2.1 Visual Marks and Variables

(To be done over Week #2)

(1) What are visual marks for items? List the three visual marks proposed by Jacque Bertin and describe the main differences in their basic property.

(2) Name three perceptual channels (visual variables) proposed by Bertin and describe how they would alter the appearance of a line mark.

(3) In the context of Bertin's visual marks and variables, describe what visual marks are employed in the visualisation shown in Figure 1 and what perceptual channels are employed to encode the different various information. Discuss the potential limitations of the perceptual channels employed.

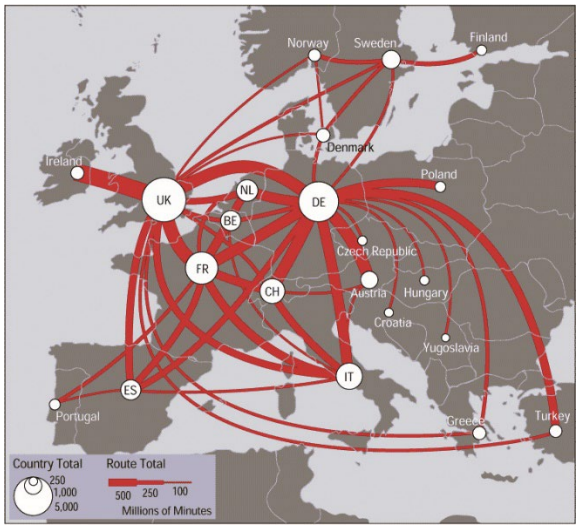


Figure 1 – Telecommunication Traffic Flow Map, © 2000 - TeleGeography, Inc.

Image taken from https://mappa.mundi.net/maps/maps_014/ . For more details on the visualisation, check out the link.

2.2 Visual Encoding

(1) Using your proposed visual encoding design, sketch a possible chart that will allow the effective visualisation of each of data tables show in Figures 2(a) to (c). The suggested visual mark for each chart has been indicated but you are free to choose an alternative. Consider carefully the attributes listed in each of the data table when designing your visual encoding and state any assumptions you made regarding the nature of these attributes that has influenced the design.

(2) What potential visual quality problems may arise due to nature of the given data attributes? How do you proposed this problem can be addressed or reduced?

Lines

Living Members from Class of '45

	Names	Gender	Age
1			
2			
3			
4			
5			
6			

(a)

Points

Orientation T-shirts - Comparing Halls

	No.	Gender	Weight	Height	Hall (A,B,C,D)	T-shirt Size
1						
2						
3						
:						
:						
700						

(b)

Areas

COVID-19 Infection in 2020

	Dates	Total Cases	Warded	ICU
1				
2				
3				
:				
:				
365				

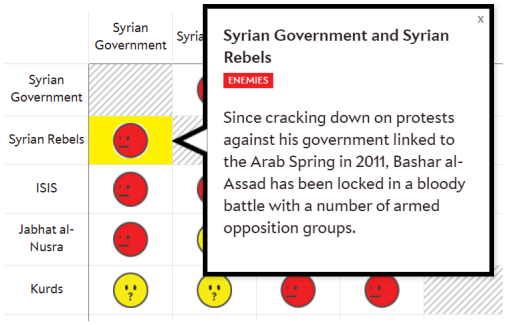
(c)

Figure 2 – Data table examples and the suggested visual mark that can use to design the chart.

2.3 Deconstruction Exercises

(1) **Middle East Friendship Chart**. Figure 3(a) shows an interactive visualisation done by Joshua Keating and Chris Kirk (@Slate.com). It depicts the relationships between the active players involved in the civil war in Syria. If you click on any coloured emoji icon, a text description is displayed next to the icon describing the nature of the relationship between the two parties, as shown in Figure 3(b).

(a)



(b)

Figure 3 – Middle East Friendship Chart

(From http://www.slate.com/blogs/the_world_/2014/07/17/the_middle_east_friendship_chart.html)

a) Draw the data table for the relational data model used to create the visualisation shown in Figure 3. You can give appropriate names to the different attributes in your columns.

b) What visual marks and variables (channel) are used to encode the different data depicted?

c) Describe if redundant coding has used in the visualisation and if so, discuss if it was done effectively.

d) Describe if the choice of colours used in visual encoding is appropriate.

