Happiness across the world

Process Book

Data Visualization - COM 480

Proposed by:

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INTRODUCTION

The aim of this project is to analyze people's happiness across the world, according to several factors. We then putted in common multiple databases that recorded different information on people's life environment and way of living, in order to find correlations between happiness and its circumstances.

The following visualizations aim then to help in bringing out new relations between our life environment characteristics and giving a chance to anyone to explore and interpret data in an easy, joyful and friendly interface.

Through this process book, we present the journey through the development of our website

MOTIVATION

Since the beginning of humanity, happiness has always been the main source of interest for all human beings and this common goal toward which people strive, remains for many, frustratingly out of reach. To achieve this state of joy, satisfaction, contentment, and fulfillment, people always tried to use their intelligence to its fullest potential in order to provoke this famous happiness.

It is known that happiness is obviously linked to a healthy and balanced life environment, but it is nearly impossible to find a causality explanation to it.

Nowadays, thanks to the new techniques developed in the domains of data science and machine learning, it is now possible to analyze the factors that interact with the concept of happiness..

DATASETS

kaggle

	country	region	hap_rank	hap_score	code	GDP	sunshine	temperature	population	region_id
0	Finland	Europe	1	7.8087	FI	2.695948e+11	154.833333	9.105620	5529543.0	0
1	Denmark	Europe	2	7.6456	DK	3.560849e+11	161.055556	11.175109	5831404.0	0
2	Switzerland	Europe	3	7.5599	CH	7.522480e+11	161.041667	12.197974	8636561.0	0
3	Iceland	Europe	4	7.5045	IS	2.171808e+10	110.583333	5.029489	366463.0	0
4	Norway	Europe	5	7.4880	NO	3.621983e+11	114.444444	9.293759	5379475.0	0
...	...	...	...	...	...	...	...	...	...	...
127	Sudan	Africa	125	4.2720	SD	2.688548e+10	296.375000	30.379986	38902950.0	1
128	South Sudan	Africa	139	3.9890	SS	1.288548e+10	236.775000	28.454740	10715660.0	1
129	Angola	Africa	119	4.5180	AO	6.288548e+10	195.000000	22.251041	27884380.0	1
130	Oman	Asia	98	5.5180	OM	7.688548e+10	291.108333	28.358000	4267341.0	4
131	Namibia	Africa	118	4.8850	NA	1.088548e+10	310.541667	19.204822	2314901.0	1

For this project, we choose to work on different databases from Kaggle, in order to put in common multiple types of information.

Our primary dataset is a collection over time of countries and their associated "happiness score".

The happiness score was calculated by averaging people's answers to the question "on a scale from 1 to 10, how would you rate your happiness?". Interestingly enough, even though a world "half happy" would yield an average score of approximately (1 + 10) / 2 = 5.5, we noticed that by aggregating the happiness score of all countries, we barely miss the mark with a total of 5.38.

In addition to this base data, we are cherry-picking datasets which could have an impact on one's country happiness score.

EXPLORATORY DATA ANALYSIS

TEMPERATURE

Our first thought was to wonder whether the weather would impact the satisfaction of people around the world. We ended up choosing two sets to hopefully answer the question.

SUNSHINE

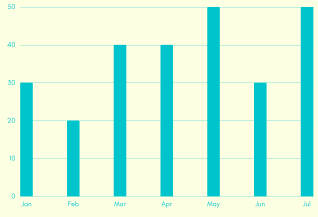
The second dataset we chose in order to argue about the possible weather influence is a time-series (monthly records) displaying the average amount of sunshine per month in each country. It was interesting - and unexpected - to discover that the amount of sunshine worldwide follows the seasonal trends (e.g. December and January have a value of 173 and 180 respectively, whereas June goes as high as 237) of the Northern Hemisphere.

ECONOMICS

What are the possible economic factors that might influence people's happiness? The World Development Indicators dataset, published by the World Bank, contains important economic measures on different countries and we selected several indicators from it as the Economic dataset.

POPULATION

Population might be another important factor that affects general happiness. This dataset from World Bank (World Population) contains population data of different countries or regions from 1960 to 2020.

