Tracing The Growth Of The Global Community: A Population Forecasting Analysis

1 INTRODUCTION

1.1 Overview

Project Description:

The world's population is more than three times larger than it was in the mid-twentieth century. The global human population reached 8.0 billion in mid-November 2022 from an estimated 2.5 billion people in 1950, adding 1 billion people since 2010 and 2 billion since 1998. The world's population is expected to increase by nearly 2 billion persons in the next 30 years, from the current 8 billion to 9.7 billion in 2050 and could peak at nearly 10.4 billion in the mid-2080s.

This dramatic growth has been driven largely by increasing numbers of people surviving to reproductive age, the gradual increase in human lifespan, increasing urbanization, and accelerating migration. Major changes in fertility rate have accompanied this growth. These trends will have far-reaching implications for generations to come.

1.2 Purpose

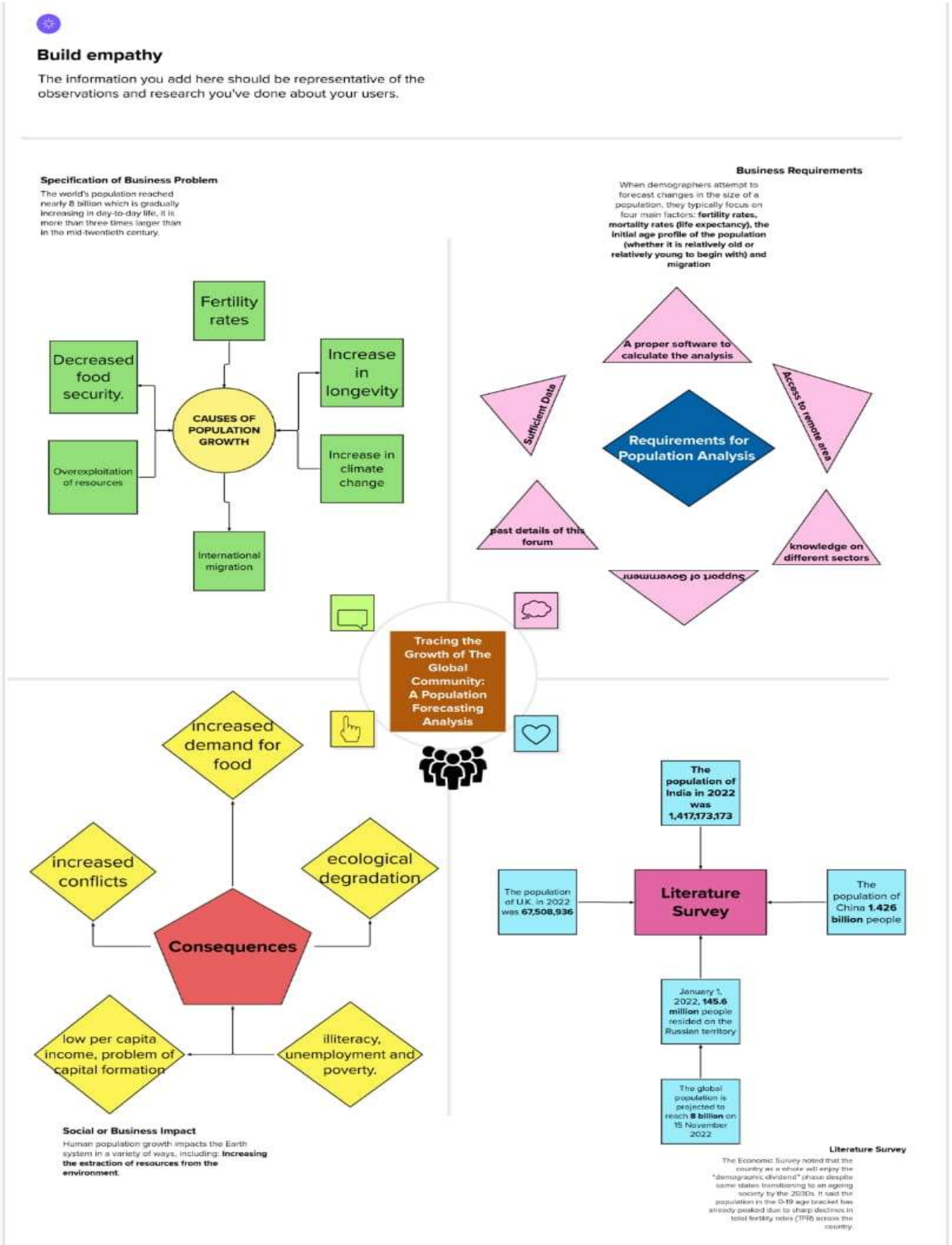
In a number of countries, the population census plays a major role in the allocation of elected political seats in government. The number of elected officials for each governmental administrative unit is determined by the population size of a given locale. For some countries, the information is also used in the allocation of government resources. The size of the population determines, in part, the amount of money that is provided by government for development efforts.

For planners, census information is used in just about all planning decisions. The census of population provides information on the age and sex distribution, in addition to household composition and size, all of which are vital in determining the needs of different segments of the population. The census of housing allows planners to assess changes in the quality of housing and related facilities and plan for future housing needs.

When two or more census counts are compared for the same location, planners can determine if locales are increasing or decreasing in size. Sex ratios can be calculated by 5-year age groups to crudely observe migration, especially among the working age cohorts. Location of Residence and Place of Prior Residence helps assess changes in rural and urban areas. Place of prior residence helps to identify communities that are experiencing in- or out-migration. A census of housing collects information on buildings, living quarters and related facilities. Information is collected on buildings that are used for residential, commercial, or industrial purposes, including the type of structure, the construction materials used for the outer walls, and the year of construction.

2 Problem Definition & Design Thinking

Empathy Map



2.1 Ideation & Brainstorming Map

PROBLEM

Tracing the Growth of The Global Community:

1

Problem statement

Currently the world's population reached nearly 8 billion which is gradually increasing in day-to-day life, it is more than three times larger than in the mid-twentieth century.

