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Births in France

Abstract:

The beginning of a new life is signalled by the transformational experience of childbirth. With the mother and the newborn experiencing physical, emotional, and psychological transformations, this event can be both thrilling and intimidating. Birth outcomes are the key factor for the child's health and development. This study aims to examine the birth rate with the mean age of the mother in a specific year and region. The systematic review is conducted to help the researcher improve child healthcare and provide modern infrastructure in the specific region compared with the previous years. To spread awareness where the mean age of a mother is lesser than the required mean age. To improve and increase the facilities which will play an important role in the forthcoming future of these children. Understanding the trend in the birth rates is essential for the doctors and government to develop effective strategies for promoting awareness and providing the facilities.

INTRODUCTION

Birth rate plays major role in any country's population growth and development. It also has an important impact on the aspects of maternal and child health care, education sector, economical and social development, and most important the environment of a belonging country. In recent years, a significant change in global birthrate was noted with respect to countries and their regions. The pattern and trend illustrated by the birthrate over the past years was an eye catching factor. The fluctuation in this rate can be affected by the factors such as cultural changes and social media, developed economy, critical changes in the government policies and advancement in the technical field. For instance, the rapid growth in the availability of family planning services, higher quality of the women's education and workforce participation, and improved quality of the maternal and child healthcare have played major role to the lower birth rate. In contrast, most of the developing countries have higher birth rates because of the factors including poverty, lack of education and lesser access to the high quality healthcare and lack of knowledge about family planning. (Weintraub, 1962)

By studying the rate of birth, government of the respected country can take various actions in many aspects of the country that indirectly contribute to the low child birth rate, which might cause the crisis in the future for human existence in the worst case scenario. It is not the study's current objective. The examination of patterns and trends in the birth rate through time is the main goal of the study, and the conclusions drawn from this analysis might be useful to practitioners and policymakers working in the area of mother and child health. It can contribute to identify the aspects where the interventions are must needed to improvise family planning policy and make the access easier of this services. With its aid, the rates of maternal and infant mortality can also be decreased. Gender equity can be advanced through developing policies that support sustainable development and gender equity, such as investing in the education sector and raising the bar for women's and children's care while also facilitating access to such facilities.

The government can take action in the various areas of the nation that are affecting the low kid rate, which could lead to a problem for human life in the future, as a result of the study on the birth rate. It is not the study's primary emphasis at this time. For policymakers and practitioners in the field of mother and child health, the study's main goal—understanding patterns and trends in birth rates across time—is crucial. In order to increase access to family planning services and programmes and lower the rates of maternal and infant mortality, it can be useful to pinpoint the geographic regions that require intervention. Additionally, it can aid in the creation of policies that favour gender equality and sustainable development, such spending money on education and improving access to healthcare for women and children. (Guest, 1974)

The proposed methodology, named "Births in France," aims to analyse the pattern and trends in the birth rates from 1975 to 2020. In addition, it also displays the average age of the mother with their age categories. Moreover, the birth number in a

specific year helps to get the exact number to conduct any study or research. The peak of birth illustrated the year having the highest birth and birth rate in a specific region, which provides a blues print for the researchers.

PURPOSE

This project, “Births in France,” is a big-data-based analytical project. We will be able to visualize and analyse the changes in the number of birth and birth rate in a specific year. Also, we can compare one region's birth data to another region for research purposes. Moreover, the mean mother age data will also help to idealize the maternal pattern over the years in the specific region.

PROGRAMMING LANGUAGE: R

R is a programming language and it provides software environment used for statistical computing, data analysis and graphical visualization. It was created in the early 1990s by Ross Ihaka and Robert Gentlemen at the University Of Auckland, New Zealand. R is a powerful tool among statisticians and data scientists because of its powerful capabilities for manipulating and visualizing data. (Kohli, 2014)

FEATURES OF R:

1. Free and open source: R is freely downloadable and its source code is available for distribution.
2. Comprehensive statistical capabilities: R offers a wide range of statistical techniques for data analysis, including time-series analysis, classification and clustering, linear and non-linear modelling, and traditional statistical testing.
3. Graphical capabilities: R has powerful graphical capabilities for creating visualizations, including traditional graphs, 3D plots, and interactive visualizations.
4. Packages: R has a vast collection of packages contributed by users from different disciplines. These packages extend the basic functionality of R and provide specialized tools for specific tasks.
5. Data manipulation: R provides powerful tools for data manipulation, including data cleaning, merging, and reshaping.
6. Reproducibility: R promotes reproducibility by enabling users to document their work, including code, data, and results.
7. Working: R is accessed through an interpreter based on the command line. Procedural programming is supported by R language with functions and object-oriented programming with generic functions for particular functions.

PACKAGES:

R packages are assemblages of data, functions, and documentation that increase the capability of the language's core. For specific activities like data manipulation, visualisation, statistical modelling, machine learning, and more, packages can be thought of as add-ons or plugins.

The R community, which consists of programmers, statisticians, and data scientists from all around the world, develops and maintains packages. Anyone can contribute a package to the Comprehensive R Archive Network (CRAN), the primary repository for R packages. Other repositories, such as Bioconductor and GitHub, host packages for specific fields or purposes.

Shiny is an R package which allows users to create interactive web applications and dashboards using R code. With Shiny, users can build web applications that enable end-users to interact with data and visualizations in real time without requiring any knowledge of R or programming. With CSS themes, HTML widgets, and JavaScript actions, you may further customize your Shiny apps.

SHINY: The graphical user interface for the proposed work, "Birth in France," is developed using the shiny package the R studio provides. Shiny is loaded with many prominent interface-enhancing features. Moreover, it is a user-friendly and efficient app development package for building an interactive website.

There are two ways to generate GUI-based web applications in Shiny:

1. Single-File: It consists of only one main file (App.R)
2. Multi-File: It is a combination of two files (ui.R and Server.R)

This project is a Multi-File project containing two components:

- a user interface (UI): to determine the layout and appearance of the application
- Server-side logic: to define how the application will be executed and how it will generate output.

METHODOLOGY:

This methodology depends on the dataset which we have provided. Here we have three different datasets for birth, region, and department in France. Each dataset consists of different kinds of data with a specific year, number of birth, birth rate and mean age of mother according to region.

SECTIONS:

This app has 3 main pages.

1. General
2. Map
3. Data

General:

This page is the most detailed page for getting information about the data. It has three sections. Each section has a detailed infographic representation of the data. We can also analyse the data with the help of a line chart and bar chart.

1. France
2. Region: Here, we can change the region to get the specific data according to that.
3. Department: This is also changeable.

Moreover, we can hover over the line and bar char to get the exact information. We can also zoom in and out to study the graph trend. We can also download the graphical representation in the svg and png files and the dataset into the csv file.

Map:

This page has a map representation of the region and department of France. We can filter the information using the radio button list named choice of variable, and each option is represented with a different colour.

The options are:

1. Number of births (Blue)
2. birth rate (Green)
3. The mean age of the mother (Purple).

Data:

The third page is the table page. Here we can see the information of the data set in the tabular form for three different categories: France, region and department. We can also download the csv file of the dataset using the export button.

PREREQUISITES:

- R binary
- R libraries: Shiny, apexcharter, reactable and bslib
- A data set of birth, region, and department
- An IDE for R programming(R studio)

STEPS OF EXECUTION:

Firstly, we need the data set for France's birth, region and department, which contains all the attributes to illustrate the data.

Then we load the data to the server-side application and distribute the data into three sections: France, Region and Department. We have loaded all the data sets in the file names global.R.

In global.R data file, we transformed the RDS file to the object so we could read the data values.

The server.R file also contains the code in three different sections for the three different parts of the application.