Optional Challenge (Will not be covered during tutorials)

(2) **Euro Cup 2008**. Duch, Waitzman and Amaral analysed three knockout-phase matches of the Spanish team using the vast amount of statistical information that was published online by UEFA. Using techniques from social network analysis, they produced the visualisation shown in Figure 4. Based on further descriptions given in their PLOS ONE open-access paper accessible at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0010937, answer the following questions:

a) Identify as many types of data variables as possible that have been visually represented in the visualisation shown in Figure 4. For each, state its scale of measure (N, O or Q).

b) Describe what perceptual channel (visual variable) has been employed to encode the values of each of these data variables.

c) Describe if the choice of colours used in visual encoding is appropriate. If not, suggest how it could be improved.

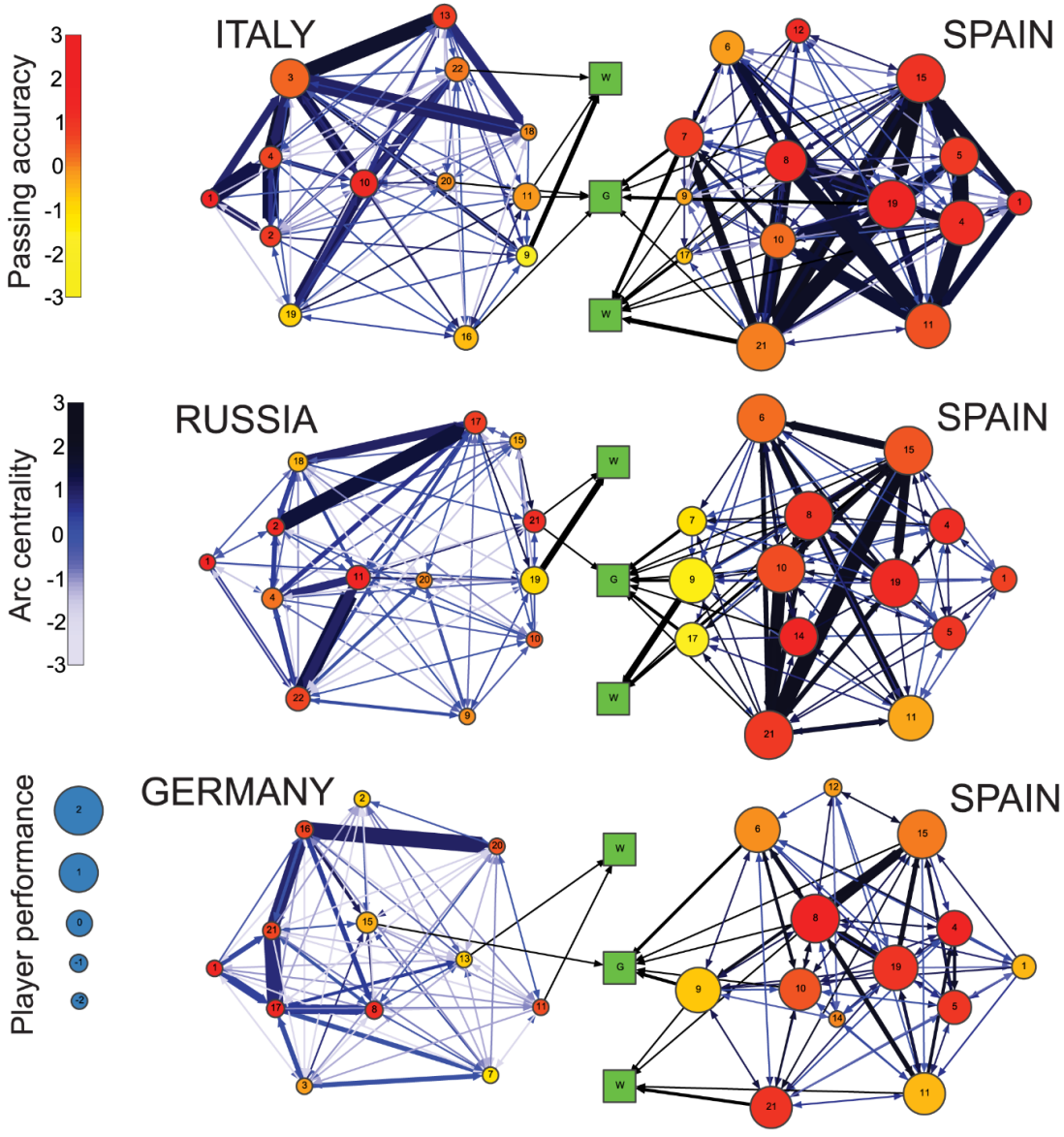


Figure 4 – Visualisation of the three knockout-phase matches of the Spanish team.
(Image from https://journals.plos.org/plosone/article/figure?id=10.1371/journal.pone.0010937.g005)