ITALIAN DIASPORA

S.1
**DESIGNING
ASSOCIATIVITY**

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Assignment 1
Visualizing Data

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Introduction:

The following description would be a tutorial that explains the steps you need to process data using Rhinoceros 3D. To do that, you should have:

- McNeel Rhinoceros 3D
- Grasshopper
- Microsoft Excel (or any other spreadsheet application)
- Internet connection

Note:
The topic I am developing in the Digital Matters research line is too general and I cannot recognize any useful data for my research.
Therefore I prefer process general data, especially related to my County and I would like to understand its **emigration flows** during the last Century. I am very interested in emigration flows because many component of my family (included my grandfather) emigrated to America looking for a better future.

I. FINDING DATA

In nearly a century between 1876 and 1970, an estimated 25 million Italians left the country in search of work and of those, 12 million left for destinations outside Europe. The *Italian National Institute of Statistics* (ISTAT - www.istat.it/en/), has a very complete database that can be consulted online.

For this research eight different counties will be considered and the purpose of this analysis is correlate the Italian diaspora to specific historical or geopolitical situations.

Downloading the datasheet from the following link:

www.seriestoriche.istat.it/index.php?id=7&user_100ind_pi1%5Bid_pagina%5D=45&cHash=a4fa14cbf3bdc927952e25cacbf64e5b

The chart considers the Italian emigration flows from 1869 to 2005. The downloaded file contains some useless data so it need to be cleaned and prepared. All the thousand separators should be deleted as well as non-numeric symbols such as brackets or notes. Moreover the file is divided in two sheets so it must be combined. The final "clean" file should be saved in **CSV** format **(Comma Separated Values)**, these operations speed the following steps.

Tavola 2.9.1 - Espatriati per alcuni Paesi di destinazione - Anni 1869 - 2005

ANNI	Francia (a)	Germania (b)	Svizzera	Canada (c)	Stati Uniti (c)	Argentina	Brasile	Australia
1869	35.007	2.912	3.779	….	….	….	….	….
1870	22.693	5.893	3.856	….	….	….	….	….
[…]	[…]	[…]	[…]	[…]	[…]	[…]	[…]	[…]
1873	33.901	15.204	….	….	….	….	….	….
1874	24.222	15.787	….	….	….	….	….	….
1875	35.588	17.187	….	….	….	….	….	….
1876	34.509	9.623	18.655	….	1.441	3.461	….	….
1877	33.333	9.058	13.498	….	976	5.733	….	216
1878	33.552	6.916	10.782	….	1.993	8.645	4.533	194
1879	39.713	6.700	10.401	94	3.114	13.197	7.999	31
1880	43.172	4.277	13.074	45	5.711	12.003	6.080	15
1881	50.735	5.793	10.245	26	11.482	15.899	6.766	10
1882	53.037	7.662	8.476	76	18.593	22.997	9.074	29
1883	46.768	12.376	6.348	81	21.256	24.127	7.590	164
1884	38.523	4.271	5.509	265	10.582	31.927	6.116	173
1885	33.438	4.532	4.583	611	12.485	37.710	12.311	158
1886	35.706	3.811	4.346	1.720	26.920	36.534	11.334	231
1887	31.185	4.676	5.561	1.632	37.221	52.383	31.445	216
1888	27.882	10.105	6.237	1.347	32.945	64.223	97.730	163
1889	27.487	17.951	9.163	447	25.434	69.008	16.953	156
1890	29.310	15.215	10.707	67	47.952	36.695	16.233	291
1891	31.248	13.880	13.195	163	44.359	24.125	108.414	784
1892	32.391	15.580	13.676	211	42.953	25.331	36.448	144
1893	28.719	15.245	9.645	382	49.765	32.541	45.324	54
1894	23.380	16.584	10.435	805	31.668	32.557	41.628	68
1895	18.746	14.939	13.878	783	37.851	41.029	98.090	154
1896	17.967	17.245	18.311	397	53.486	56.426	76.665	467
1897	19.566	21.080	25.266	139	47.000	36.712	80.984	436
1898	22.927	26.852	27.613	328	56.375	33.938	38.659	371
1899	25.047	40.283	29.282	1.021	63.156	44.168	26.574	427
1900	39.292	49.243	27.761	1.686	87.714	40.393	27.438	535
1901	59.162	46.934	45.785	3.497	121.139	59.881	82.159	890
1902	59.777	52.885	50.233	2.951	193.772	36.778	40.434	767
1903	48.993	53.553	45.780	2.528	197.855	43.915	27.707	389

Tavola 2.9.1 | Tavola 2.9.1 (segue)