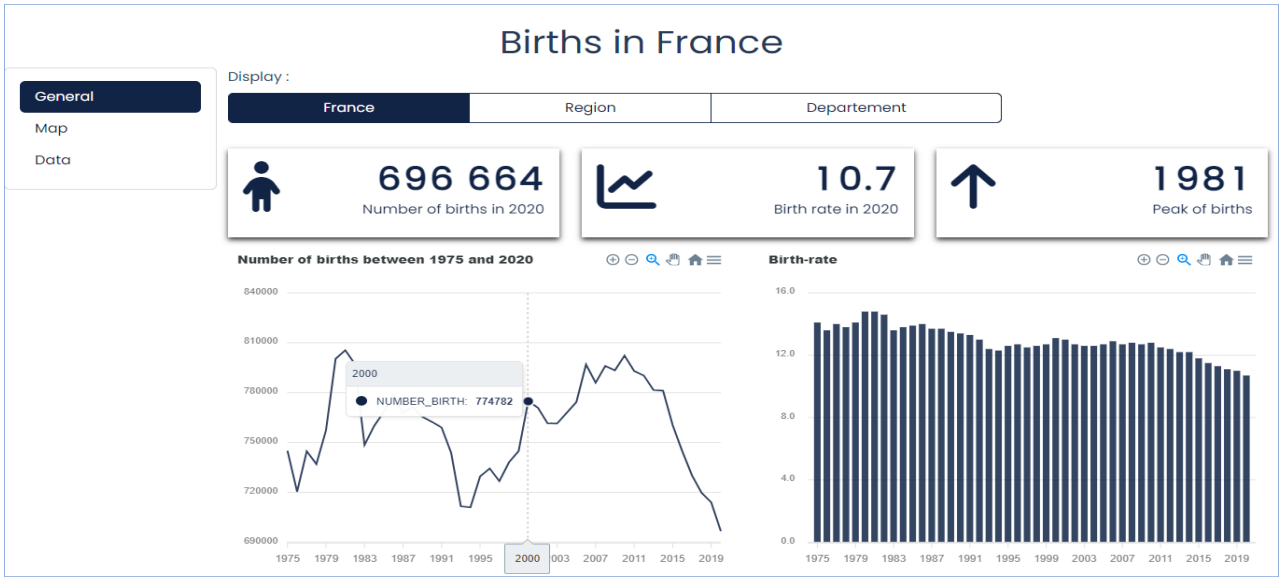
The ui.R file contains the design according to the name of the objects of the components, which will be loaded after the click event.

After that, open the server.R file, and we will execute the script using the “Run App” provided by the R studio in the top-right corner.

After the script is executed, we will encounter the interactive user dashboard with an attractive theme and CSS.

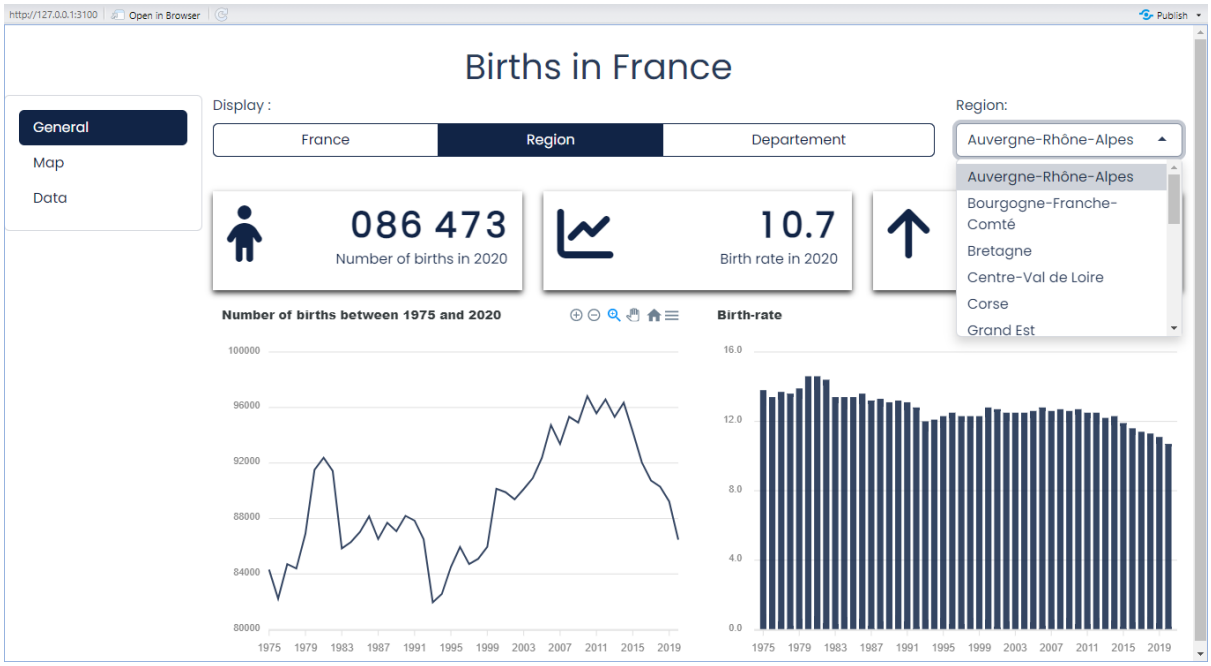
DESCRIPTION WITH IMAGES:

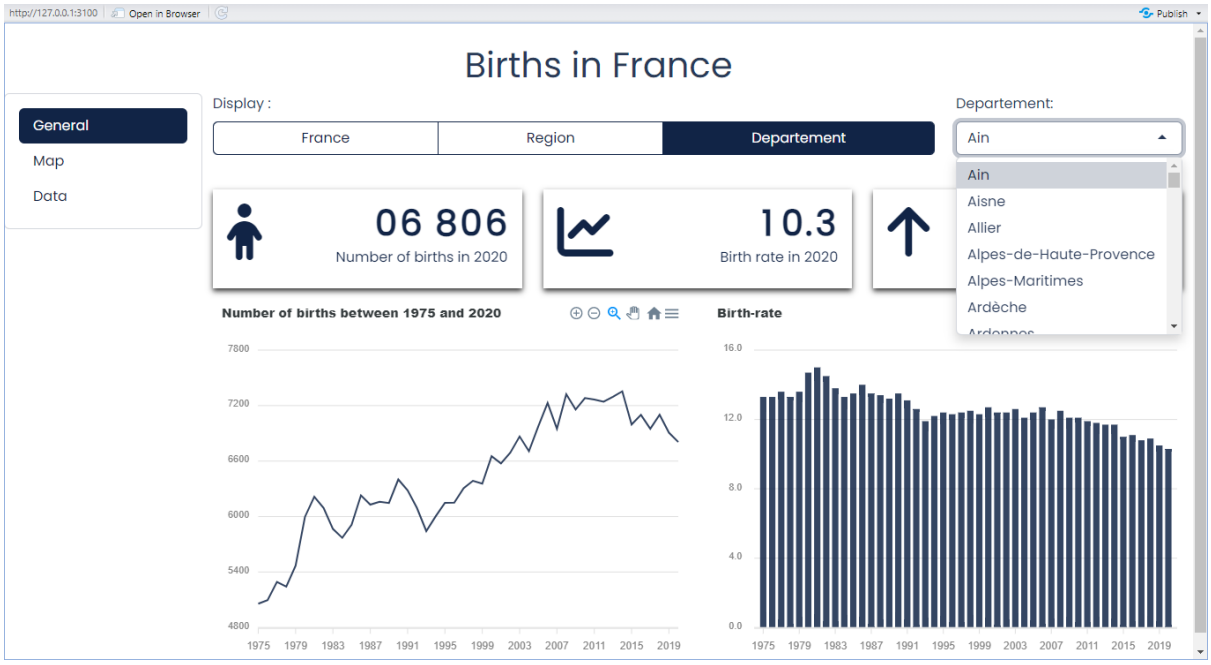
After the execution of the server.R, the dashboard shown below will appear with the eye catching animation for the graphical and numerical representation.



We can see the data with the three card, which shows the number of birth in 2020, the birth rate in 2020 and the peak year of birth. Below we distributed the data set to create the two different graphical representations, a line chart and a bar graph. Using the apexchart library, we can hover over the graphs, and we can also zoom in and zoom out.