Overpopulation refers to an increase in the number of people that exceeds the actual capacity of the planet

2

Brainstorm

Due to overpopulation, the coastal areas are set to experience annual flooding by 2050.

greater risk of flooding due to climate change, low-lying land, and undoubtedly overpopulation

Francis Figo A

Sufficient level of data on the population of people → Population growth trends over a specific time period

The values of present and past population records → ***The growth of a region or country can be calculated***

Illavarsi A

The age-sex population analysis → Forecasts can be of a short, medium or long-term nature

Natality & Mortality rate → ***Comparative*** (or ratio) ***method***

Esakki Muthu E

Minimal data requirements → Simple and quick calculation

Based solely on past trend → ***Simple extrapolative models***

Dhanalakshmi R

Reduced mortality rate → Advanced healthcare services

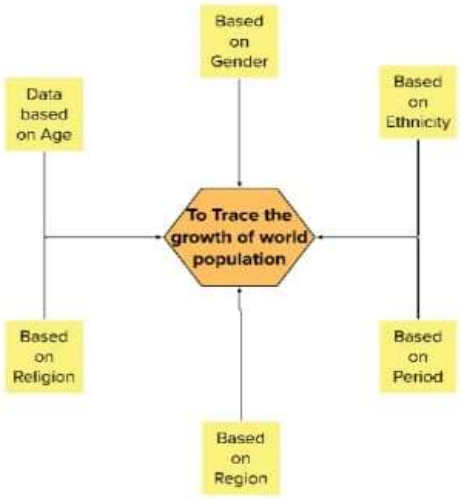
Industrial revolution improves the livelihood → ***Exceeds the actual capacity of the planet***

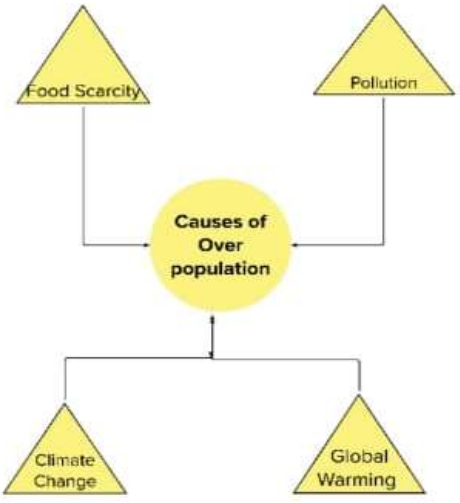
3

Group ideas

Anticipating the numbers and characteristics of future population is very difficult. Since the planner is unable to fully foresee and therefore to predict future world social and economic conditions, he can only project what he thinks will happen to present trends in the future.