Meanwhile, downloading a World map from the Wikipedia website:

www.en.wikipedia.org/wiki/World#mediaviewer/File:ColoredBlankMap-World-10E.svg

The map is a **SVG** file (**Scalable Vector Graphics**), so it can be easily opened, modified or converted into a dxf file using Illustrator as well as web platform like *www.cloudconvert.com*.
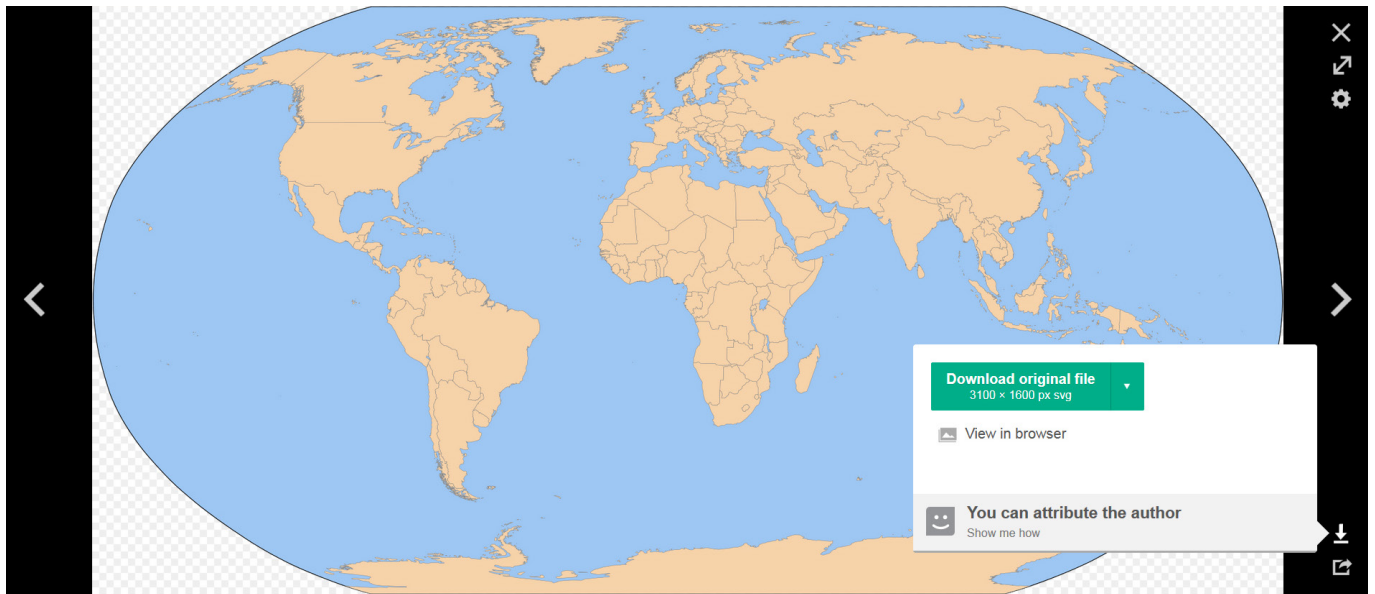
A detailed Robinson-projection SVG map with grouping enabled to connect all non-contiguous parts of a country's territory for easy colouring. Smaller countries can also be represented by larger circles to show their data easier. A thorough description of use and other instructions relating to can be found on the **instruction page**.

II.   IMPORTING DATA INTO RHINO

Once all the files are ready, they can be opened and processed using Rhinoceros 3D and Grasshopper. Importing the map into Rhino, splitting the Case study countries in different layers and deleting all the useless polylines such as small island or the South pole.

Opening Grasshopper and importing the CSV spreadsheet. Using the **Text Split Command**, split the data. With the **Panels command** check the data just processed: the output should be a data tree made of 102 branches (spreadsheet row) with 10 items each (spreadsheet columns).
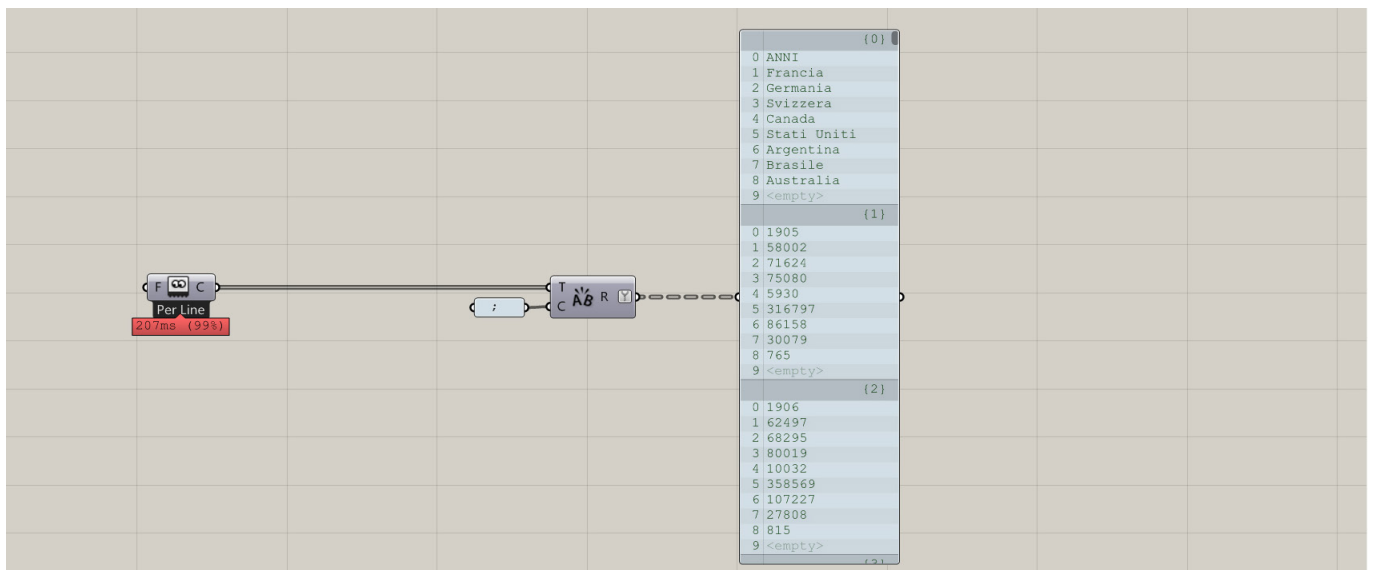
Using the **Tree Branch Command**, extracting the first data branch that contains the countries' name. After that, using the **Flip Matrix Command** to swap rows and columns, obtaining a data tree characterized by 8 branches (countries) with 102 items (annual data).

