Summary Results for Geo Data Science with Python Midterm Exam

1. Introduction

In this task, the population distribution of countries is analyzed using UN population prediction data. The script was set up to allow it to be imported as a module or run as a main level function from the terminal. The data was provided in a text file with a first line corresponding to headers and comma-delimited columns. A script was written that performed several functions, a summary of which is given here.

The function, *readUNpopData*, was written to strip out new line characters and whitespaces inside and outside the numerical values that corresponded to populations. The resulting outputs were a list of countries, a list of years, and a list of lists containing the populations for each country. Three mathematical functions are found outside the 'main' function, and each of these can be called from the imported module. *mySum* calculated the sum of all elements in a list, *myMax* returned the max of values in a list, and *myStd* provided the standard deviation of all elements in a list

Several other analyses were performed within the code that determined the estimated world population at specific periods, percentage changes, largest absolute values, and fastest rates relative to current values. Finally, input is required from the User, and relevant statistics are provided.

2. Results

The results of the population analyses are as follows:

- The estimated total world population in 2020 is 7.79 billion people.
- The predicted total world population in 2050 and 2100 are 9.74 and 10.88 billion people, respectively.
- The population increase of the total world population from the present, 2020, to 2050 is 24.89% and this value will increase to 39.52% by 2100 .
- In 10 years, the most populous countries will be India, China and the USA in decreasing order of magnitude.
- If the User chooses Ghana, they would be informed that country has a current population of 31.07 million people, and this will increase to 52.02 million by 2050 and finally 79.01 million by 2100.
- In Table 1 below, the current population and expected population increase in percentage for a group of countries is shown.

Table 1 The current population and corresponding expected increase by 2100 for a group of countries.

Country	**Population in 2020** ***millions***	**Increase by year 2100** ***%***
Unite States of America	331	31
China	1,439	-26
India	1380	5
Nigeria	206	256
Egypt	102	120
Brazil	213	-15
Australia	26	68
France	65	0.3
Turkey	84	2

- Niger is expected to experience the fastest population growth by 2100 with a massive 581% increase.
- By 2100, the average growth for all countries is 53.5%, but this varies greatly with a standard deviation of 107%
- Ghana's population is expected to grow by 154%, and so they will have twice as many people in 2100.

3. Discussion of results

The population of most countries seems to be increasing, and by 2100 India is expected to have the largest world population. The percentage of some countries, including India, France, and Turkey, increases marginally compared to Nigeria and Niger – up to 580% increase in population.

Acknowledgments

- Google
- Stack Overflow
- I had discussions with Rose McGroarty and Ben Eppinger. Ideas and opinions were exchanged, and results were compared, but no code was shared to my knowledge.