population analysis



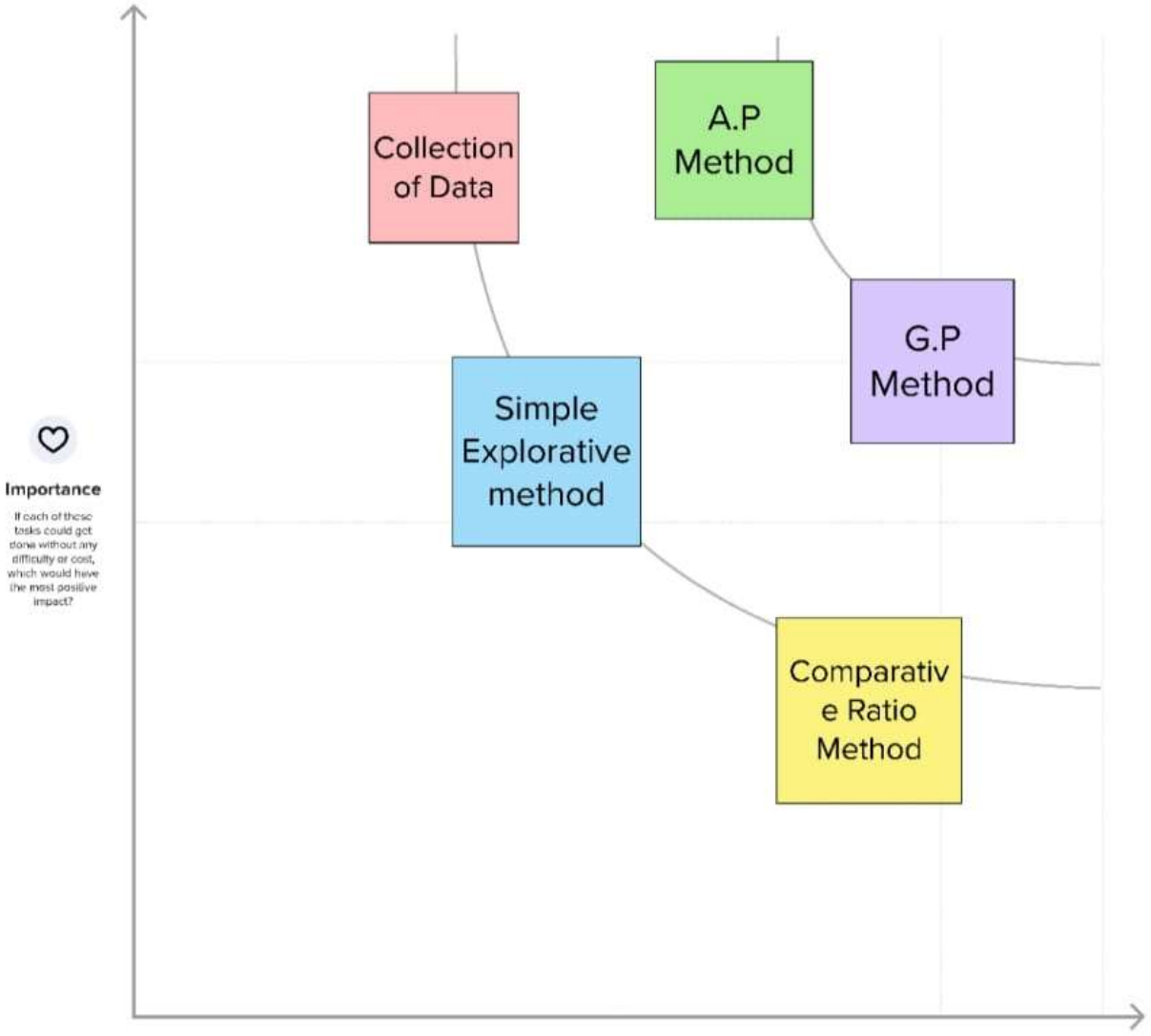


4

Prioritize

Determinants of analaysis

20 minutes

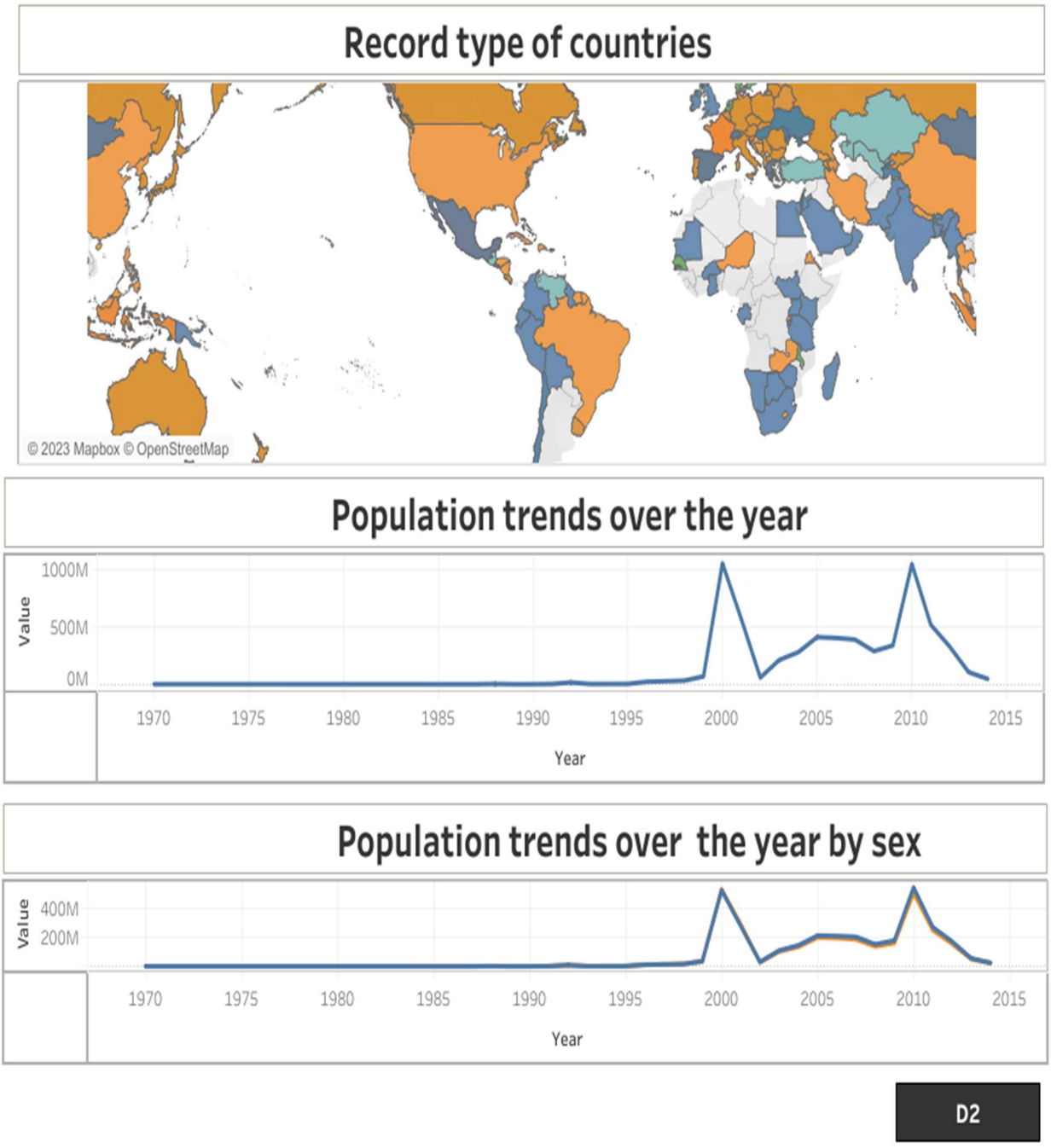


the term 'forecasts' throughout the paper but acknowledge that some small area forecasts are labelled 'projections' by their creators who emphasise that their numbers are not intended to be forecasts but simply the outcome of selected assumptions and models. Projections are often defined as a calculation of future population based on chosen assumptions about the future drivers of population change (which may or may not be plausible), whereas a forecast is deemed the most likely future. However, for consistency and because most users tend to interpret projections as forecasts, we primarily use the term 'forecasts' here.

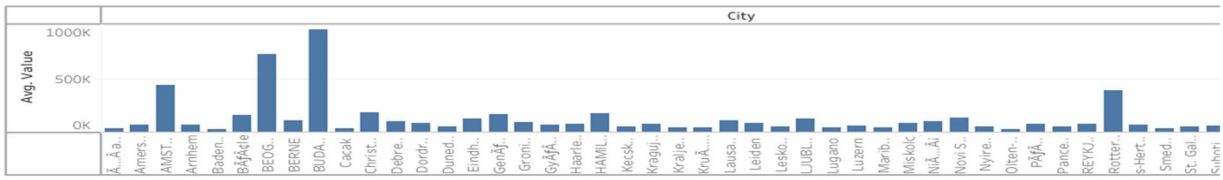
3 RESULT

Work sheets are created using Tableau with given dataset, the dashboards and stories are created using the worksheets. We have published our Dashboard and Story file in Tableau public .The published dashboard and story are given by

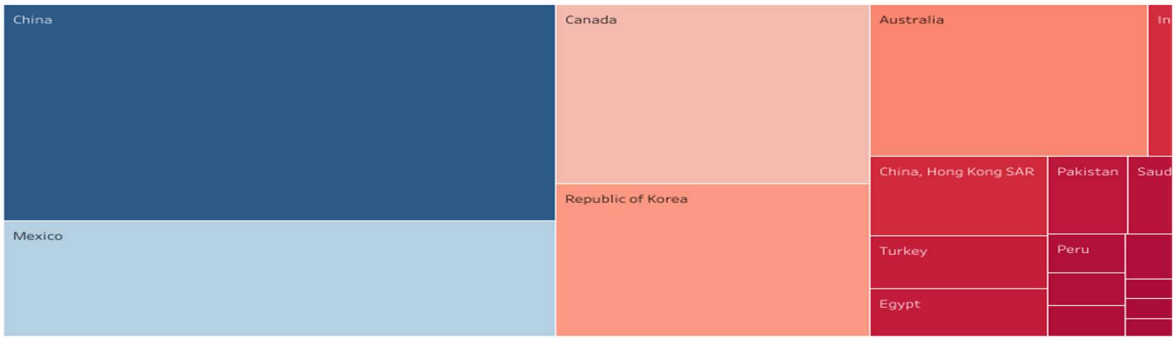
Dashboards:



Cities with highest average population



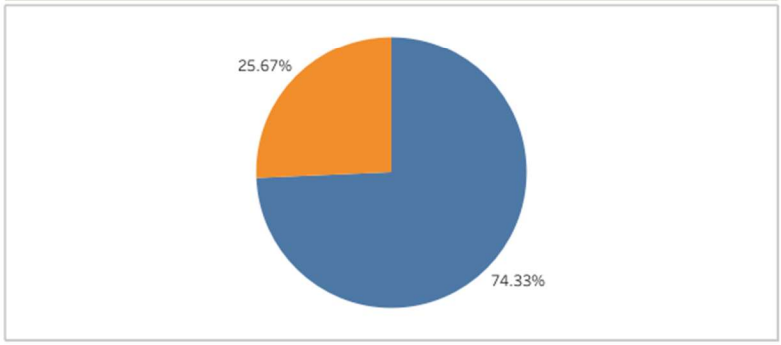
Countries by highest avg population from 2000 -2014



Population of city by year

City	Country or Area									
	Brazil	China	Egypt	India	Indonesia	Japan	Pakistan	Republic of ..	United King..	Unite
6th of October City			154,093							
AÃƒÂ§ailÃƒÂ¢ndia	156,474									
Abaeteluba	163,802									
Abbotabad							106,101			
Aberdeen									212,125	
Aberdeenshire									226,871	
Abiko						654,213				
Abilene (TX)										2
Abo Keber			103,175							
Abohar				124,339						
Achalpur				107,316						
Acheng		638,894								
Adilabad				238,932						
Adityapur				119,233						

Population by city type



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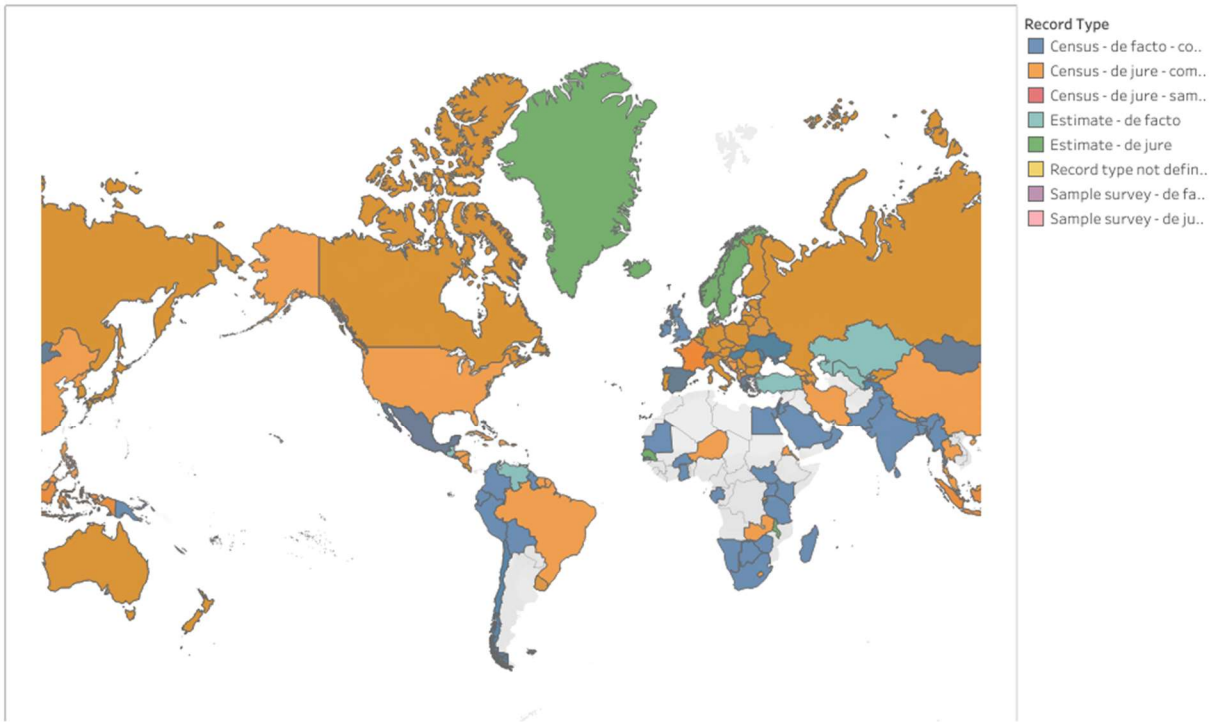
Project Report

Story:

Story 1

It is a geographic map it shows all the country according to their population record types | This line map represents the population trend over year by year.It covers the information about 1970-2015 | For an accuracy this chart shows the ratio of gender (Male.Female). It depicts the year gender and population value | The column chart shows the average population of the city