Finally, using the **Shift List Command**, deleting the first item of each branch (countries' name).

Strategy:
First of all a general XY diagram will be designed. The diagram should show the general emigration evolution during the last Century toward the eight studied counties.
After that it will be interesting analyzing the immigration flows in each year and studying the amount of expats to each county. In this manner it could be possible read all the data in a general way as well as analyzing each year separately.

III. GENERAL XY CHART

The diagram shows the emigration evolution from 1905 to 2005 and it is a simple XY chart that process each data branch (countries) into a series of curves. The X axis displays the years and the Y axis displays the number of emigrants.

Creating a domain made of 101 items (from 1905 to 2005 -> from 0 to 100) using the **Create Series Command** and remapping the data from the spreadsheet in order to scale them.
From the X axis (years) defining a cloud of points using the **Construction Point Command** and using the data set as Y value. All the point are divided in different branches and the command adds eight different points for each X value (one for each branch).
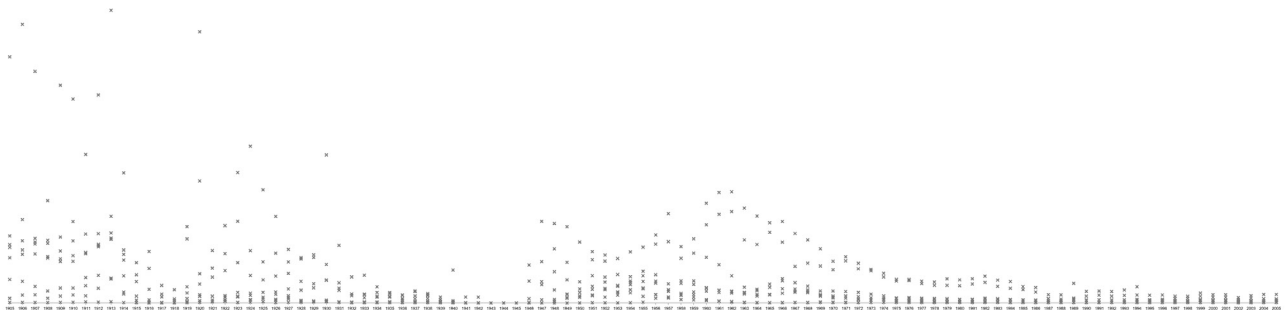
Thanks to the data tree structure, using the **Nurbs Curve Command**, a series of curves that represent each country can be created.
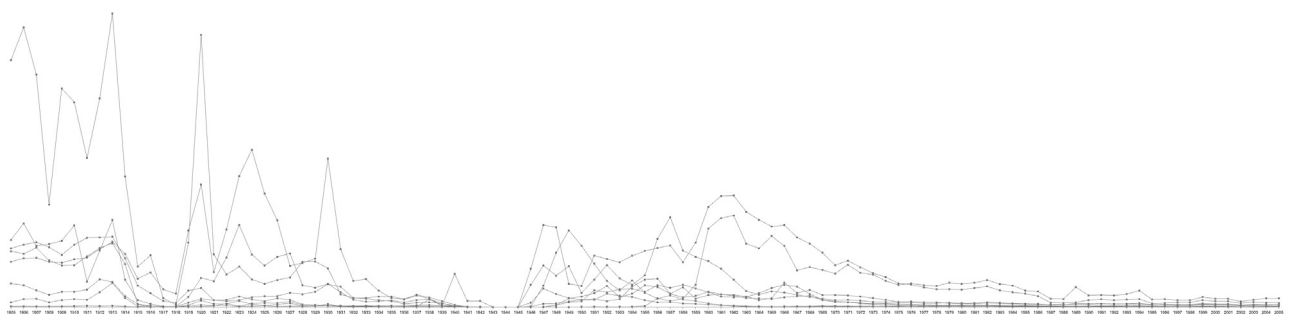
Using the **Text Tag Command**, placing the name of the Country related to each lines as well as the values along the X axis. However, in some parts the lines are too close each other so conferring a color for each country using the **Gradient Command**.
Thanks to this solution, each country can be easily recognized and studied.
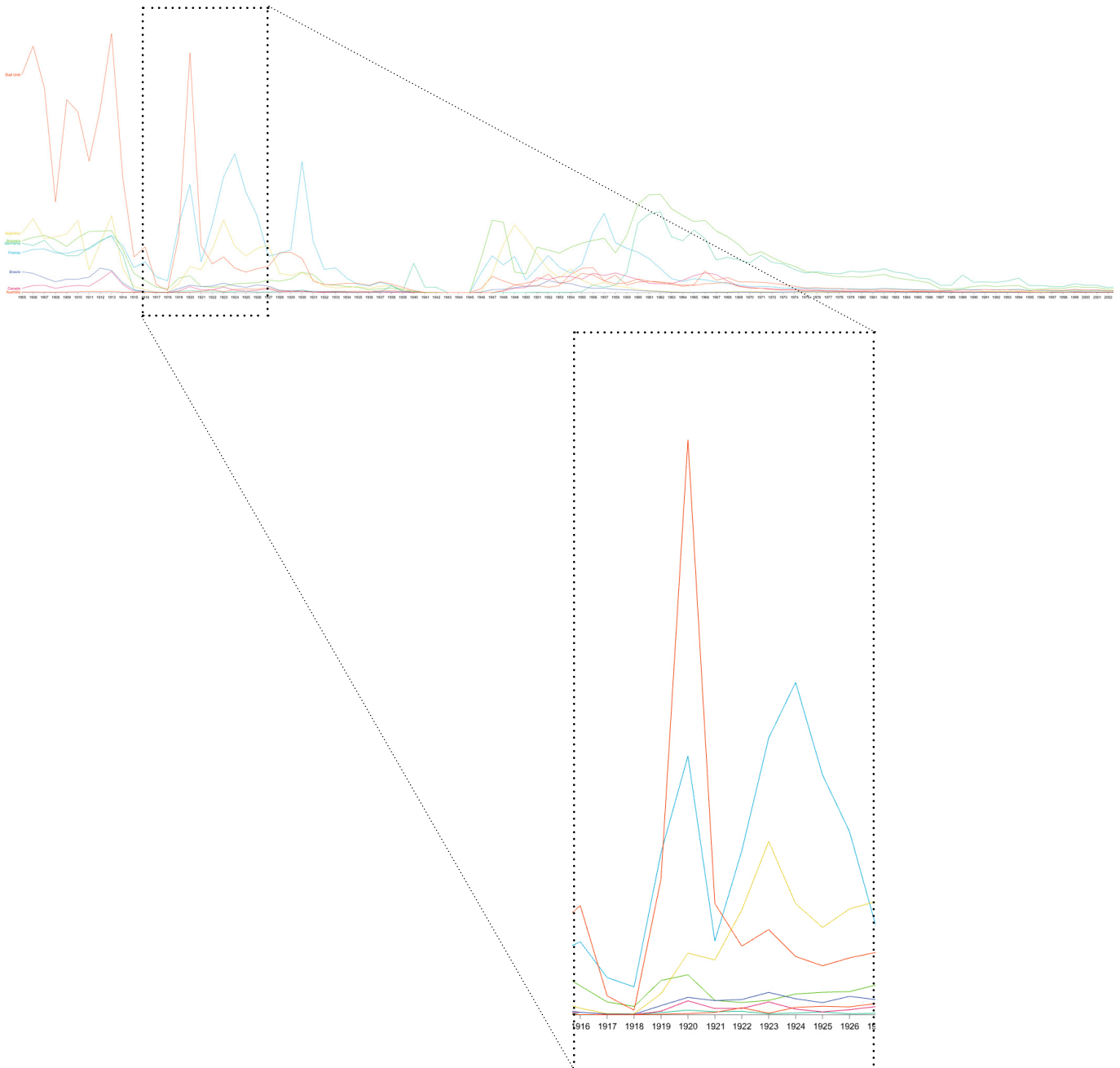
IV.   WORLD DIAGRAM

The general World diagram should display the emigration flows in each year. Unlike the XY chart this diagram shows the data in a specific defined year that can be modified using the slider set.

First of all, setting a "diagram resolution" scaling the input data. After that, a series of different display strategies can be developed.

