

Mini Project Report

India population analysis of few decades

**Jawaharlal Nehru Technological University Anantapur,
Ananthapuramu**

in partial fulfillment of the requirements for the award
of the degree of

BACHELOR OF TECHNOLOGY

IN

INFORMATION TECHNOLOGY

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SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

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Institute Vision and Mission

VISION

To be one of the Nation's premier Engineering Colleges by achieving the highest order of excellence in Teaching and Research.

MISSION

- To foster intellectual curiosity, pursuit and dissemination of knowledge.
- To explore students' potential through academic freedom and integrity.
- To promote technical mastery and nurture skilled professionals to face competition in ever increasing complex world.

DEPARTMENT OF INFORMATION TECHNOLOGY

VISION

To become a nationally recognized quality education center in the domain of Computer Science and Information Technology through teaching, training, learning, research and consultancy.

MISSION

- The Department offers undergraduate program in Information Technology to produce high quality information technologists and software engineers by disseminating knowledge through contemporary curriculum, competent faculty and adopting effective teaching-learning methodologies.
- Igniting passion among students for research and innovation by exposing them to real time systems and problems
- Developing technical and life skills in diverse community of students with modern training methods to solve problems in Software Industry.
- Inculcating values to practice engineering in adherence to code of ethics in multicultural and multi discipline teams.

PROGRAM EDUCATIONAL OBJECTIVES

After few years of graduation, the graduates of B. Tech. (IT) Program will be:

1. Enrolled or completed higher education in the core or allied areas of Computer Science and Information Technology or management.
2. Successful entrepreneurial or technical career in the core or allied areas of Computer Science and Information Technology.
3. Continued to learn and to adapt to the world of constantly evolving technologies in the core or allied areas of Computer Science and Information Technology.

PROGRAM OUTCOMES

On successful completion of the Program, the graduates of B. Tech. (IT) Program will be able to:

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

On successful completion of the program, the graduates of B.Tech. (IT) program will be able to:

PSO1: Design and develop database systems, apply data analytics techniques, and use advanced databases for data storage, processing and retrieval.

- PSO2:** Apply network security techniques and tools for the development of highly secure systems.
- PSO3:** Analyze, design and develop efficient algorithms and software applications to deploy in secure environment to support contemporary services using programming languages, tools and technologies.
- PSO4:** Apply concepts of computer vision and artificial intelligent for the development of efficient intelligent systems and applications.

ABSTRACT

This abstract provides a succinct overview of the population dynamics in India over the past few decades. India, the world's second-most populous country, has experienced profound demographic changes marked by rapid population growth, urbanization, shifts in age structure, changes in fertility rates, and ongoing challenges related to gender disparities, healthcare, and education. An understanding of these population trends is essential for policymakers, researchers, and stakeholders seeking to address the multifaceted issues and opportunities arising from India's evolving demographic landscape.

India's population, the second-largest in the world, has witnessed significant changes and challenges over the last few decades, making it a focal point of demographic analysis. This abstract provides an overview of the key trends and factors that have shaped India's population dynamics, including rapid growth, urbanization, changing age structures, fertility rates, gender disparities, healthcare, and education. Understanding these population trends is vital for policymakers, researchers, and global stakeholders as they work to address the unique demographic challenges and opportunities facing the nation in the 21st century.

INTRODUCTION

India, a country renowned for its diversity, culture, and history, has also been a significant contributor to the global population dynamics. Over the last few decades, India has experienced profound changes in its population landscape, which have far-reaching implications for the nation's development, economy, and social fabric.

The population of India, currently estimated to be over 1.3 billion, has grown substantially in recent history. This rapid growth is attributed to a combination of high birth rates, declining death rates, and increased life expectancy. As a result, India is now the second-most populous country in the world, and this demographic shift presents both opportunities and challenges for the nation.

One of the most noticeable trends has been the accelerating pace of urbanization. People from rural areas have flocked to cities in search of better economic opportunities, contributing to the growth of urban centers. This migration has strained infrastructure and resources, raising questions about sustainable urban development.

India's age structure has also undergone significant changes. The nation is experiencing a demographic transition with a growing proportion of its population falling within the working-age group. This "youth bulge" presents the potential for economic growth and innovation but also necessitates job creation and skill development to harness this demographic dividend effectively.