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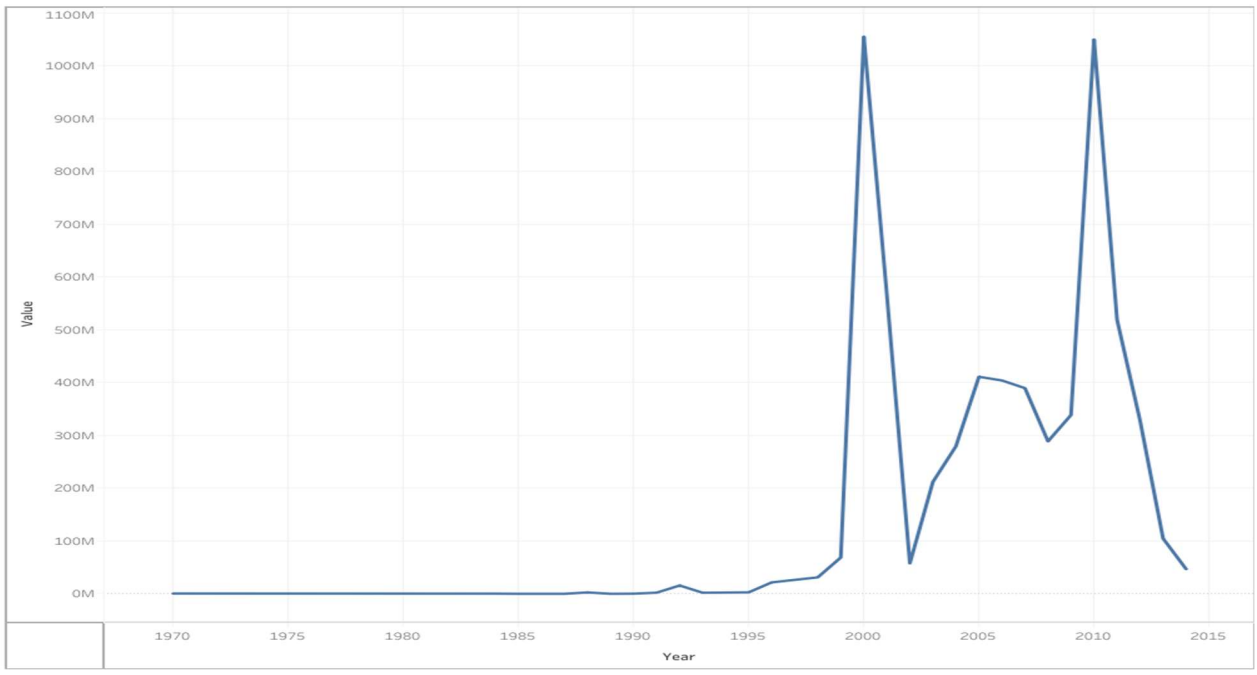

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Project Report

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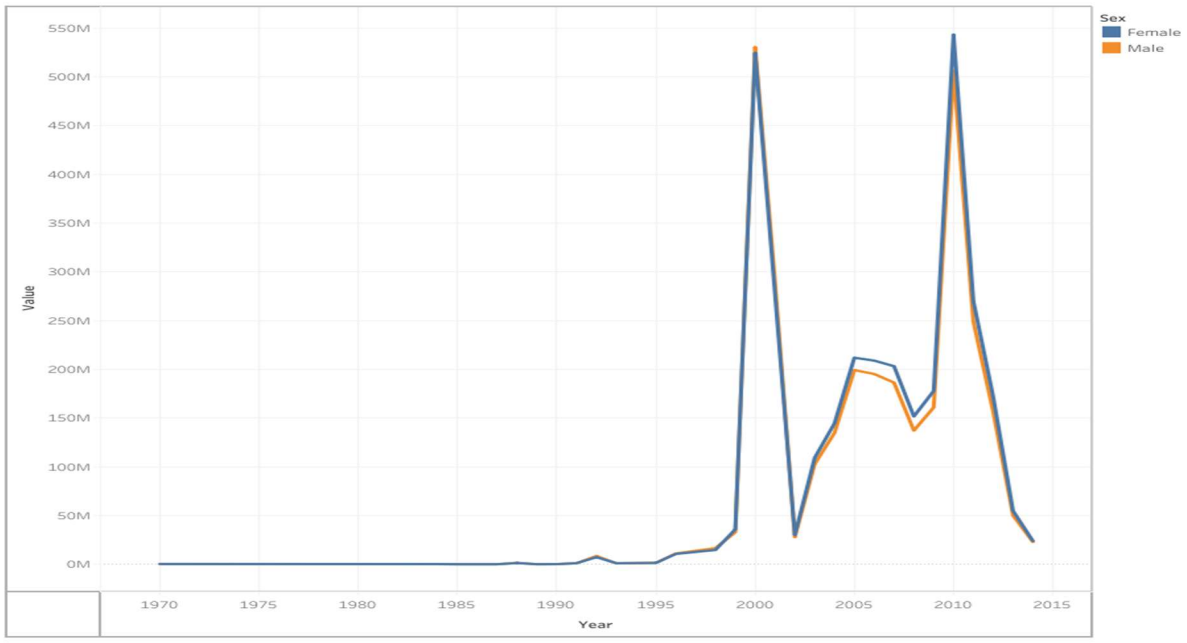
This tree map shows the highest average ..



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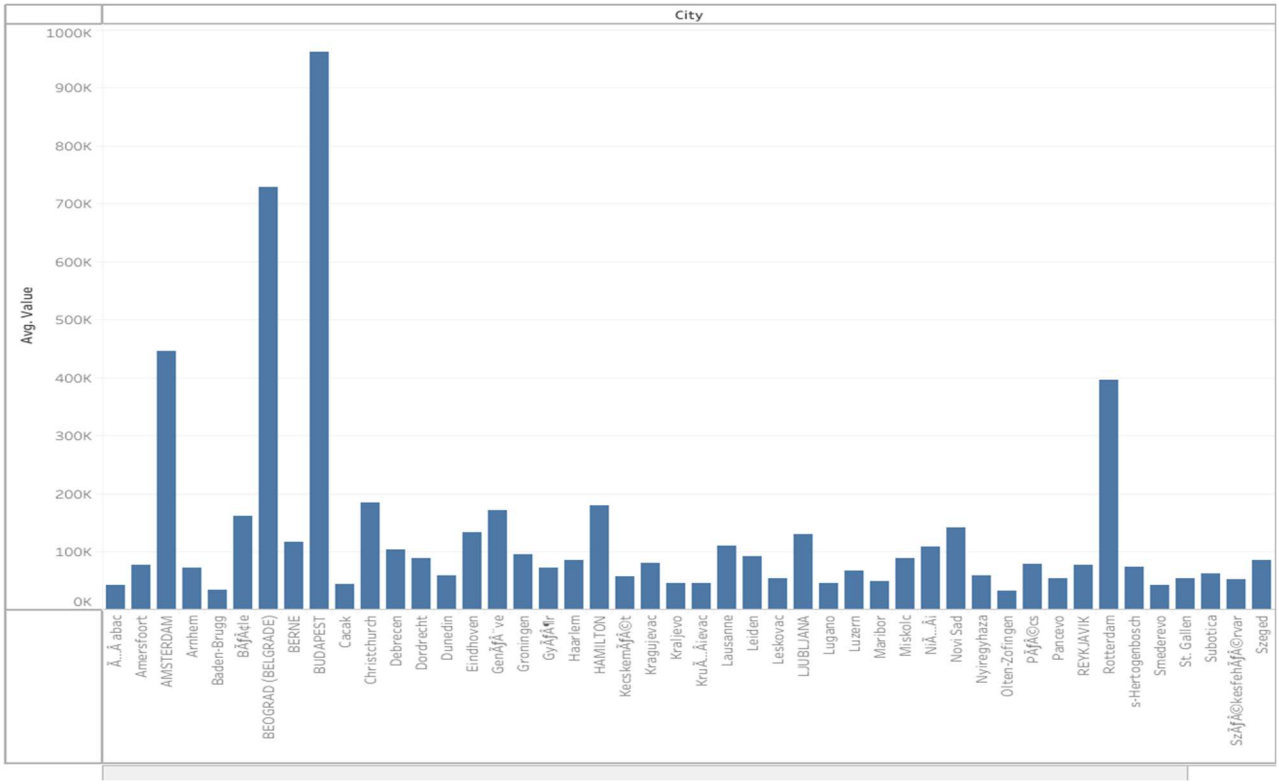
The column chart shows the average population of the city

