

Process Book, COM-480 Data Visualization

Sylvain Lugeon Rodrigo Soares Granja
Benno Schneeberger

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1 Process

1.1 Initial idea

After hesitating about which aspect of the Olympic Games to focus on, we decided that we would focus exclusively on the one about the physique of athletes. From the EDA, we knew that there was some physical differences between the disciplines and we found more interesting to focus on that, rather than on athletes results. Moreover, it allowed us to spend more time thinking about the design and implementing all the functionalities we wanted.

Follows our sketch:

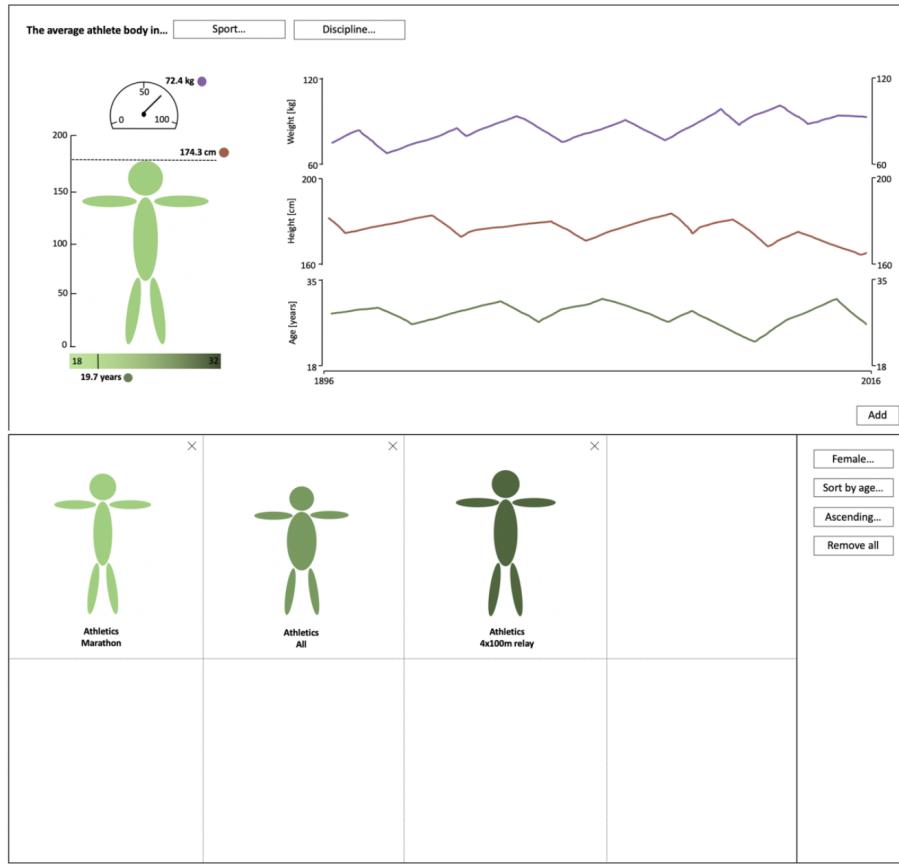


Figure 1: Sketch of our visualization from Milestone 2

1.2 Representation of an athlete

One key element of our visualisation was how to graphically represent athletes physiques. We had three characteristics to represent: the **height**, the **weight** and the **age**. The idea was to use a human-like figure, that we would change so that the differences between the athletes would be visible.

The height is naturally represented with a general scaling. We decided to use the BMI (Body Mass Index) to scale the figure horizontally. The BMI is the weight divided by the squared height and is an indicator of the *corpulence* of a person. The reasoning was the following: first scale a default sized figure so that it matches the desired height, and then horizontally scale the central ellipsis so that it matches the desired corpulence.

We finally decided to use the color of the figure for representing the age. Using a light to dark green mimicked the nature. The riper a fruit become, the darker its color.

The idea was to first show to the user the exact measurements of an athlete, using a balance, a scaled axis and a gradual slider as per the initial sketch. Then the user could choose to add the figure to a small multiple section, which goal is to highlight the **differences** between the athletes. Because the design of the figure is such that it channels all the relative information, no scale was needed in the small multiple part.

The first figure design used only six ellipsis, which made it look very minimalist, nearly child-drawing like. We tried two other ways of drawing it: by using more ellipses to make the silhouette look more human or to directly use a human silhouette.

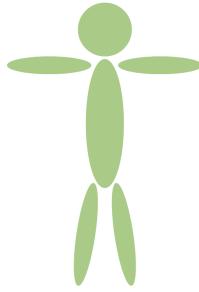


Figure 2: Original.



Figure 3: More ellipses.



Figure 4: Human like.

The advantage of using a six ellipsis design is that we were changing the corpulence by scaling only the central ellipsis. When we tried to apply the same concept to the human-like silhouette, i.e horizontally scale the figure without modifying the head, arms and legs lengths, we thought it looked uncanny and

not human at all.

Thus, we decided to stick with the six ellipses design.

With this approach we could finalize our first attempt at building the website using simple structures for representing the graphs and small multiples container.