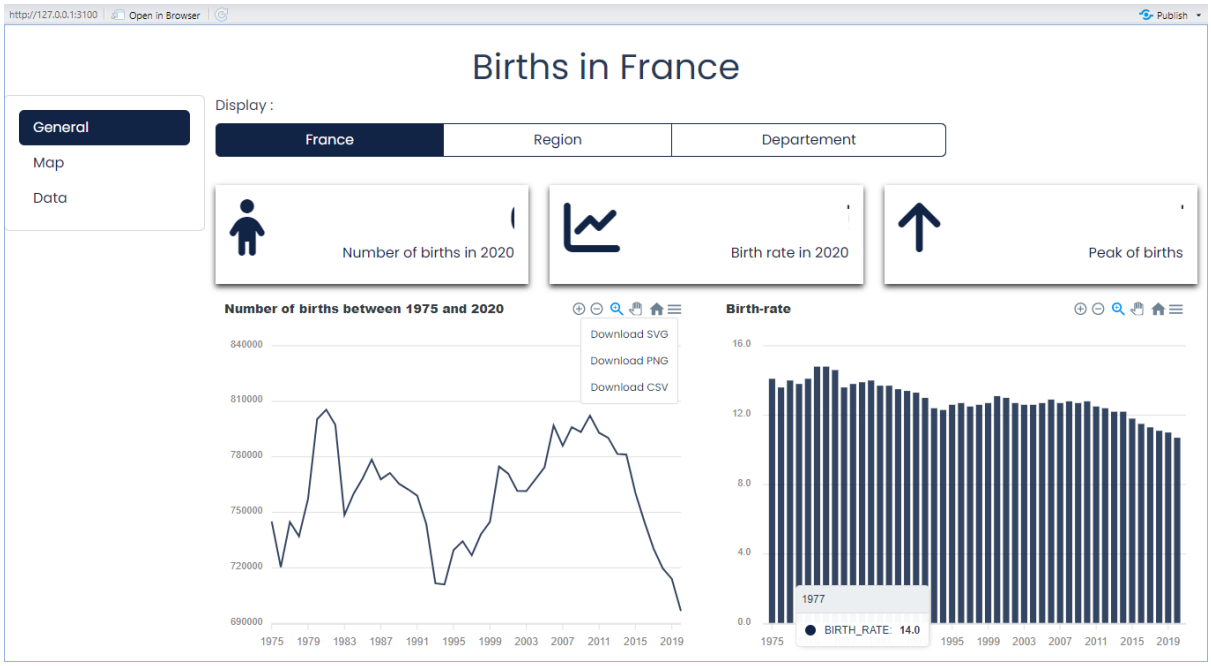
In the other two sections, we have added a dropdown box to filter the region and department to get a specific dataset. The data get reloaded according to the selected value by clicking the particular region or department.