This tree map shows the highest average oopulation from 2000-2014 around top 50 couuntries with their values

This pie chart demonstrates where the most ..



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Project Report

For an accuracy this chart shows ..

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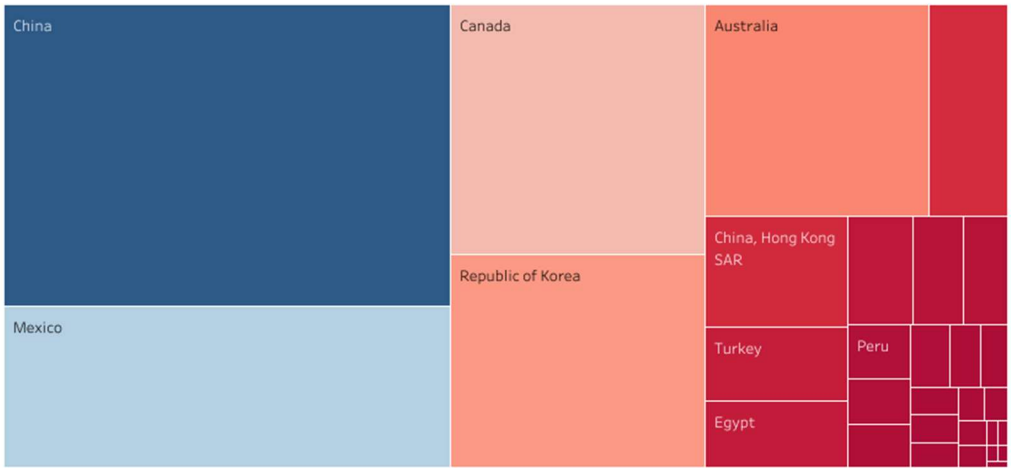
This pie chart demonstrates where the most of the people resides according to their nature of the location

This table shows the precise information abo..



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This table shows the precise information about some country's cities population data

Country or Area

City	Brazil	China	Egypt	India	Indonesia	Japan	Pakistan	Republic of ..	United King..
6th of Octo..			154,093						
AÃƒÃ§ailÃƒ..	156,474								
Abaeteluba	163,802								
Abbotabad							106,101		
Aberdeen									212,125
Aberdeensh..									226,871
Abiko						654,213			
Abilene (TX)									
Abo Keber			103,175						
Abohar				124,339					
Achalpur				107,316					
Acheng		638,894							
Adilabad				238,932					
Adityapur				119,233					
Adoni				319,763					
Agartala				189,998					
Ageo						1,093,308			
Agra				2,606,473					
Aguas Lind..	318,276								
Ahmedabad				8,045,098					
Ahmednagar				655,164					
Aizawl				228,280					
Aizuwakam..						599,503			
Ajmer				976,095					
Akashi						1,459,302			
Akeshu		561,822							
Akhmim			101,509						
Akishima						548,294			
Akita						1,610,514			
Akola				400,520					
Akron (OH)									
Al Orizah			100,482						
Alagoinhas	246,366								
Alandur				146,287					
Alappuzha				459,704					
Albuquerqu..									
Aldershot									243,344

Year
All values

The column chart shows the average population of the city

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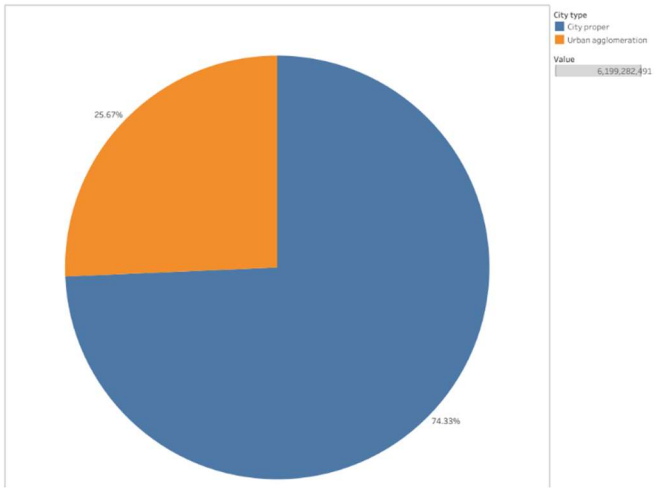