a. Column chart:
The column chart is the first and easiest way to represent these data. The scaled data can be used to extrude a circle drawn in the centre of each country; again, each column "recognize" its country thanks to the data tree structure.
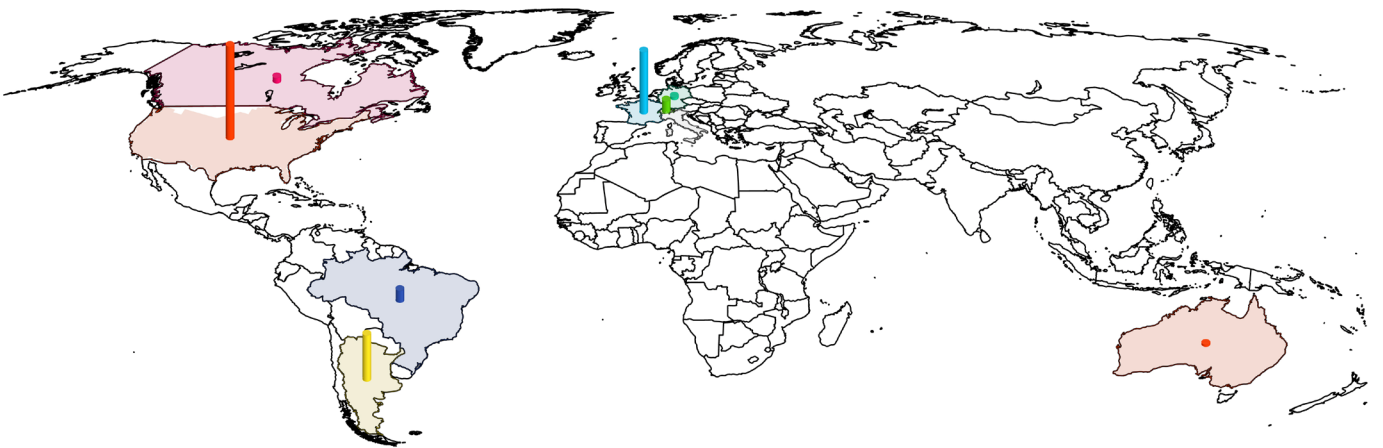
Trip arch diagram:
Even though the column chart displays pretty well the data, something more changeling should be developed. The idea is to show the amount of people emigrated in each county in a more 3Dimensional way.

Firstly, using the scaled values, creating a series of random points in each state surface using the **Populate Geometry Command**. The points represented the scaled value of emigrants.
In each point will be interesting inserting a symbol that can easily show the emigration size. Therefore adding the shape of a typical Italian into the file, scaling it properly and copy in each point created using the **Move Command**.

Moreover, connecting all these points to a defined "starting point" (Rome) using the **Arc3pt Command**. Thanks to the definition developed each arch will have a different 3Dimensional radius, creating a bundle of curves from Italy to the various target nations (italians' journey).
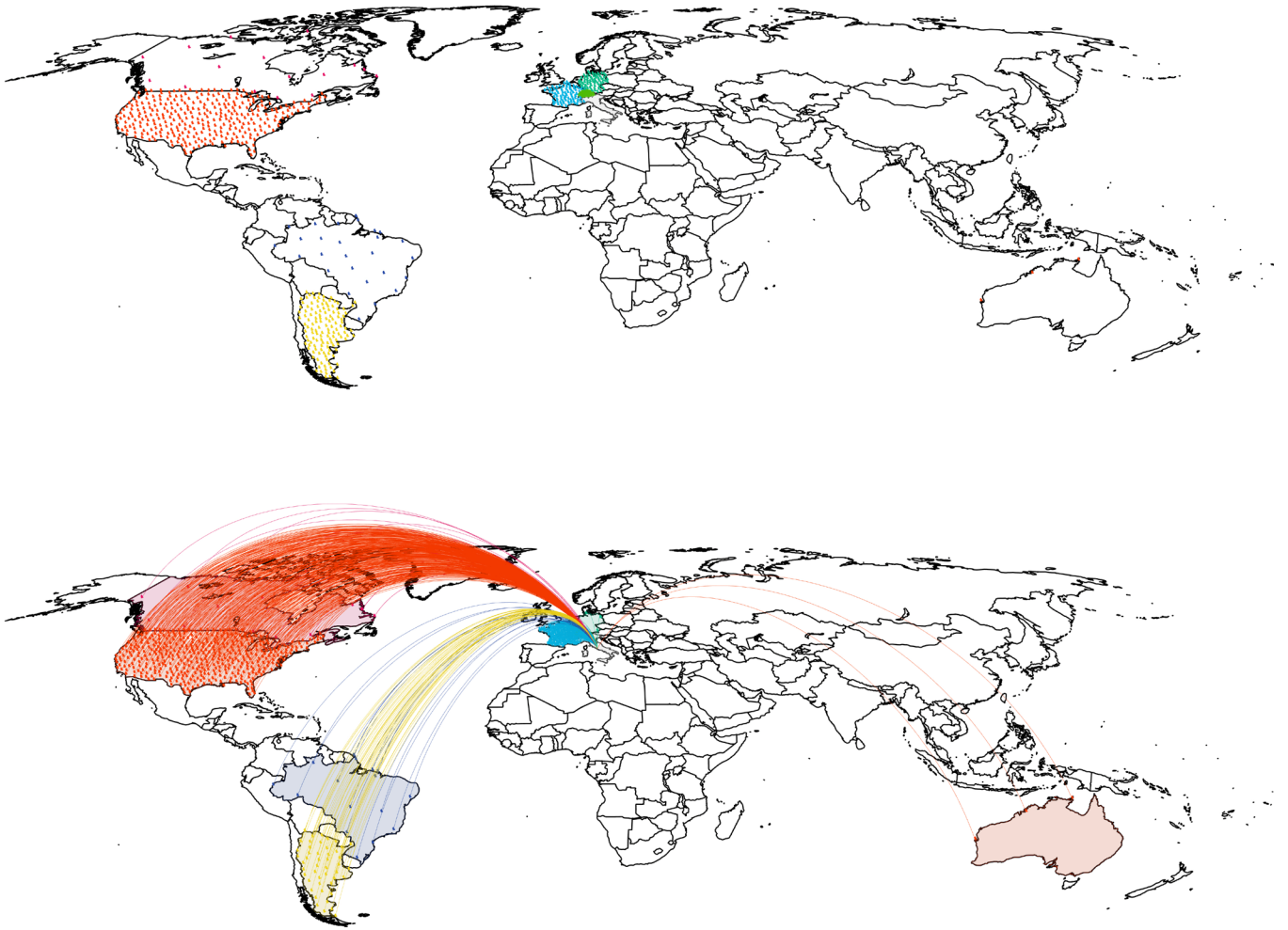
In order to make the charts more "interactive", creating a slider line (into the general XY chart) into the general XY chart. This bar should show the year the World diagram is analyzing.