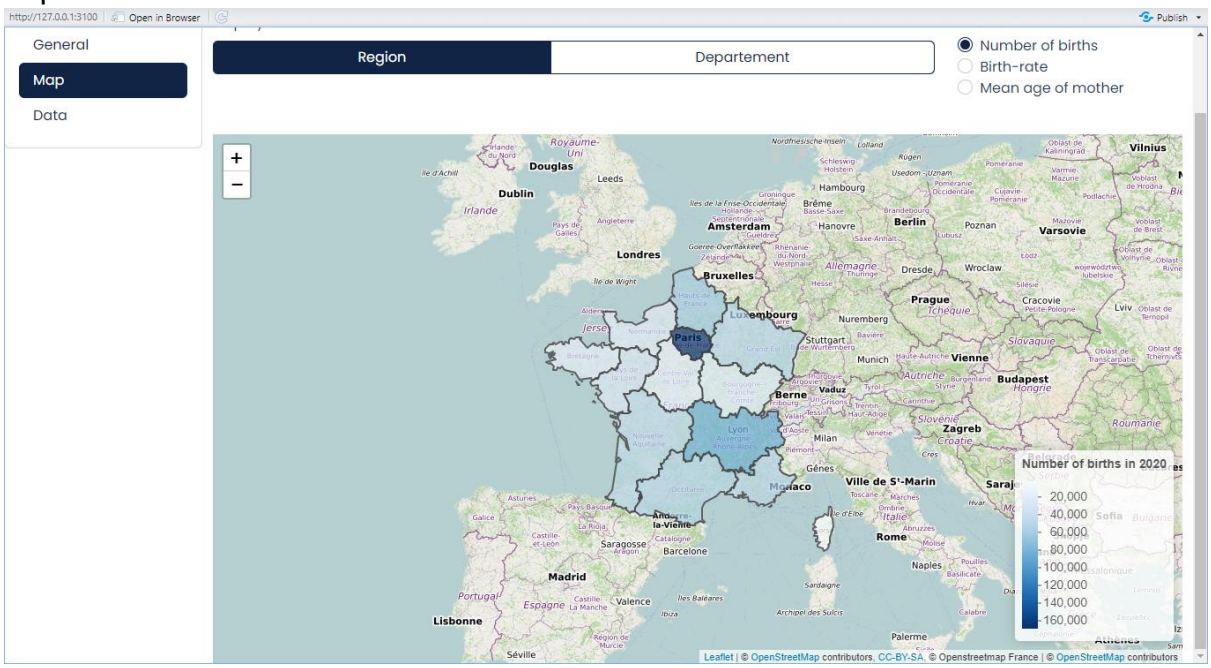


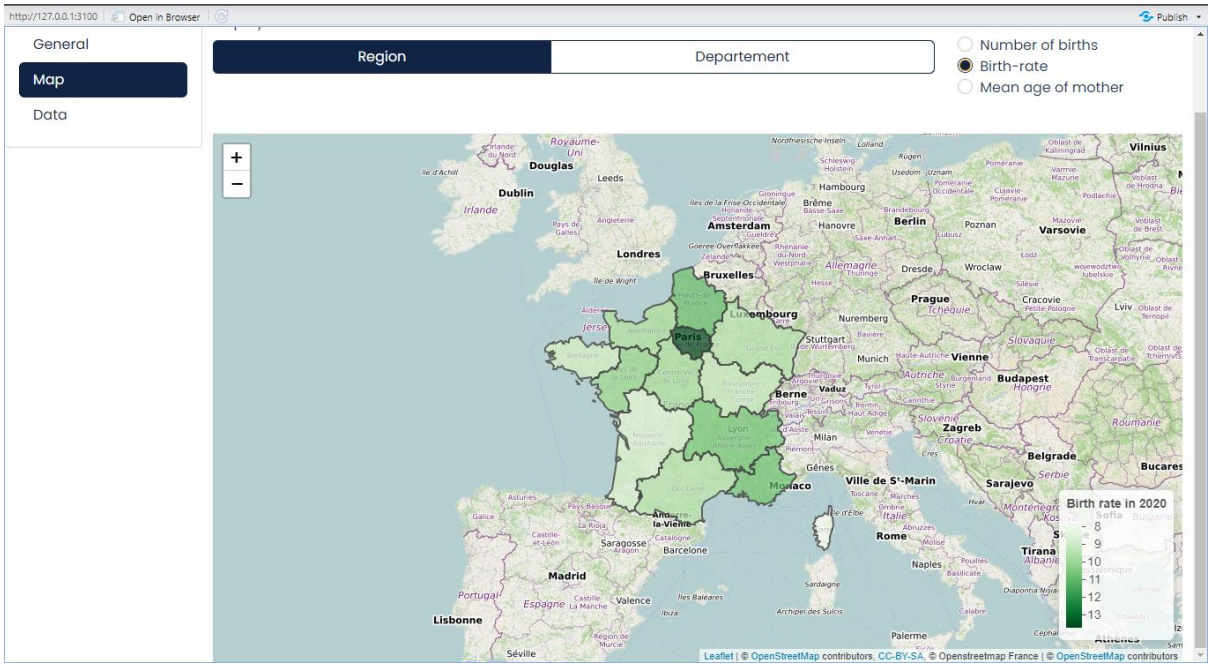
To get the better view of the graphical representation and analyse the pattern and trend carefully we can also use the feature of zoom in and zoom out in the line graphs and bar graphs.