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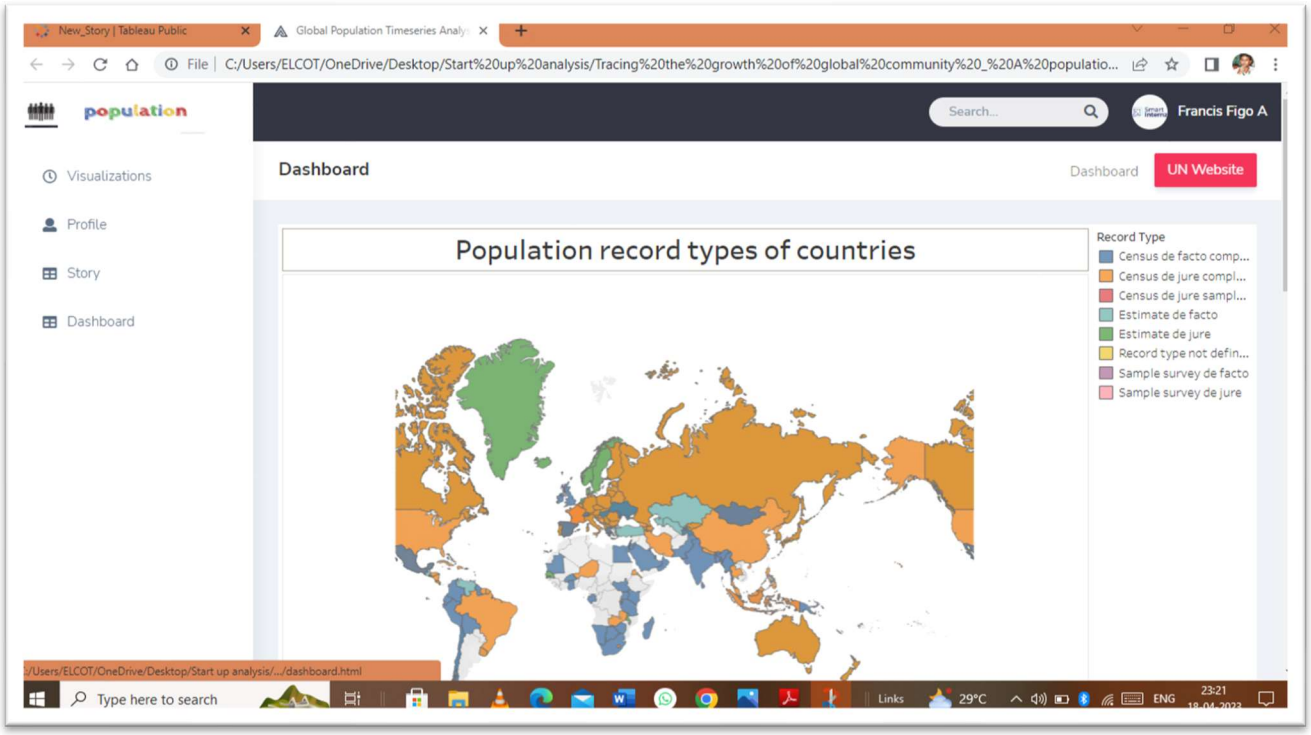
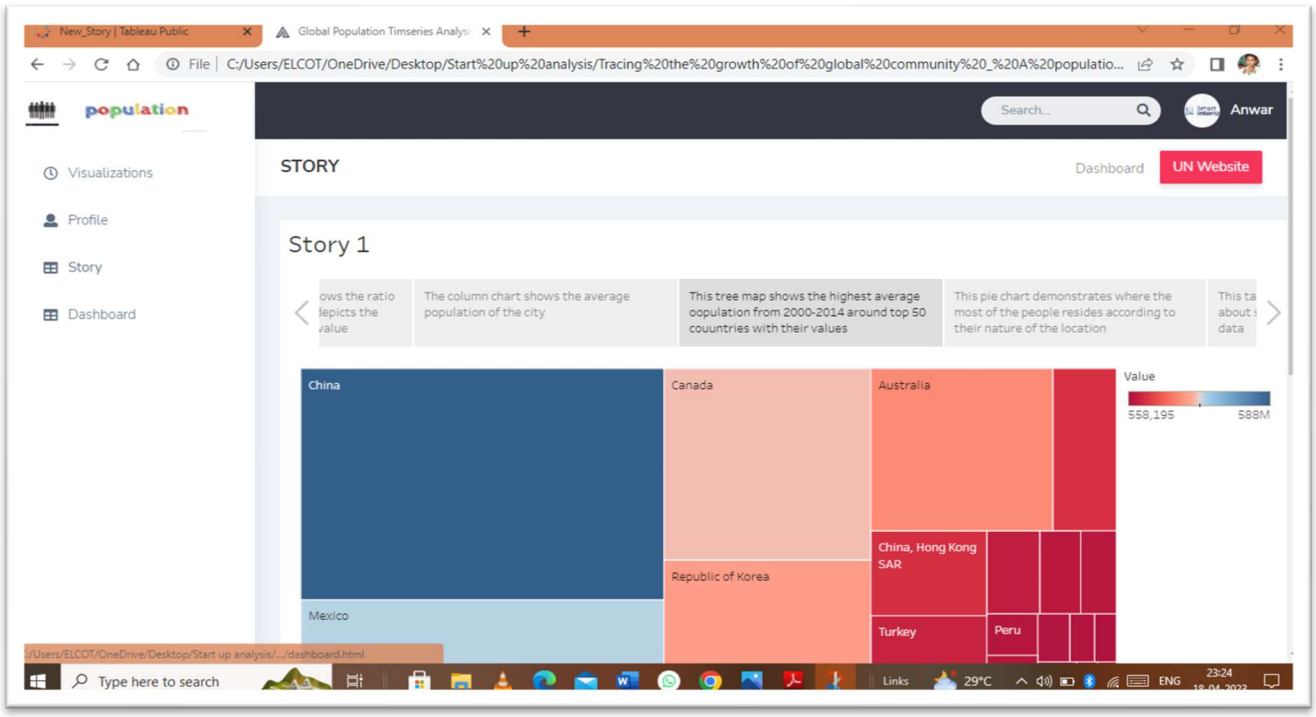
Project Report