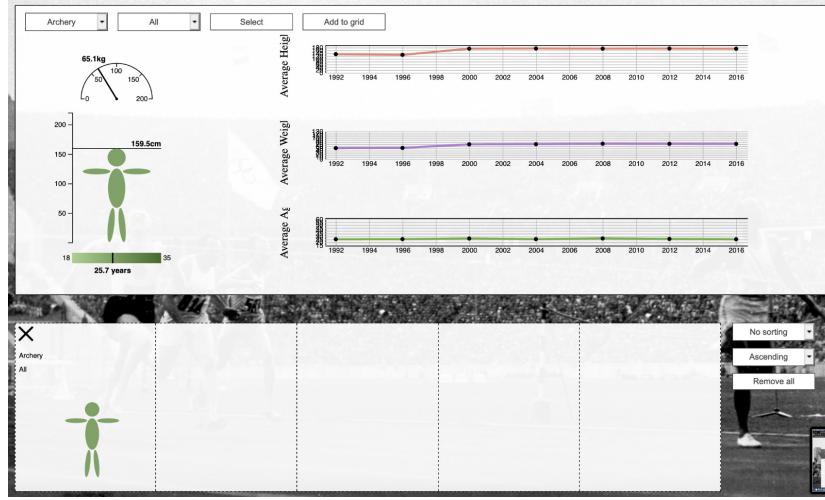


Figure 5: First website attempt.

It was a good start. More work was needed to make it interactive and good-looking.

1.3 Making Olympics great again

We were happy with our athlete design and description but there were no dynamic functionalities, neither in our graphs nor in our small multiples container. We were also not quite happy with the overall design.

1.3.1 Dynamic interface

We started by improving the actual selection of sports and disciplines :

Our first implementation required clicking on the "Select" button to confirm our Sport and/or Discipline. This would prompt the update of the description and the graphs. Furthermore, we also required the user to click "Add to grid" to perform this action. These constraints made our website old and not user-friendly.



Figure 6: First implementation of the selection tools.

We added the following improvements : Firstly, we made it such that the detailed description of the athlete and the graphs were directly updated whenever there was a change in one the dropdown buttons. That enabled us to remove the "Select" button which became obsolete. We also incorporated a **search bar** which allows a user to look for a specific Olympic event more easily. We finally decided to move the add action to the small multiples. This will be discussed later on.



Figure 7: Updated implementation of the selection tools.

As you can see these changes greatly improve the user experience of our visualization. They also allowed us to give more thought to the small multiples and decided to improve it by:

- Reducing maximum number of displayed objects to 5
- Making empty frames invisible
- Giving the possibility to add an element to the container by clicking on the right-most empty frame with a + sign in it
- Moving action buttons related to the container to the top to improve space utilisation
- Improving design of elements inside frames and buttons

Below we show a comparison of the old and new versions of the small multiples:



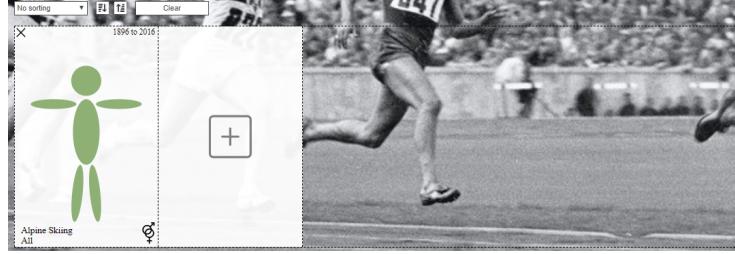


Figure 8: Old and new versions of the small multiples.

We believe these changes made the small multiples more interactive and modern.

The we focused our attention on improving the graphs.

In our first implementation, we used default template graphs which did not look as good as we wanted. It was one of our priorities to improve them overall and we proceeded by :

- Modifying the graphs to resemble those of the sketch. This included displaying only one X axis on the bottom of all graphs containing all covered years.
- Implementing a brush with year selection. This allowed users to choose which years were selected for calculating the Athlete's statistics on the left. Another advantage is that one can add elements to the small multiples container with specific year selections and thus compare different time intervals. The Athlete's description is automatically updated after the selection is performed. We use color to notify the user of which points have been selected or not.
- Implementing a hover action over the points to display the exact values (cm, kg or years) in a tooltip. Here again color is dynamic and gives life to our visualization.
- Adapting Y Axis scales to the displayed values for better data comparison

On the figure 9, one can see how these changes improved the dynamic of our data visualization.

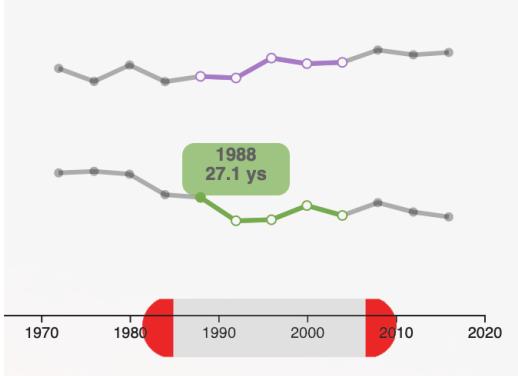


Figure 9: Features added to the graphs.

