Milestone 2, COM-480 Data Visualization

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Contents

1 Two different axes

As we explained in the first milestone, we think that two axes are interesting with this dataset; the results axis and the physique axis. The result axis would allow the comparison over time of country-based features, such as the number of won medals or the delegation size. The physique axis would also be a comparison, but between the average athletes body for a given sport or discipline. It would also allow the visualization of the evolution of the body characteristics over time.

Because we found both axes worth to be developed, we decided to include both in this milestone. However, as we consider the physique visualization to be our main one, we will spend more time developing it. We may include a more or less simplified version of the other visualization depending on the amount of time we have left.

The different pieces to implement are described in the two sections below.

2 Physique axis

The basic functionalities of this visualization are the following:

- Compare the average body type between different disciplines.

- Visualise the evolution of the physique over time for a given discipline.

2.1 Visualization sketch

The figure 1 shows a sketch of what the visualization would look like. We can distinguish two different areas:

- Top area; Description of the physical features of the selected discipline.

  On the left, we can visualize the average body of an athlete that would compete in that discipline. The average body is the average of all athletes that have competed in that discipline over the 5 last years[1].

  On the right, we can visualize the evolution of the average body for that discipline over time. The value corresponding to a given year is the average of all athletes that competed during that year.

  It is also possible to add the selected discipline to the grid with the help of a button.

- Bottom area; *Small multiple* to compare the average body of several disciplines (as it is represented in the top left part).

  This part allow to visualize in a glance the difference of physiques between the selected disciplines. It is possible to plot the female or male version and to sort the disciplines respective to a single feature.

  Selecting a discipline in the grid will also plot it in the top part.

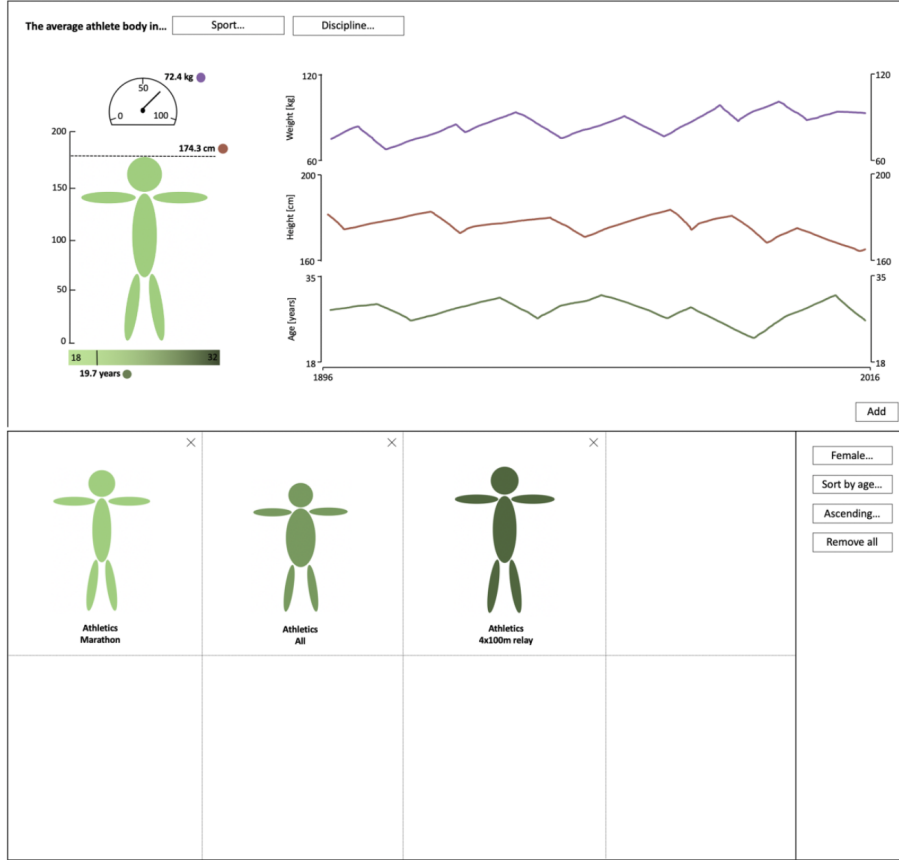[1]Several values will be tested, but this gives a rough approximation

Figure 1: A first draft of the physique visualization.

2.2 Representation of physical features

A main challenge is the representation of the physical features we want to visualize: the height, the weight and the age of an athlete. Our idea is the use a person-like icon made of five ellipsis, one for each part of the body. The physical features can then be expressed with:

- **Height: scaling.** We scale the whole person to the right height.

- **Weight: central ellipsis width**. We change the width of the central ellipsis, the larger the weight the larger the ellipsis would be. All the other ellipsis remained unchanged in size (but may change in position - to keep distances between ellipsis constant).

- **Age: lightness** The oldest the person, the darker it will appear.

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Note that with this system, a taller person will also have a larger body in absolute value, but it matches the reality. The advantage of the representation system is that it is effective - we can easily spot the differences in the *small multiple* part - while it remains not so complex to implement.

2.3 Further developments

We also thought about ideas that could improve the visualization:

- Having two different body types for male and female, or design a more unisex body type.

- Let the user choose the time window of the average. It will allow to visually compare the average body for a same discipline between several time periods.

- Add the possibility to plots different pre-chosen set of disciplines in the *small multiple*: disciplines chosen at random, disciplines with the tallest athletes, etc.

3 Results axis

The basic functionalities of this visualization are the following:

- Compare countries/continents performances by means of their medal count, attendance and size of delegation.

- Visualise the evolution of these results over time.