Moreover, the number slider used to define the years can be added to the lateral Rhino panel using the **Publish to Remote Panel Command**. Thanks to this solution, the user can play with the diagram hiding the grasshopper window.

Finally, using the **Text Tag 3D Command**, adding the year date near the World Map.
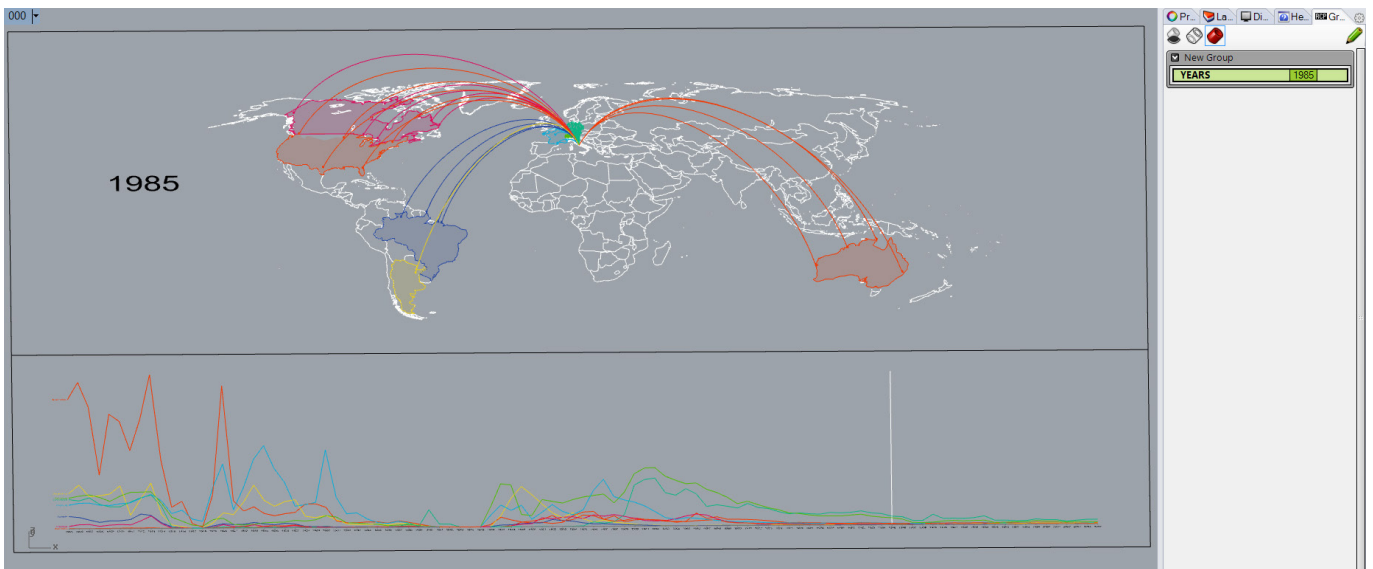
V. PIE CHART

The diagrams developed show all the data evolution with no numbers. In order to display some exact values, a pie chart should be designed. The new chart could illustrate the emigration distribution in each year and the exact amount of expats to each nation.