Fertility rates in India have seen a decline, though regional disparities persist. Government policies and healthcare initiatives have played a vital role in promoting family planning and reproductive health, contributing to these changes. Gender disparities, particularly in terms of sex ratios and women's empowerment, remain areas of concern, and efforts to address these issues have been ongoing but require continued attention.

Access to quality healthcare and education has improved for many in India, but challenges still exist, particularly in rural areas. Investments in these sectors are vital to improve the overall quality of life for the population. This study aims to provide a comprehensive analysis of the population trends in India over the last few decades. By examining these trends, we can better understand the challenges and opportunities that India faces as it strives for sustainable development, social progress, and the well-being of its diverse and dynamic population.

PROBLEM DEFINITION

The rapid population growth and associated challenges in India over the past few decades have created a pressing need for comprehensive and sustainable solutions to address issues related to resource allocation, gender disparities, urbanization, healthcare, education, employment, agriculture, environmental sustainability, social inequality, migration, and aging population, in order to ensure a prosperous and equitable future for the nation.

DATASET

The "Indian Demographic and Health Survey (DHS)" dataset provides a comprehensive collection of demographic, health, and socioeconomic information pertaining to the Indian population over the past few decades. This dataset includes a wide range of variables such as population growth, fertility rates, infant mortality, maternal healthcare, education levels, and more. It allows researchers and policymakers to analyze trends, disparities, and changes in the Indian population's demographic and socio-economic characteristics over time, making it a valuable resource for studying India's evolving population dynamics.

DATA PRE-PROCESSING

csv to dataframe:

```
import pandas as pd

df=pd.read_csv(r'C:\Users\suman\Documents\project.csv')

data=pd.DataFrame(df)

print(data)
```

Output:

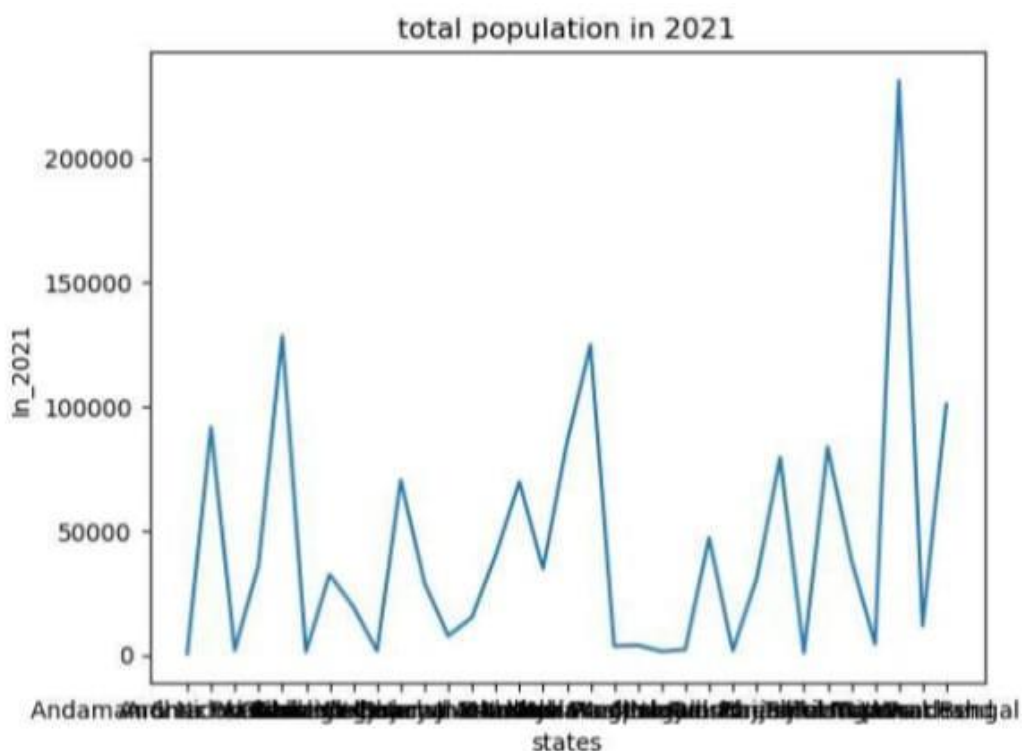
	state	1951	1961	1971	1981	1991	2001	\
0	Andaman & Nicobar Island	31.0	64	115	189	281	356	
1	Andhra Pradesh	31115.0	35983	43503	53551	66508	76210	
2	Arunachal Pradesh	NaN	337	468	632	865	1098	
3	Assam	8029.0	10837	14625	18041	22414	26656	
4	Bihar	29085.0	34841	42126	52303	64531	82999	
5	Chandigarh	24.0	120	257	452	642	901	
6	Chhattisgarh	7457.0	9154	11637	14010	17615	20834	
7	Delhi	1744.0	2659	4066	6220	9421	13851	
8	Goa	547.0	590	795	1008	1170	1348	
9	Gujarat	16263.0	20633	26697	34086	41310	50671	
10	Haryana	5674.0	7591	10036	12922	16464	21145	
11	Himachal Pradesh	2386.0	2812	3460	4281	5171	6078	
12	Jammu & Kashmir	3254.0	3561	4617	5987	7837	10144	
13	Jharkhand	9697.0	11606	14227	17612	21844	26946	
14	Karnataka	19402.0	23587	29299	37136	44977	52851	
15	Kerala	13549.0	16904	21347	25454	29099	31841	
16	Madhya Pradesh	18615.0	23218	30017	38169	48566	60348	
17	Maharashtra	32003.0	39554	50412	62783	78937	96879	
18	Manipur	578.0	780	1073	1421	1837	2294	
19	Meghalaya	606.0	769	1012	1336	1775	2319	
20	Mizoram	196.0	266	332	494	690	889	
21	Nagaland	213.0	369	516	775	1210	1990	
22	Odisha	14646.0	17549	21945	26370	31660	36805	
23	Puducherry	317.0	369	472	604	808	974	
24	Punjab	9161.0	11135	13551	16789	20282	24359	
25	Rajasthan	15971.0	20156	25766	34262	44006	56507	
26	Sikkim	138.0	162	210	316	406	541	