3.1 Visualization

3.1.1 Bubble Graph

We seek to implement this visualization in two parts that complement each other in this part.
First we start by presenting an overall view of the results by means of a bubble chart. We provide a settings menu for this bubble chart where users can define what is represented, this includes:

- Should bubbles represent countries or continents;

- What the bubble size represent (both overall or by discipline) :

  - Total Medals
  - Most medals in one participation
  - Participation Count
  - Max Delegation Size

The actual disposition of the bubbles will be random at first, like in the figure. Our ideal implementation would dispose said bubbles in a world map, so users may have geographical in formation. Of course this feature would take more time and we will only approach this if we feel we have the time to do so.

3.1.2   Graph over time

Our second part would be a way to have a view of the evolution in function of time. We would achieve this by implementing a dynamic graph which adapts to the bubble graph. On the y-axis we have the values represented in the bubble graph and in the x-axis we have years. For example:

- Medal count (both total or most medals) :
  For each year we show the medal count (both winter and summer Olympics). A bar chart would be the most appropriate in this case

- Participation Count :
  Each year contributes to the curve if there is participation, meaning the curve is growing in time. A simple curve graph would be appropriate in this case

- Max Delegation size :
  For each year we show the Delegation count, by discipline or overall. A bar chart would be the most appropriate in this case

3.2   Manipulating the visualization

We wish the user is able to add **at most** 4 different countries/continents to the graph over time. This will allow for a direct comparison of at most 4 objects. To do so the user may click on a chosen bubble in the bubble chart and drag it to a specified location around the graph. We acknowledge that some bubbles may be very small and very hard to click on, for this reason there will also be a way for the user to look for a specific continent or country by the means of a simple search field. We show you a simple handmade sketch of this visualization in 2.

4   Lectures and tools

The lectures that will be useful for our visualizations will be the two on D3.js (i.e. D3.js and More interactive D3.js) as well as the one on graphs. We will also probably reuse some D3.js code that can be found on websites such as [1].
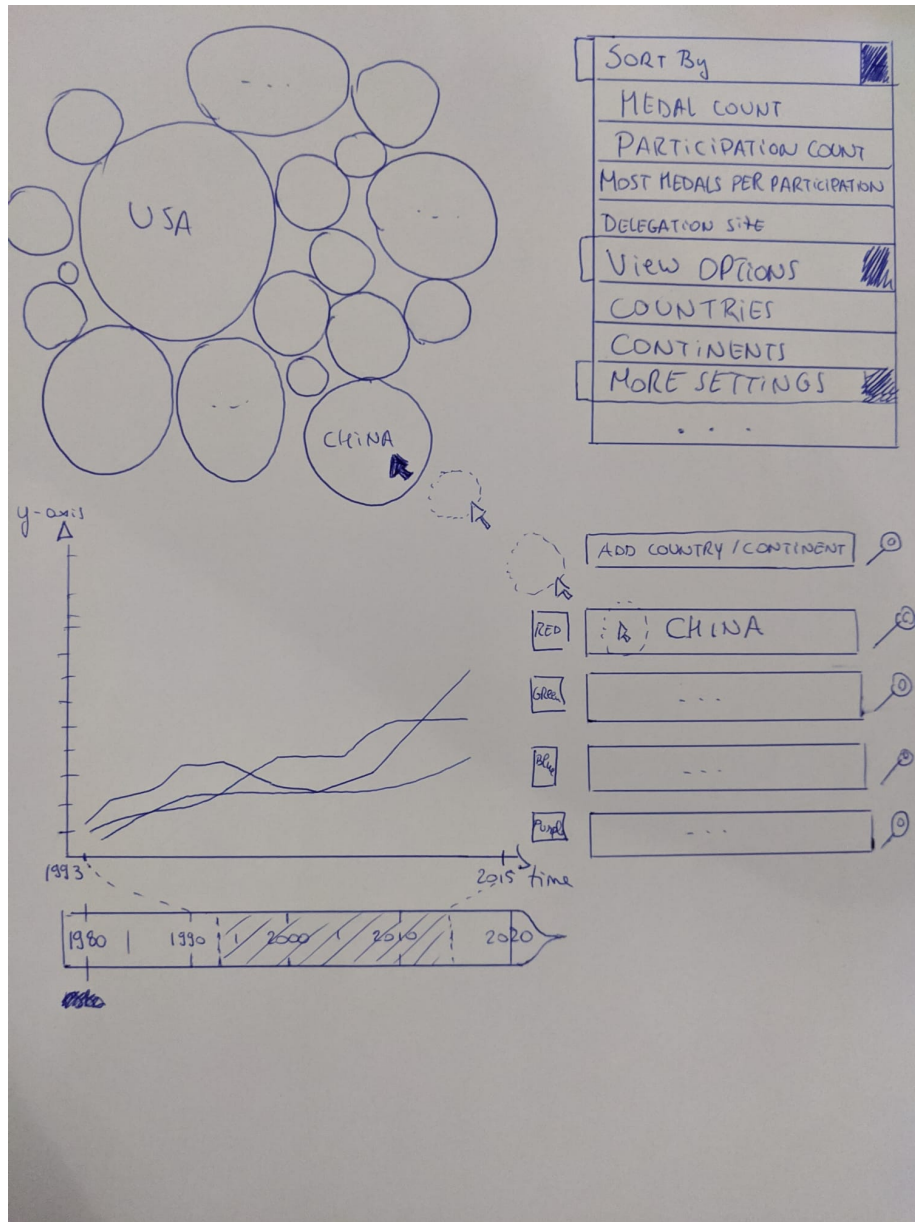
Figure 2: A first draft of the results visualization.

References

[1] Example of d3.js. `https://observablehq.com/explore`.