We were pleased with our website functionalities, interface and user experience. Nevertheless we were not quite satisfied with the overall design and we decided to give it more attention to details.

1.3.2 From 80's to 2020 design

We changed multiple things regarding the overall design. Firstly, we made boxes' corners round and added some margins between those to make the visualization look less packed. We limited the number of elements in the small multiples to make the upper (Athlete description + graphs) and lower part (actual small multiples) fit on only one page with standard dimensions. We also spent some time thinking about the buttons' labels, if it could be a good idea to replace text with icons (e.g. replaced ascending/descending labels by icons) or by a term that sounds more user friendly (e.g. replaced "Remove All" by "Clear"). Regarding the font and the design of the different buttons, we imported Skeleton which improved the overall design of our page. We tried multiple background related to the Olympic Games and finally decided one, representing a running track, which gave the best result.

We also greatly improved the design of the small multiples frames by adding and reorganising information about the athlete displayed. Compared to the second attempt, we decided to add the average height, weight and age to be able to perform a better comparison between the different athletes represented in the small multiples:



Figure 10: Second attempt frame.

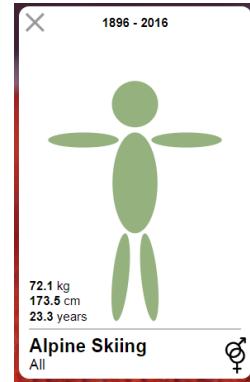


Figure 11: Final frame.

With all those changes, we were able to come up with the following design:

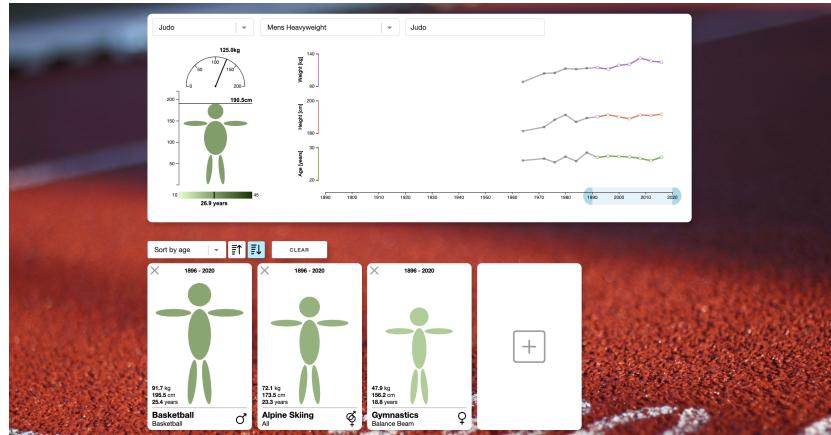


Figure 12: The final design.

1.4 Adding the final touch

Our website was interactive, modern, sexy. But it was missing one thing: a **story**. There were no description about the aim of the visualization, and how to use it.

To introduce the topic, we implemented a bubble chart showing the differences between the sports. Coupled with two paragraphs, the user is now more guided through the visualization.

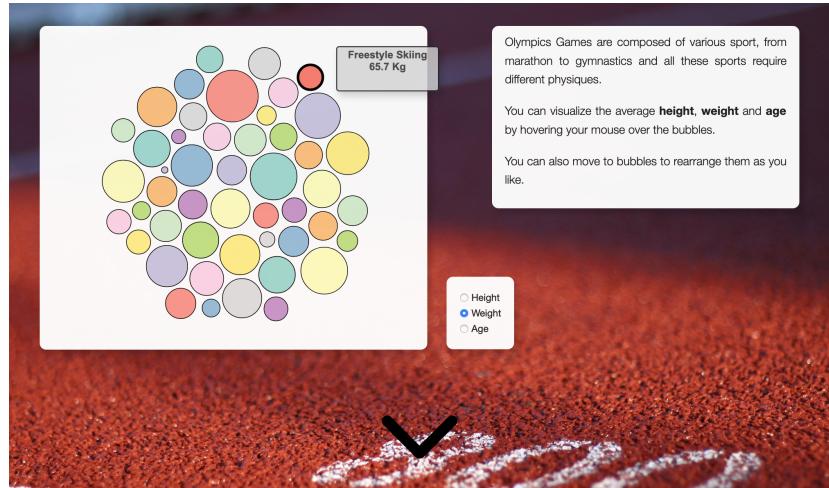


Figure 13: An introduction to our main visualization.

2 Peer assessment

During the whole duration of the project, we all met on a weekly or biweekly basis to discuss the things implemented in the meantime as well as the design and functionalities of our visualization. Roughly, Sylvain focused his work on the general design and the representation of an average athlete, Rodrigo the part with the graphs and circle packing and Benno everything related to the the small multiples. All of us also helped improving or modifying the part of the others. Overall, we all spent a similar amount of time on this project.