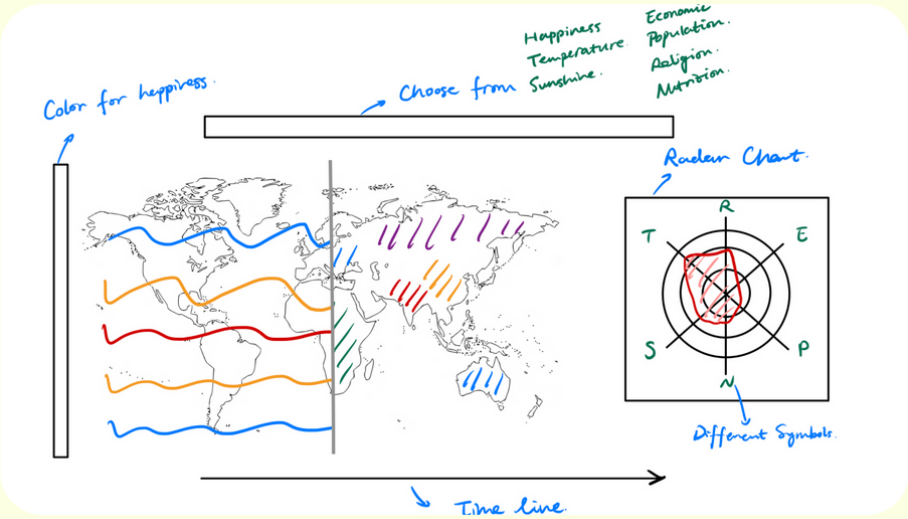


DESIGN DECISIONS

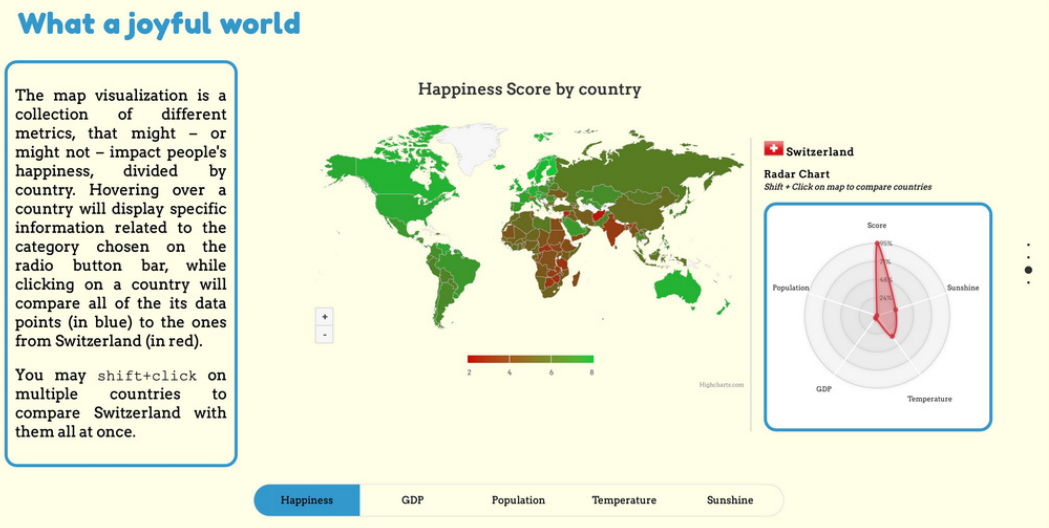
OUR JOURNEY TO THE FINAL RESULT

In order to develop our website we made multiple choices that were different from our original plan. we discovered that a heat map will not be possible because of the multiple missing data, principally in the ocean part . We the prefered to go for a Choropleth map. Moreover, to simplify our website we decided to not make the map vary accros time .

Original design plan :



Final result :



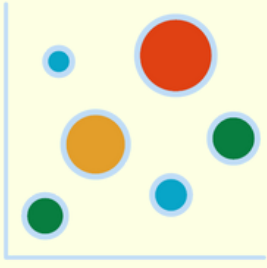
WEBSITE ARCHITECHTURE

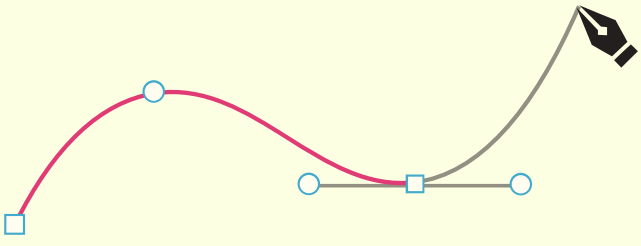
Our website deployment is based on the full pages library. The use of this tool permitted us to create an easy to use, interactive and fun interface where the user can walk around website, play with the visualization and interpret the data as he/she wants.
Our main visualisation is a Choropleth map and can be seen in the third page.
Three other visualizations are also present in the fourth page and will permit the user to interact directly with the data.

PLOTS

Our first plot is a bubble plot that depicts the relation between multiple dimensions, namely population, sunshine, and GDP. The size of each data point denotes the happiness score, whereas the color depends on the continent the country is situated in.
Our last visualisation
This plot is useful to analyze whether there exists a relation or correlation between multiple dimensions.

The color of the lines depicts the continent.
We also decided to add a radar plot to our map visualisation. In the event a country is selected on the map, the radar plot will compare both the chosen country and Switzerland, our default location. Getting a score of 100% on a specific dimension depicts the fact that said country is the highest ranked out of all country in our dataset on the particular dimension.





CHALLENGES

While building the map, our most complicated visualization, we needed to bind three separate elements together. These were the map itself, the radio button list to choose between different metrics, and the radar chart displaying comparison between multiple selected countries. We solved this issue by calling the radar chart constructor and displaying the newly created chart each time the user selects a single or a collection of countries.

We encountered a myriad of similar challenges, but solved them more easily.

CONCLUSION

In this project we worked on different visualizations showing happiness across the world. We chose to deploy a web interface that renders a page for each visualization rather than a single linear page. The implementation was realized with modern web technologies including ReactJS, Plotly and other visualization libraries such as numerD3 and full page.

PEER ASSESSMENT:

SAMI

MAOCHENG

NICOLAS

For this project, all team members contributed to the general visualization ideas and design decisions that lead to the final website result. Furthermore, tasks were divided the following way :

Sami Ferchiou :
Data preparation / Minimum viable product / Parallel coordinates plot / Process book / Choropleth map / Final website design

Maocheng Xu:
Data preparation / Initial sketches of website / 2D and 3D bubble plot / Choropleth map / Final website design / Screencast

Nicolas Pierre Raulin :
Data preparation / First website deployment / Radar plot / All texts of the website