Using the **Radial Component**, creating a grid characterized by 8 polar divisions. In this case a different way to scale the data has been used. This short script allows to remap the data maintaining the chart size and avoiding display errors when all the data are zero (during the Italian Civil War) and mantaining the chart size constant.
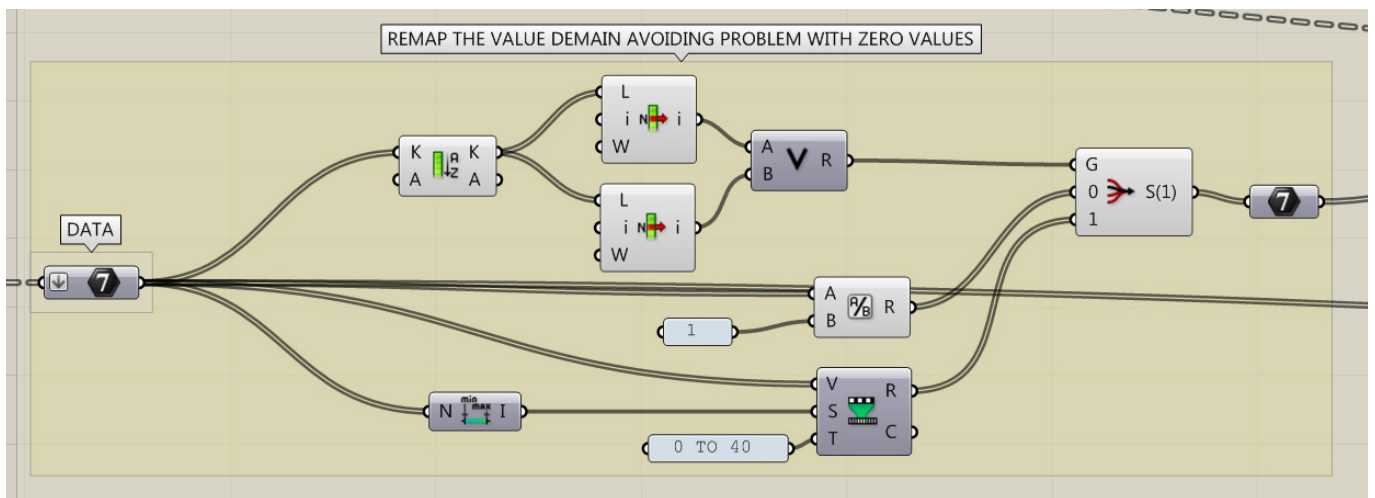
Finally, using the **Text Tag 3D Command**, adding the countries' name as well as the emigrant numbers related to each slice.

