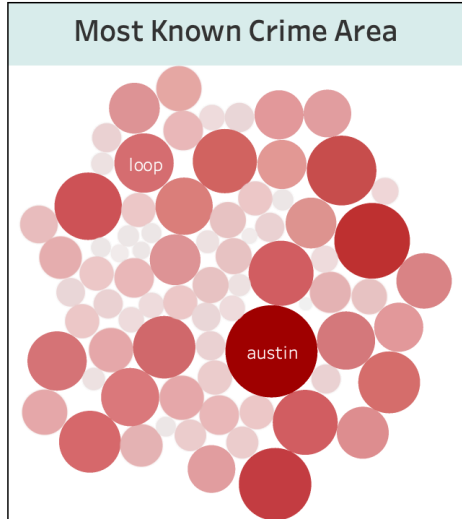
(All)

Area_Name

(All)

No. of Crime/Area_Name

96 4,706



Tableau

Conclusion

From the above queries and all the execution, we have understood the following points:

- The crimes that were reported in Chicago was a total of 82,088 in just one year, 2021. Chicago is a hub for multiple sorts of crimes out of which burglary, homicide, and assaults were the highest committed ones.
- The high-risk community is seen as Austin whereas the highest-risk street is Michigan Ave. Due to this, we can conclude that people should stop choosing these two areas as a place to live and police vigilance should be increased to try and avoid future crimes. Security cameras and other safety measures also could be improved and added.
- The month of January shows the highest number of crimes reported, which we can also conclude by saying the weather is not causing any effect on the rate of crimes reported.

By all this, we can clearly understand that the harsh weather of Chicago could not beat the harsh hearts of the criminals, and hence the highest number of crimes can be seen reported in the open and on the streets.

THANK YOU!

