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Assignment 1

(Due: 07.11.2022)

Task 1 Characterizations of Visualization Disciplines

- Information Visualization refers to the representation of abstract data in a graphical format so that it is easy to make out overall meaning and possibly derive conclusions which otherwise may not be so clear in the raw data.
  An example of information visualization can be annual reports of profits and losses in a business. In these cases spatial layout has to be chosen.
  In case of scientific visualization, spatial layout is given. It is mainly scientific data from natural sciences where some sort of physical component of representation is already present. Example of scientific data can be 3D medical images or molecule rendering of protein data.

Task 2 Motivation of Information Visualization

- VELOCITY means rate of flow of data: Information Visualization in form of live dashboard can represent real-time data generated from air or road traffic.
  VOLUME means size of dataset: The computation involved in information visualization can handle large dataset to represent it in a defined scale.
  VARIETY means data from multiple sources and domains: Different variety of data can be represented by using the available diagram models like Heat Maps, Symbol Maps, Word Clouds, Network Models.
  VERACITY means metadata, context and management of collected data: The computation process can be trained to identify context of incoming data. An example includes sentiment analysis for tweets posted on Twitter.

Task 3 Historical Visualization in Epidemiology

- Rose Diagram and Polar Area Diagram by Florence Nightingale in 1885 was the beginning of usage of statistics in a graphical way to showcase epidemiological data. The graphical representation indeed helped to point out that main cause of death in times of war was rather related to poor sanitation.
  The three different data attributes were death caused from preventable diseases, death from wounds and death from all other sources.
  These data attributes were represented month wise in form of wedges from the centre as common vortex. The blue part of the wedges measured death from preventable diseases, the red part measured death from wounds and the black area of wedges measured death from all other causes.
  This polar chart has a radial layout like the pie chart chart we have today. However, each wedge in the polar chart is equal-angled unlike in pie chart and the size of each wedge represents the quantitative value and is mapped like radial bar chart.

Task 4 Climate Change Data: Global Warming

(a) Temperature Anomalies Evolution over Years

i. Impl

ii. The height of each bar in the vertical Bar Chart indicates the temperature over a period of time. Both negative and positive temperatures can be easily visualized on X-axis using vertical bar chart. The blue bars indicate cold temperatures and red bars indicate hot temperatures.

iii. Two ways to improve visualization: 1. add the labels for X and Y axis 2. indicate what the blue and red color bars indicate by inserting a color box on the graph

(b) Warming Stripes

i. Impl

ii. Warming stripes are visually better to comprehend temperature change as the color switch between blue and red in a along same length of bars look uniform and proportionate.

iii. The bar seems to be too condensed. Each bar width can be increased so that temperature change with time can be visualized better.