Web Integration: Dashboard & Story embed with UI with Flask

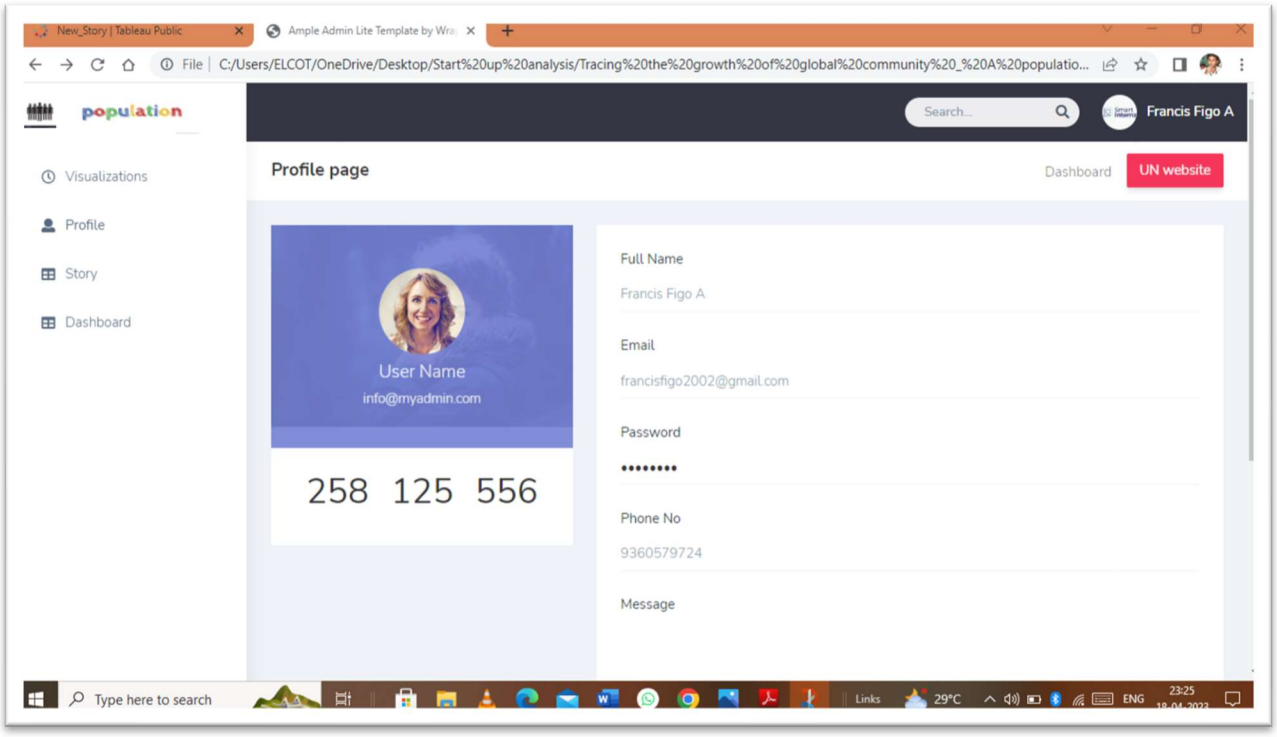
Dashboard:



Story:



Profile:



4 ADVANTAGES & DISADVANTAGES

By this proposed solution we can overview a detailed data on population forecast analysis. This project gives the clear idea on Unique data visualization or graphs on a certain topic, the list of charts is

- Population record types of countries
- Population trends over the years
- Population trends over the years by sex
- Cities with highest average population
- Countries with highest average population from 2000-2014
- Population by city type
- Population of cities by year

Advantages:

- Every people can get the precise information on population forecasting very easily and comprehensible
- By our project we can easily sort each and every data individually according to their countries, states cities, ethnicity, sex etc.
- A complete information about a population can be seen on the basis of city type, like if it is a rural or urban or semi urban
- The findings would be representative of the population (since analyses are based on the population).
- No need for sampling! (The entire population is in our dataset)

Dis Advantages:

- To collect all of the information for a population it would likely take a great deal of time, which means more effort and money.
- We cannot get accurate data because some individuals may be missed on counting due to their contactless residencies
- It may also pave way for discrimination and used to separate in the sense of majorities and minorities'

5 APPLICATIONS

Prediction is a strategy that enlights the outcome of a feature event based on past experience. Also, making the prediction is crucial in different fields to remove uncertainties that can happen in the future. There are many different countries in the world. To survive, these countries need an administration that manages the people living in them. In order to rule and make decisions about the country, this administration or state must first have an idea of the number of people it is responsible for, i.e., the population of the country.

For this reason, there was a need to conduct a census at regular intervals throughout the country. The census is defined as the collection, compilation, analysis and publication of demographic, social and economic data on all people living in the country within a certain period (Bamgbose, 2009). Population statistics provide information about the country such as age-gender distribution, labour force, education, birthplace, population

This study aims to estimate the total population with different Tableau worksheets. For this purpose, the total population value can estimate by selecting different visualizations. The reason for predicting the population value is comparing the predictions with the actual population value.

6 CONCLUSIONS

In this study, population projection was made with both state-of-the-art time series and regression. According to the results, assembling regression with the cohort component methods have very successful results in the prediction Data analytics with Tableau, especially ensemble regression models, can better estimate the country's future population by minimizing the factors that make it difficult to estimate the country's population and by analyzing uncertainties on demographic data. Therefore, Data analytics on population estimation will make an essential contribution to the country. This will facilitate the planning of national needs about the country and pave the way for more consistent social, economic and environmental decisions. The cohort components method is used to estimate the population by using variables such as the total population of the country, birth, death and migration rates, life expectancy at birth and sex ratio at birth. However, different features can also affect the total population of the country. Thanks to Tableau for successful in learning these effects from the dataset. One of the study limits can be said to be the pooling of 257 different countries and training the model with all data.

According to the results, training models with all data gives better performance results than training with fewer data. However, according to their developed levels, clustering the training data, cultural characteristics, or geographical location may provide different results. Due to the nature of the problem, population statistics and demographic indicators have limited dataset. Besides, the dataset is insufficient, especially for underdeveloped countries. The consistency of available data is also questionable. Increasing the accuracy and texture of the collected data will improve the population projection. So, the population projection of underdeveloped countries with limited datasets is more complex than developed countries' population projections.

7 FUTURE SCOPE

In future studies, Data analytics can be synthesized with the cohort components method. In the cohort components method, all input data up to the desired year is needed. For example, when it is expected to estimate population for 2050, all variables, such as birth rates for each year during the 29 years, must be predicted. Data analytics can estimate these input data for each year. Later, the data obtained from Tableau can be used in the cohort component method. This study can also be expanded by increasing the number of years to be estimated. Countries may need to estimate 50 years from now when producing population projections. The use of Data analytics can make a significant contribution to predicting many years. After analyzing all the data, the variables were filtered with the variables of cohort components method for better comparison. This reduction can be made in future research by using different Data analytics methods. For example, Principal Component Analysis (PCA) can be used to differentiate the entire dataset

8 APPENDIX

- Tableau public link https://public.tableau.com/app/profile/francis.figo
- Source code link https://drive.google.com/file/d/17RrJ4jyfgpY4y5D7sMAt3aSEm8X6M84L/view?usp=share_link