

InfoVis Lab 2.

Task 1. (Perception in Visualization)

1.

Preattentive processing is perception which is done very fast (200 - 250 ms) and requires little effort by the user. Examples of this are distinguishing color, size, closure, etc. To create a good visual environment one should distinguish different attributes of data using characteristics that can be perceived using preattentive processing.

2.

A strategy that could be used is to distinguish two different groups of data using two different colors, sizes, varying closures etc. since these are processed preattentively. Color is favored over shape when it comes to boundary detection.

3.

When a visual environment changes humans have a hard time perceiving the change unless they are guided. In a visualization this might affect analysis if for example there is a plot where the user can filter data and the change when filtering is not guided in any way or does not use properties of preattentive processing. For example if the user switches from one data group to another in a plot and nothing about the plot changes, it has the same colors, shapes etc, then it will be very hard for the user to perform any type of analysis on the data.

4.

Motion is commonly used in for example, particle visualization or fluid flow visualization. The three properties brought up in the paper were flicker, direction of motion and velocity of motion.

I think the most useful property depends a bit on the type of motion. If the flicker is of a high frequency and the velocity of motion is low then the flicker is the easiest to detect. If it's the other way then velocity of motion could be the more useful one.

Task 2. (Optical Illusion)

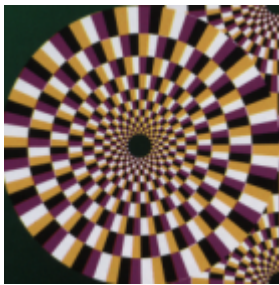
1.

The circles are centered around a central point but our mind perceives them as uneven since there are many diagonal lines which makes our preattentive processing perceive them as “twisted” in the direction of the lines. Closure is also implicit in this image since our mind wants to close the pattern we perceive the black and white lines going “behind” the lines.

2.

The left one looks bigger. This is due to grouping and relative size.

3.



If you look at the top of each circle you see that half of them have white/orange to the left and purple/black to the right. Since color and curvature are attributes of preattentive processing they are perceived in parallel for all shapes in the image, so when you focus on one circle, you adjust the other circles to have the colors line up to the one you're focusing on.

Task 3 (scatter-plot implementation)

Our scatter-plot implementation was done using Python and tkinter[1]. The implementation is straightforward and all code is written inside a class called Application. The program satisfies the basic requirements for the task.

We read the CSV file using built-in python CSV reader functions. When loading a new dataset we clear the entire canvas and re-render everything. In a practical sense that isn't very performant. But for this simple program where the data is relatively small this solution works.

References

[1] <https://docs.python.org/3/library/tkinter.html> Tkinter, a simple gui library for Python