From the hamburger menu beside the home button, we can download the image of the graphs in two different formats svg and png. Moreover, we can download the data set into csv file for that specific attribute only.



For the map component of the application, the data is represented in the map with specific colours. The map of France is distributed in two categories Region and department. We can also select the variable from the radio button list.




http://127.0.0.1:3100
Open in Browser
Publish
General
Map
Data
Region
Departement
Number of births
Birth-rate
Mean age of mother
Birth rate in 2020
8
9
10
11
12
13
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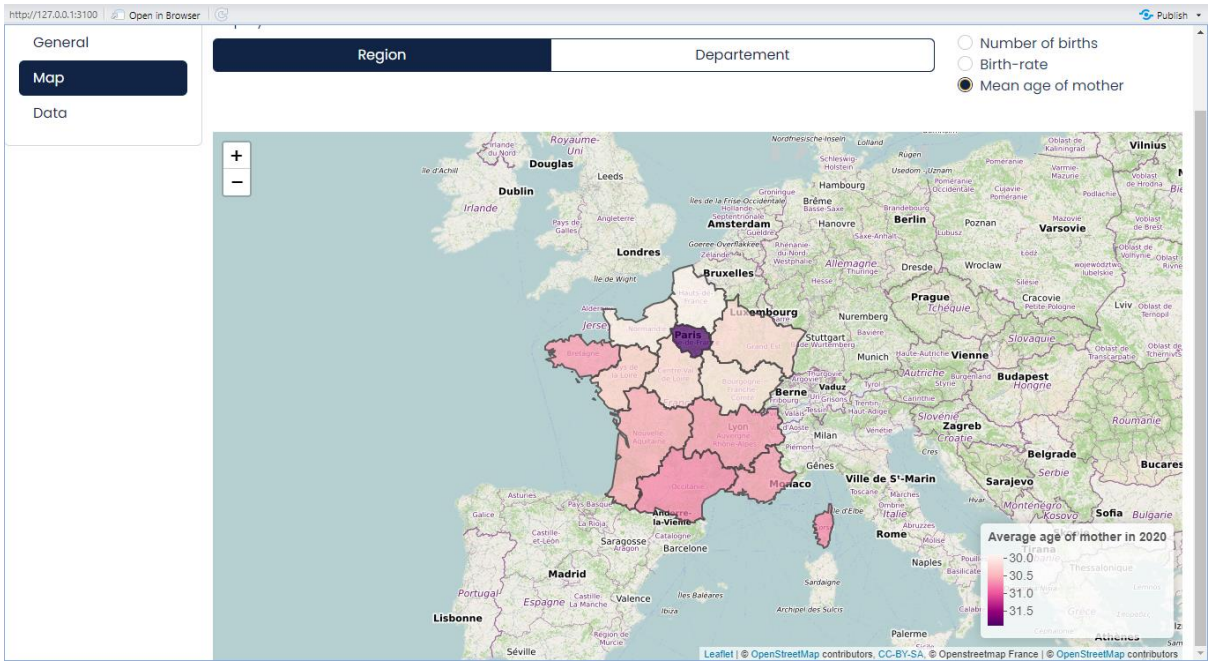
http://127.0.0.1:3100
Open in Browser
Publish
General
Map
Data
Region
Departement
Number of births
Birth-rate
Mean age of mother
Average age of mother in 2020
30.0
30.5
31.0
31.5
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In the third component of the dashboard, we can see the tabular representation of the data set. Here also get the three options, France, Region and Department, with a drop box. The most attractive part of this page is the export button. From there, we can download the data file into the csv format.

CONCLUSION AND FUTURE WORKS:

We can generate the dashboard with a graphical representation by arranging the dataset into a specific form. This helps to analyse and study the data efficiently for research and development. The option to download the data set and the graphs make it more efficient and convenient for the study. The map representation shows a clear image of the dataset's three main aspects: the number of birth, birth rate and mean age of the mother.

The future goals of this project can be utilizing the framework for the different datasets and getting a clearer vision of the trend and pattern. More sections can be added to the dashboard to enhance the data distribution. More graphical representation can be used to visualize data efficiently.

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