EECE5642 Data Visualization HW1

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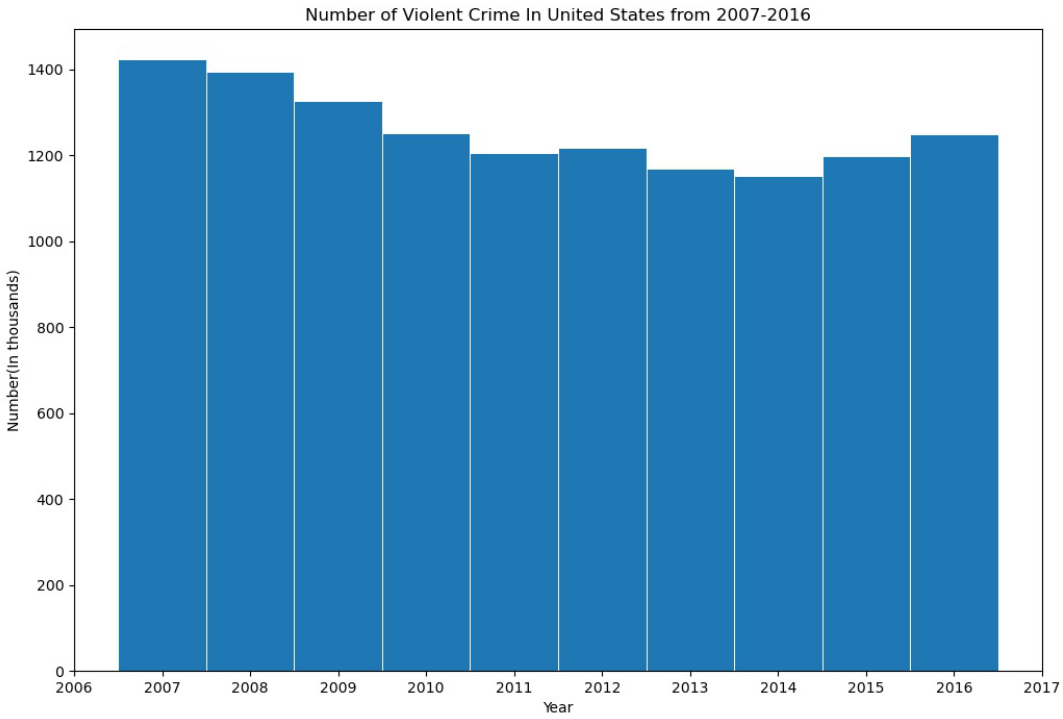
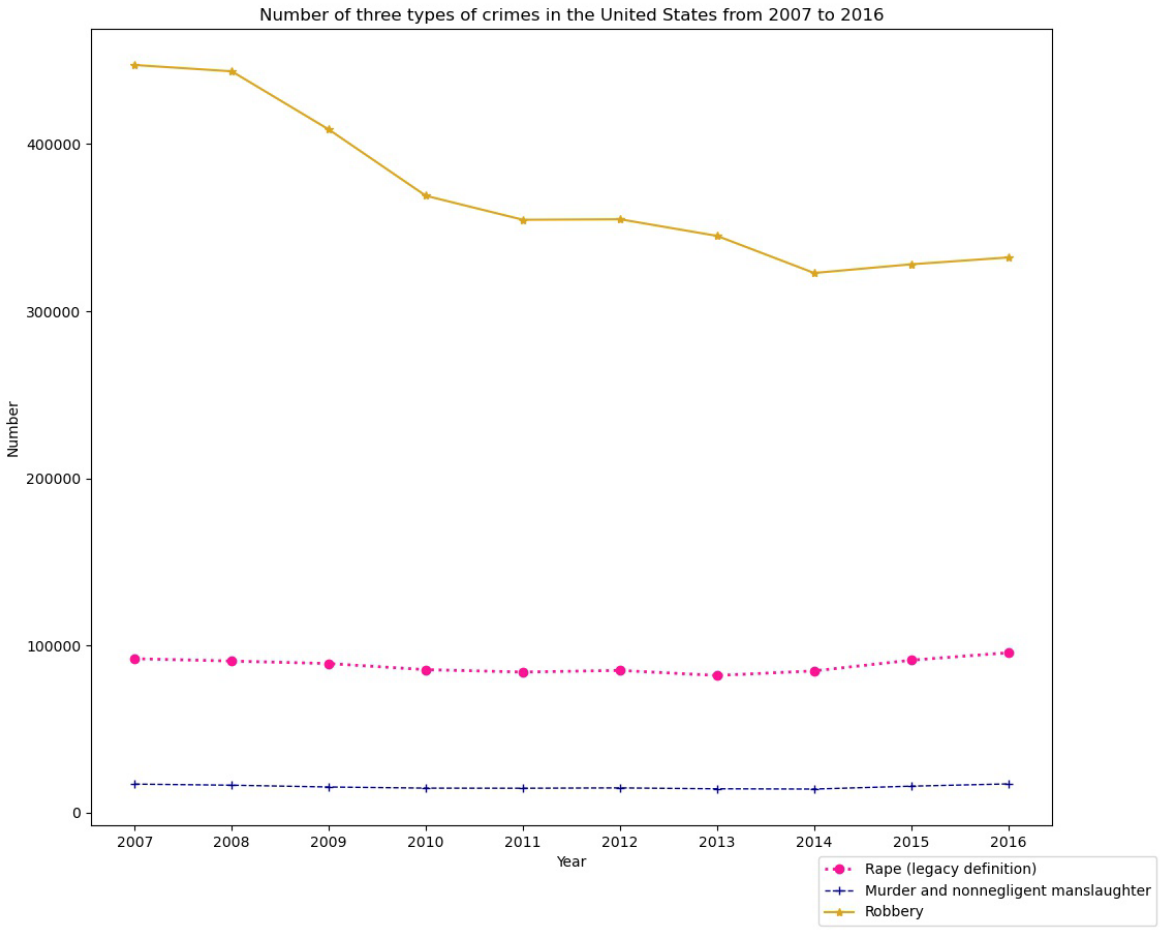
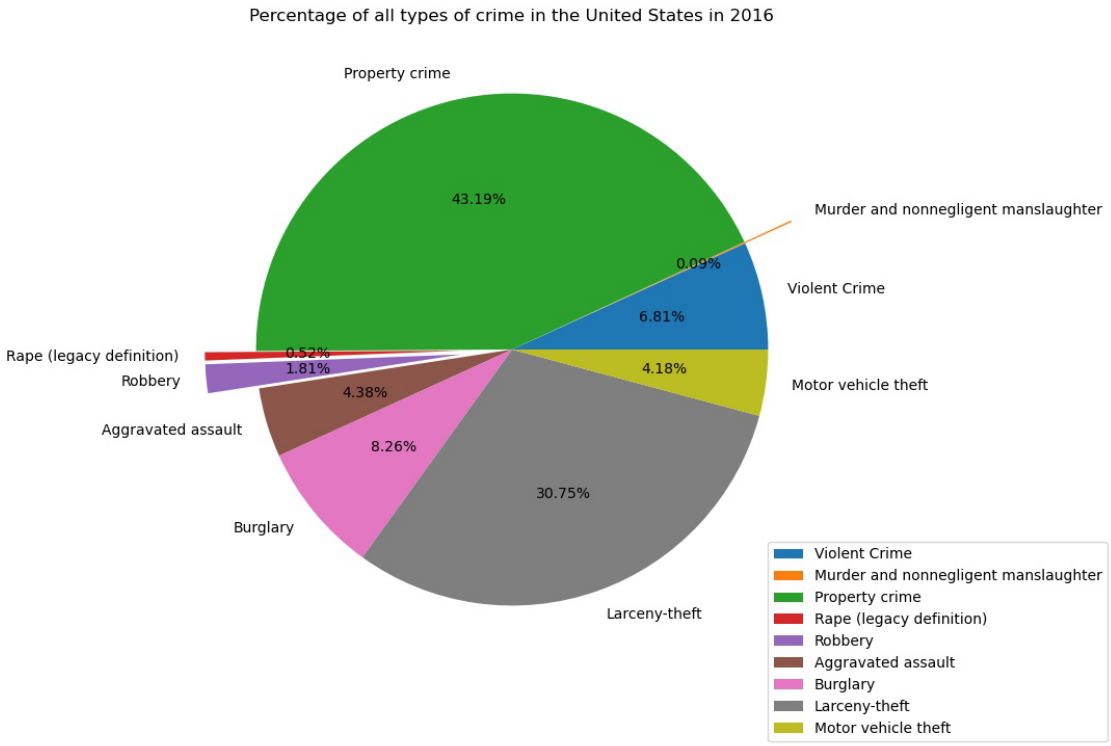
1.Visualization Design



In this chart, I select violent crime data from 2007 to 2016. Then based on these data, I create a bar chart. We can see from the chart that the overall number of violent crimes is on a downward trend. When I select the data, I did not notice that the difference between data is small. So, the difference between different bar is hard to see.