1985

1955

1905
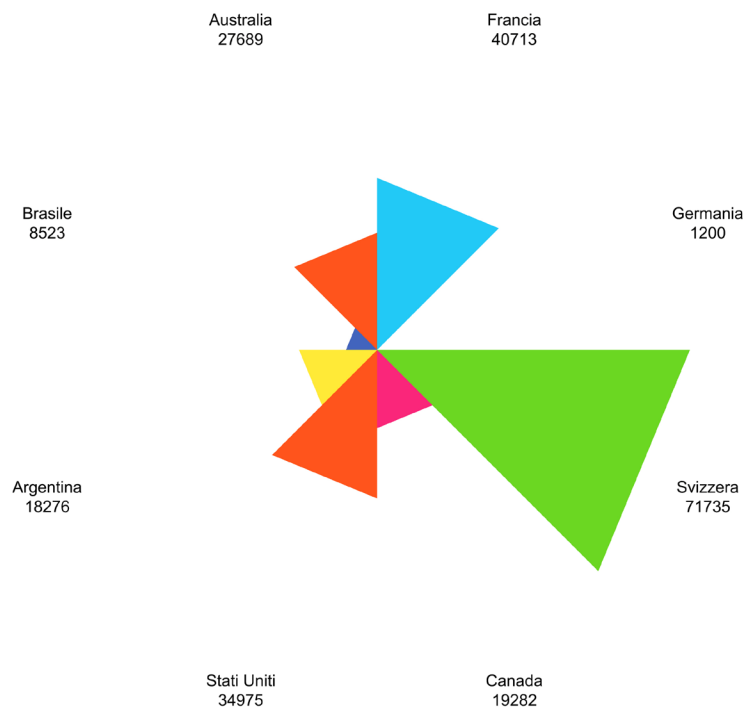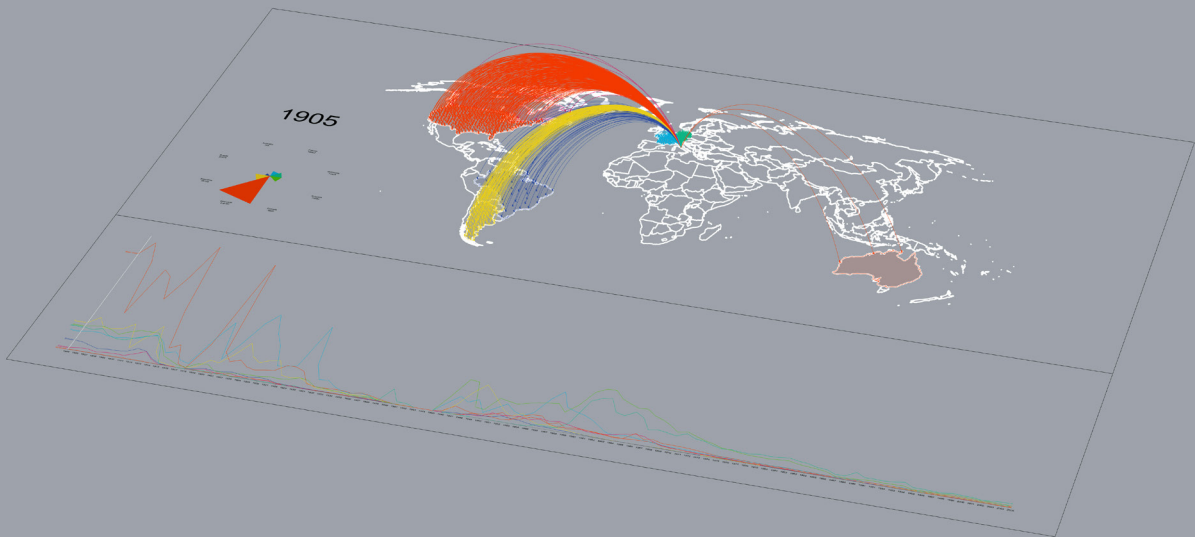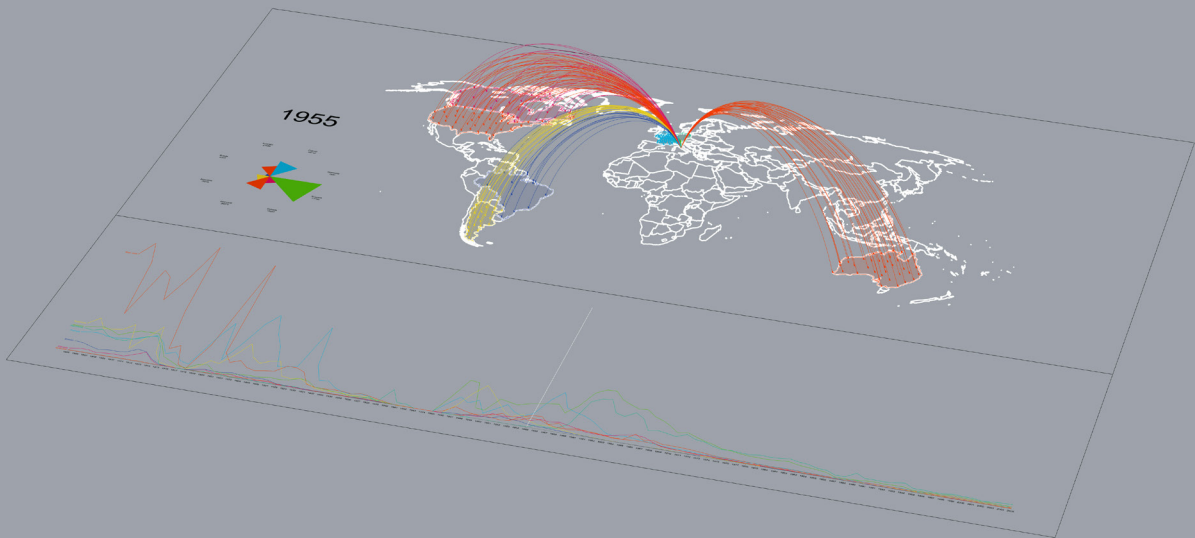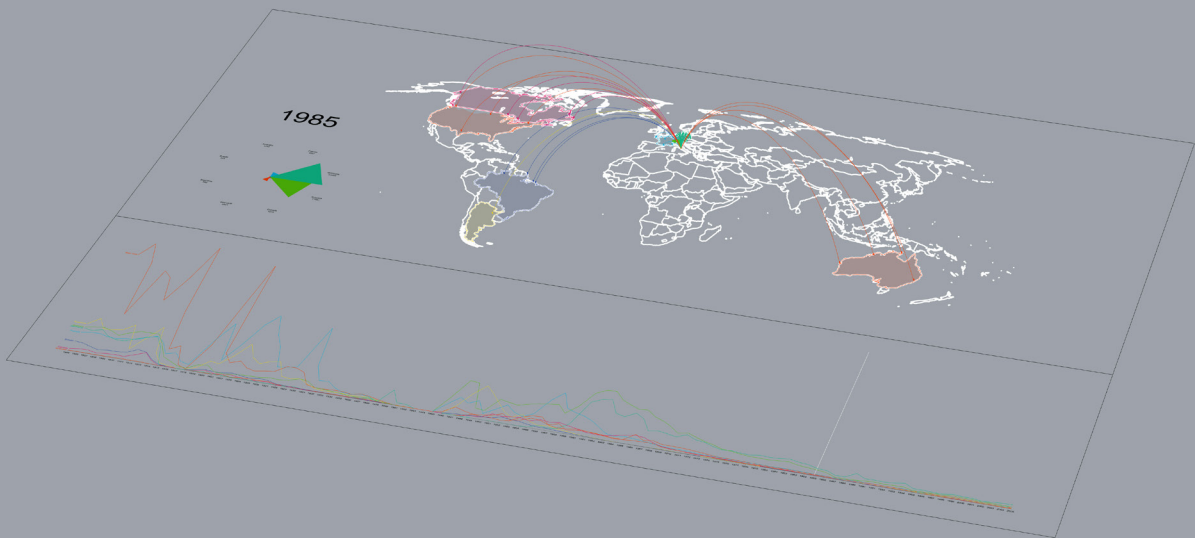
VI.   CONCLUSION

As expected, the immigration follows specific historical or geopolitical situations.
The first twenty years studied are characterized by a big emigration to America. This flow drastically decrease during the Mussolini's dictatorship, when USA was considered italians enemy and especially because the great depression.

During the Italian Civil war there are no data (actually from 1943 to 1945 there was no Italy) and, after the end of the Second World War the emigration restarted but it gradually decreased, especially thanks to the Marshall plan and the Italian economic miracle.