DATA VISUALIZATION

line graph:

```
import matplotlib.pyplot as plt
x = data['state']
y = data['2021']
plt.xlabel('states')
plt.ylabel('In_2021')
plt.title('total population in 2021')
plt.plot(x, y)
plt.show()
```

Output:

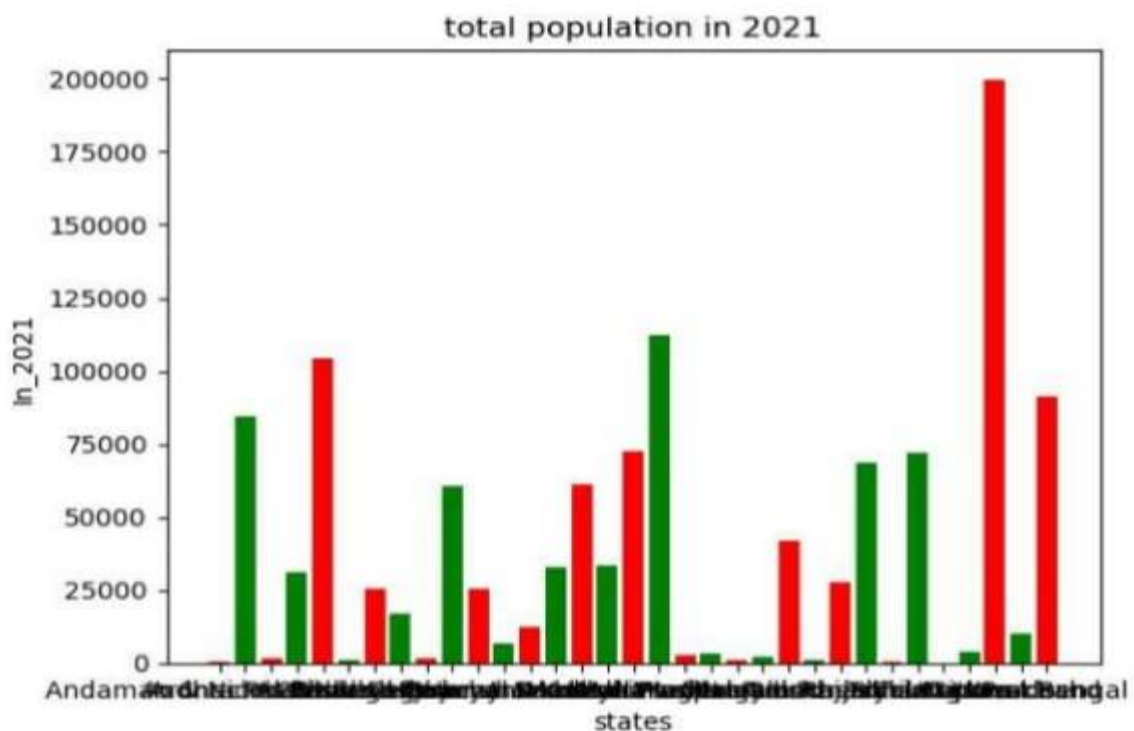


A line graph depicting the 2021 population across 27 states reveals variations, with peaks around states 5, 16, and 24. Notably, state 5 exhibits the highest population, while state 7 experiences a distinct dip.

bargraph:

```
import matplotlib.pyplot as plt
x =data['state']
y =data['2011']
plt.xlabel('states')
plt.ylabel('In_2011')
plt.title('total population in 2011')
plt.bar(x, y,width = 0.8, color = ['red', 'green'])
plt.show()
```

Output:

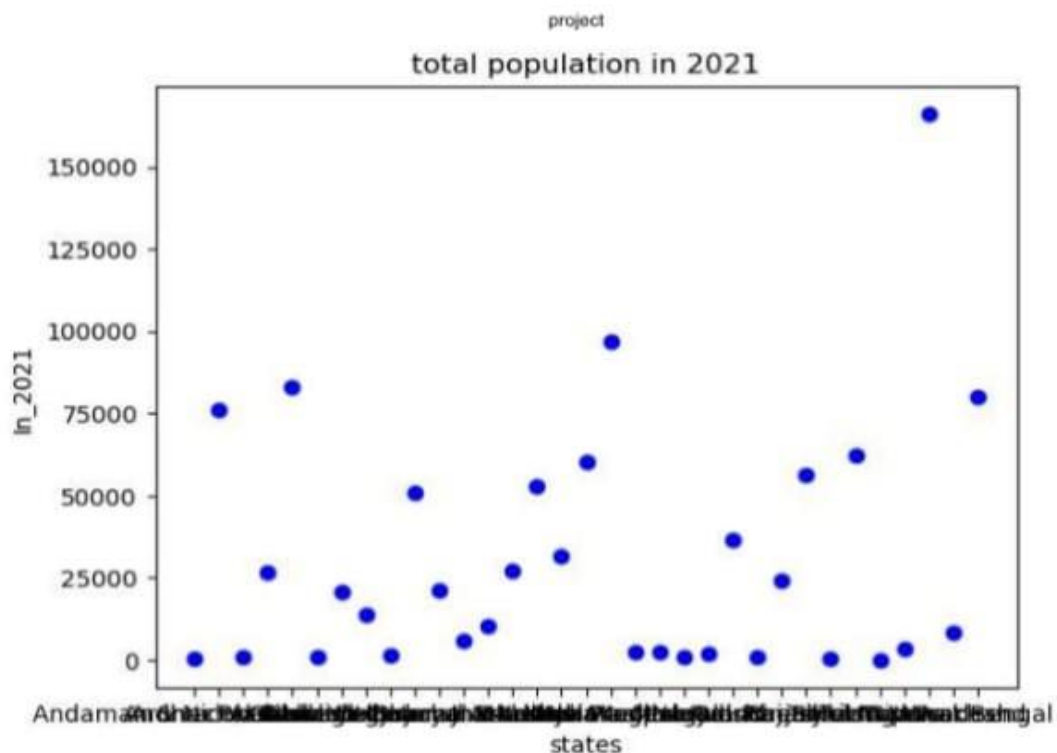


A bar graph illustrating 2021 populations in 27 states highlights disparities, notably peaking in states 5, 16, and 24. State 5 records the highest population, while state 7 stands out with a noticeable decline.