In this chart, I select the number of rape (legacy definition), murder and nonnegligent manslaughter and robbery from 2007 to 2016. The number of robberies is much higher every year compared to rape and murder and nonnegligent manslaughter cases. The ten-year trend shows that the number of robberies decreases year by year, but the number of rapes and murder and nonnegligent manslaughter remains largely stable.



In this chart, I selected the number of crimes in 2016 and plotted them as a pie chart. In pie chart, it is easy to see the percentage of each member. As the figure shows, the property crime accounted for the highest percentage of all crimes in 2016, at 43.19%. Correspondingly,), murder and nonnegligent manslaughter had the lowest percentage of all crimes in 2016, at 0.09%.

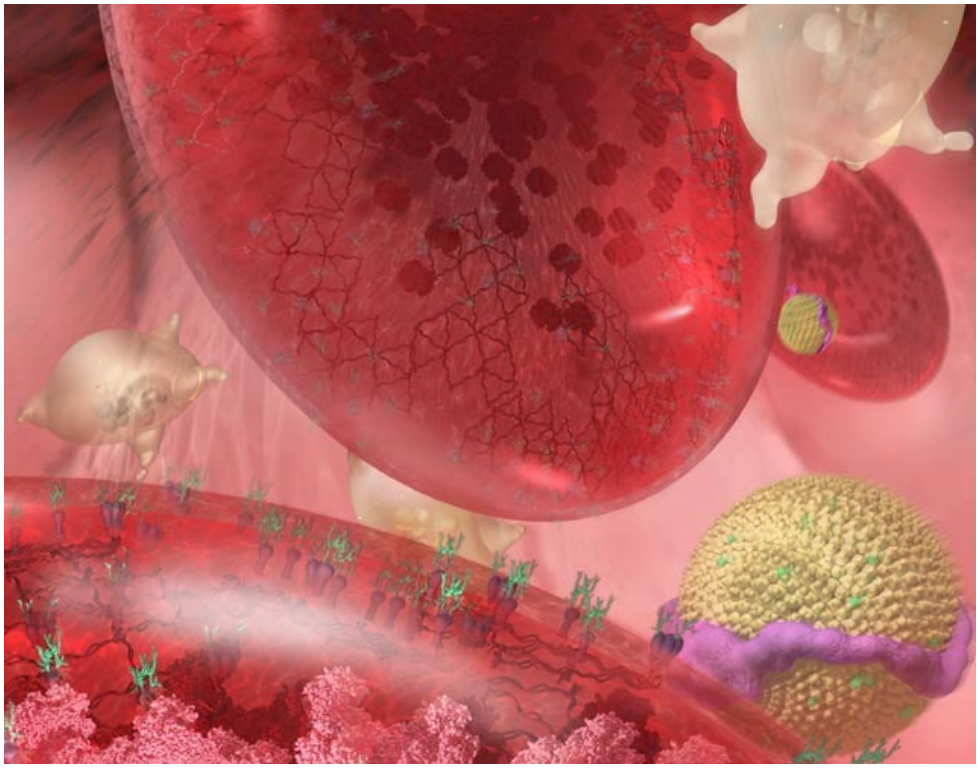
Analysis:

Dataset:

