Visual Analytics Exercises: Week 1

In this first tutorial, we will do two exercises in groups.

Exercise 1

Warm-up for whole class. For each of the following variables, define its type and identify any unusual features that might make its visualisation or analysis challenging:

1. Email address
2. Date of birth
3. Cruising speed of an airplane
4. Hurricane force scale (Saffir-Simpson https://www.nhc.noaa.gov/aboutsshws.php#:~:text=The%20Saffir%2DSimpson%20Hurricane%20Wind,scale%20estimates%20potential%20property%20damage.&text=In%20the%20western%20North%20Pacific,sustained%20winds%20exceeding%20150%20mph.)
5. Bank balance
6. Country
7. MSc grades (Pass, Merit, Distinction)

Exercise 2

In your groups consider one of the following scenarios for time series data:

- Scenario 1: sample every 1/100th of a second (100Hz), duration 1 day, 1 thing.
  - Example: ECG recording
- Scenario 2: sample every 5 minutes, duration 1 year, 2 things.
  - Example: Currency exchange rates: British pound against US dollar; British pound against euro.
- Scenario 3: sample every 5 minutes, duration 1 year, 10 things.
  - Example: Many currency exchange rates
- Scenario 4: sample every 5 minutes, duration 1 year, 1000 things.
  - Example: CPU load across 1000 machines
- Scenario 5: sampling frequency varying from 100Hz to every minute, duration 1 day, 5 things.
  - Example: Health monitoring in hospital ward.

Your group has ~20 minutes to brainstorm possible strategies for visualization that you think would be appropriate for your assigned scenario. Both static charts and interactive strategies are worth thinking about. You'll be reporting back to the large group afterwards, so decide in advance which person will speak for the group.

Document your discussion in your group's shared document, as you go. Words are quick to type. You should also make sketches to communicate your ideas, whenever words alone aren't enough. You can sketch on paper and take a picture with your phone camera, or use a drawing program on a tablet or laptop – whatever is quick and easy – and upload those images into your shared document.

Exercise 3

In this exercise you will identify the types of datasets and attributes. These datasets are taken from the Office of National Statistics website but are more immediately accessible from the Blackboard page as attachments.

- Estimates of completed international visits to and from the UK for on month https://www.ons.gov.uk/peoplepopulationandcommunity/leisureandtourism/datasets/monthlyoverseastravelandtourismreferencetables
- Travelpac Quarterly data on travel to and from the UK, taken from the International Passenger Survey (IPS). Includes detail on age and sex of travellers, purpose and length of trip, and spending. https://www.ons.gov.uk/peoplepopulationandcommunity/leisureandtourism/datasets/travelpac

NSA = 'non-seasonally adjusted': why do you think that seasonal adjustment is important for travel statistics?

For each field

- Analyze the attribute abstractions:
    - write down a concise description in domain-dependent language of field's meaning
    - decide the attribute type and write that down
- Determine its cardinality/range
    - For categorical attributes, write down the number of unique levels
    - For quantitative attributes, specify the range from min to max and note any other characterization that seems potentially useful (cyclic? Anything else?)
    - For ordered attributes, consider whether it would be more useful to treat them categorical or quantitative, or to preserve them as ordered.

Write down your discussions in the shared document.