Expat Project Summary

Overview

The project "Where Should You Live in Retirement?" is designed to aid potential retirees in making informed decisions about where to live abroad by providing a data-driven analysis of various countries. Given the increasing interest among retirees to relocate internationally, this project leverages key indicators such as GDP, life expectancy, happiness index, crime rate, cost of living, population density, and healthcare quality to develop a comprehensive analysis tool.

Objectives

The primary goal of this project is to construct an interactive application that allows users to:

1. View visual summaries of data on world countries.
2. Compare two user-selected countries side-by-side based on various socio-economic metrics.
3. Dynamically adjust weightings for different factors according to personal preference and see the impact on overall rankings, highlighting the top 10 countries based on the weighted scores.

Data Collection

The project begins with an extensive data collection phase, sourcing information from global databases such as the World Bank, World Health Organization, and various other relevant sources. Data collected includes:

- **Economic Indicators**: GDP, cost of living, and Consumer Price Index.
- **Social Indicators**: Happiness index, population density, and crime rates.
- **Health Indicators**: Life expectancy and healthcare expenditure.

Analysis and Development

Using Python, particularly libraries like Pandas and NumPy for data manipulation, and Matplotlib, plotly for data visualization, a series of analyses were conducted:

1. **Data Preparation**: Data cleansing and normalization to ensure consistency and accuracy.
2. **Exploratory Data Analysis (EDA)**: Statistical summaries and initial plotting to understand distributions and identify outliers.
3. **Interactive Model Building**: Implementation of interactive widgets using **ipywidgets** in Jupyter Notebook to allow users to select countries and set preferences for different life quality indicators.

Interactive Web Interface with Gradio
To enhance accessibility and user interaction, a significant part of the project was developing a web-based interface using Gradio. It is a Python library that enables the rapid creation of web apps from Python scripts.

We used matplotlib and plotly for real time visualization of various metrics in the data frame.

Implementation Details

1. **Setup and Configuration**: Gradio was chosen for its simplicity and ability to integrate seamlessly with existing Python workflows. The interface was set up to interact directly with the analytical backend written in Python, providing a real-time response to user input.

2. **Interactive Components**
    - **Dropdown Menus**: Users can select countries from dropdown menus for comparative analysis. This feature was implemented using Gradio's and ipywidgets dropdown widget, which populates dynamically from the dataset.
    - **Sliders**: To adjust the weights of various indicators such as GDP, health, and happiness, sliders were incorporated. These sliders allow users to define what factors are most important to them, and the backend recalculates the scores in real-time.
    - **Output Display**: The results of the comparisons and weighted scores are displayed through Gradio's interface. This includes country names, numeric data, and graphical representations, enhancing the interpretability of the information.

3. **Real-Time Data Visualizations**

    - **Bar Charts**: Upon selection and weighting, the application generates bar charts comparing the two chosen countries across the selected metrics. These charts update dynamically as users adjust the parameters, providing immediate visual feedback.
    - **Bubble Chart**: Selecting the metrics for the X and Y axes we create bubble charts. We can also select the number of countries to be displayed.
    - **Choropleth Map:** The maps display various indicators for countries around the world, allowing for dynamic exploration based on user-selected criteria.

4. **User Experience**
    - **Ease of Use**: Gradio's straightforward layout options were utilized to design an intuitive interface, making the application accessible to users with varying levels of technical proficiency. This user-friendly approach encourages

engagement and exploration, empowering users to make data-driven decisions about their retirement living options.

Future Directions

Potential enhancements include:

- Expansion of the dataset to include more countries and additional metrics.
- Development of a mobile-friendly version to increase accessibility.
- Specific city suggestions withing the selected countries.