Crime in the United States by Volume and Rate per 100,000 Inhabitants, 1997–2016

1. For this dataset, it shows the crime in the United States from 1997-2016. I think the goal of this dataset is demonstrate the crime distribution in every year and the crime trend from 1997 to 2016.
2. The dataset has 22 dimensions. They are Year, Population, Violent crime, Violent crime rate, Murder and nonnegligent manslaughter, Murder and nonnegligent manslaughter rate, Rape (revised definition), Rape (revised definition) rate, Rape (legacy definition), Rape (legacy definition) rate, Robbery, Robbery rate, Aggravated assault, Aggravated assault rate, Property crime, Property crime rate, Burglary, Burglary rate, Larceny-theft, Larceny-theft rate, Motor vehicle theft, Motor vehicle theft rate. All these data are in number. The format of this dataset is a XLS file.
3. My visualizations show:
   In Fig.1, the trend of violent crime was going down from 2007 to 2016.
   In Fig.3, compared with the number of rape and murder, the number of robbery significant decline.
   In Fig.3, in 2016, most common crime is the property crime. The rarest crime is the murder and nonnegligent manslaughter.
4. I think the pie chart and line chart are good. They can show what I want. For line chart, I want to see the trend of specific crime. It shows that trend to me directly. For pie chart, I want to find the distribution of crime in a specific year. But for the bar chart, I don't think it had the effect I wanted. The number of violent crimes in several years are very similar. The data distribution is dense over several years. So, we can not see the difference between several years. Maybe I should use violent crime rate for this chart.
5. I think I should use more quantitative data rather than raw data. The readability of the raw data is relatively poor. If transform it to quantitative data, the trend is protected and readability is improved.

2.Visualization Critique



1. The audience in museums.
2. Data Variation and Design Variation. As the author said, Something very large can appear small because it's on the horizon, and something very small can appear large because it's in the foreground. She used different scale to show the interactions between the macro and micro.
3. Although I can't understand the meaning of each part of the picture, I like this picture. I think it correctly and in detail represents the composition of the blood. The contrast of the images is appropriate, using generally accepted colors on different elements. It is well known that the various components of blood vessels are small. If presented at normal size, we may not be able to see anything. This enlarged data representation avoids this problem very well.
4. I imagined that I was already in the veins. Just like Alice in Wonderland, I was very small and had all kinds of cellular fluid flowing past me in my veins. In addition, some other colors are used to represent other parts of the blood flow.
5. I think the use of color in the chart makes sense. When you think of blood vessels, the first thing that comes to everyone's mind is red.
6. I think this image should be illustrated with some legends, so that it can be easily read by laymen. In addition to that, I think the images should include a scale to give the observer a deep appreciation of the dimensions of the components in the image.

3. 2D Convolution

8	8	6	-2	3	3
8	8	6	-2	3	3
1	1	6	4	5	5
3	3	2	-4	11	11
10	10	-1	7	1	1
10	10	-1	7	1	1

After Padding

61	68	46	45
38	8	22	119
55	30	67	5
76	75	2	67

Result

1,1: -2*8+3*8+-1*6+4*8+-1*8+2*6+0*1+5*1+3*6=61

1,2: -2*8+3*6+-1*-2+4*8+-1*6+2*-2+0*1+5*6+3*4=68

1,3: -2*6+3*-2+-1*3+4*6+-1*-2+2*3+0*6+5*4+3*5=46

1,4: -2*-2+3*3+-1*3+4*-2+-1*3+2*3+0*4+5*5+3*5=45

2,1: -2*8+3*8+-1*6+4*1+-1*1+2*6+0*3+5*3+3*2=38

2,2: -2*8+3*6+-1*-2+4*1+-1*6+2*4+0*3+5*2+3*-4=8

2,3: -2*6+3*-2+-1*3+4*6+-1*4+2*5+0*2+5*-4+3*11=22

2,4: -2*-2+3*3+-1*3+4*4+-1*5+2*5+0*-4+5*11+3*11=119

3,1: -2*1+3*1+-1*6+4*3+-1*3+2*2+0*10+5*10+3*-1=55

3,2: -2*1+3*6+-1*4+4*3+-1*2+2*-4+0*10+5*-1+3*7=30

3,3: -2*6+3*4+-1*5+4*2-1*-4+2*11+0*-1+5*7+3*1=67

3,4: -2*4+3*5+-1*5+4*-4+-1*11+2*11+0*7+5*1+3*1=5

4,1: -2*3+3*3+-1*2+4*10+-1*10+2*-1+0*10+5*10+3*-1=76

4,2: -2*3+3*2+-1*-4+4*10+-1*-1+2*7+0*10+5*-1+3*7=75

4,3: -2*2+3*-4+-1*11+4*-1+-1*7+2*1+0*-1+5*7+3*1=2

4,4: -2*-4+3*11+-1*11+4*7+-1*1+2*1+0*7+5*1+3*1=67

4. Comments and Suggestions on the Course

I found that our professor is highly ranked on CSRanking. I'm sure he has a lot of experience in writing papers. I was curious about how the beautiful illustrations in thesis writing were drawn. It would be great if we could cover this in our courses.