scatterplot:

```
import matplotlib.pyplot as plt
x =data['state']
y =data['2001']
plt.xlabel('states')
plt.ylabel('In_2001')
plt.title('total population in 2001')
plt.scatter(x,y,color='blue')
plt.show()
```

Output:

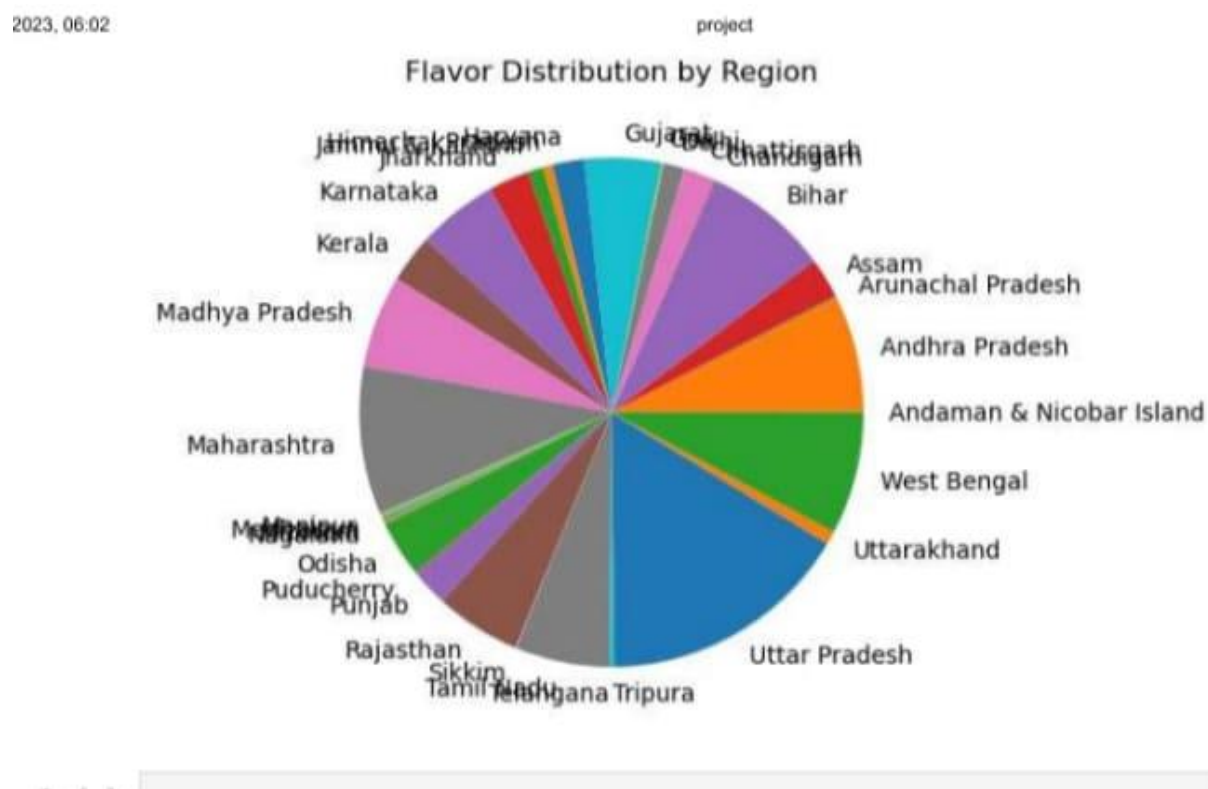


A scatter plot showcasing 2021 populations in 27 states reveals diverse patterns. Notably, states 5, 16, and 24 exhibit distinct population clusters, with state 5 standing out as the most populous. State 7 presents a scattered pattern, indicative of its unique demographic distribution.

piechart:

```
import pandas as pd
import matplotlib.pyplot as plt
df=pd.read_csv(r'C:\Users\suman\Documents\project.csv')
data=pd.DataFrame(df)
x =data['state']
y =data['1991']
plt.title('POPULATION IN INDIA IN 1991')
plt.pie(y,labels=x)
plt.show()
```

Output:

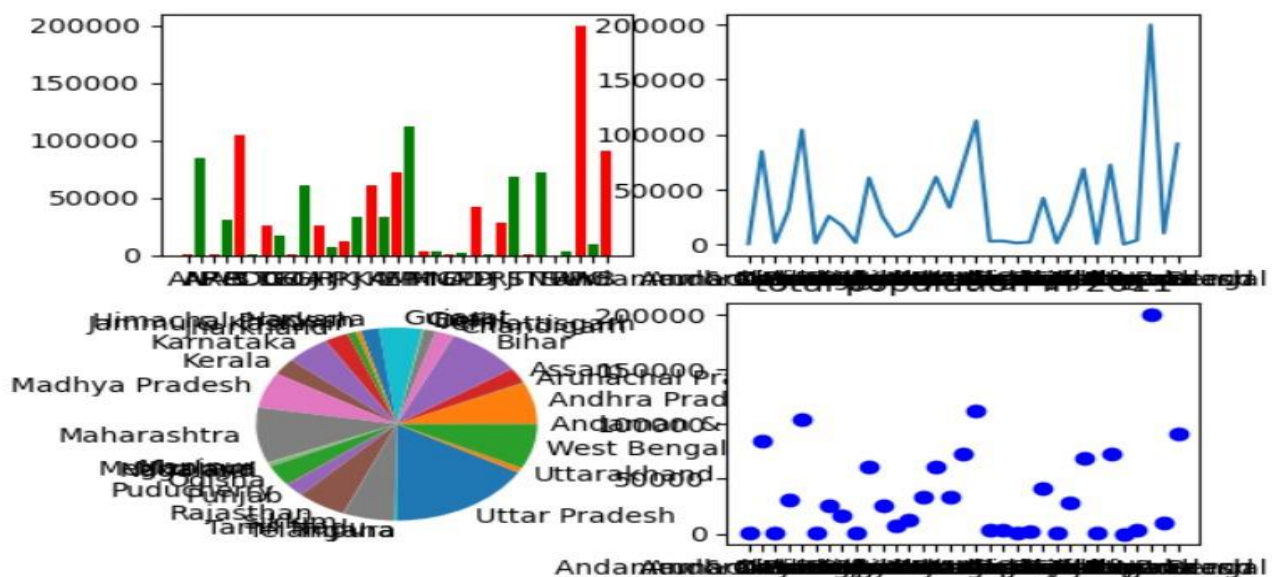


A pie chart representing the distribution of 2021 populations across 27 states highlights significant variations. State 5 claims the largest share, while state 7 occupies a smaller segment, indicating diverse demographic proportions

Subplots:

```
import matplotlib.pyplot as plt
import pandas as pd
df=pd.read_csv(r'C:\Users\suman\Documents\project.csv')
data=pd.DataFrame(df)
x =data['state']
y =data['2011']
fig = plt.figure()
ax1 = fig.add_subplot(2, 2, 1)
ax2 = fig.add_subplot(2, 2, 2)
ax3 = fig.add_subplot(2, 2, 3)
ax4 = fig.add_subplot(2, 2, 4)
plt.title('total population in 2011')
ax1.bar(x, y,width = 0.8, color = ['red', 'green'])
ax2.plot(x, y)
ax3.pie(y,labels=x)
ax4.scatter(x,y,color='blue')
plt.show()
```

Output:



CONCLUSION

In conclusion, India has witnessed significant population growth, urbanization, improvements in healthcare and education, and economic development over the past few decades. However, these positive trends are accompanied by challenges, including overpopulation, inequality, and the need for sustainable development and social programs to address the evolving demographic landscape.

India's population has seen significant changes over the past few decades, including growth, demographic shifts, and improvements in healthcare and education. While there have been many positive developments, the country also faces challenges related to overpopulation, urbanization, and inequality. It's important for policymakers to address these issues to ensure sustainable and inclusive development in the coming years. To provide a more up-to-date conclusion, it is advisable to consult the most recent data and reports on India's population and related trends.

REFERENCES

- Advanced EDA & Data Wrangling - Crypto Market Data by François Georges and Julien (Kaggle): <http://www.kaggle.com/c/avazu-ctr-prediction/data>
- Cryptocurrency wrangling with pandas by Marco Bonzanini (Towards Data Science): data <https://elitedatascience.com/python-data-wrangling-tutorial>