SUSTAINABLE DEVELOPMENT

EPA1333 Final Assignment

October-November 2018

INTRODUCTION

The Sustainable Development Goals (SDGs) are a collection of 17 global goals set by the United Nations General Assembly (UNGA). They are part of Resolution 70/1 of the UNGA: "Transforming our World: the 2030 Agenda for Sustainable Development, which is also known as the "2030 Agenda" [1]. The goals are broad and interdependent, yet each has a separate list of targets to achieve. The SDGs cover social and economic development issues such as poverty, health, education, hunger, global warming, sanitation, energy and social justice [2].

1 - IMAGE SOURCE: HTTP://WWW.UNDP.ORG/

The World Bank (http://www.worldbank.org/) provides public access to a collection of development indicators, compiled from officially recognized international sources. More specifically, the World Development Indicators (WDI) are large collection of time series from 1960 to 2017, covering topics such as Economic Growth, Poverty, Health, Nutrition, Population, Climate Change, Social Protection and Labour, etc., including national, regional and global estimates [3].

Data analysis helps us to better understand the current state with respect to sustainable developments, the evolution over the past years, to make predictions for the future, and to evaluate effects of different measures. For this assignment you will use Python to perform an original and non-trivial analysis using the World Development Indicators as a starting point. While you can use the SDPs as inspiration, you are not required to do so.

ASSIGNMENT

Create a Jupyter Notebook that contains your explanations and analyses. Start the notebook with a clear description of your research question and the type of analysis you are going to perform. The conceptual contents of the Notebook should be roughly similar to a normal written report of 10-20 pages. Make your Notebook self-explanatory. So, it should contain text (with references) as well as your actual analysis code and results. If you want to use other libraries for your analyses or visualizations, feel free to do so. However, only use free available and well-known libraries. The ones that come standard with Anaconda are fine. If you want to use something else, that you first need to install, check with us first. Create a zip archive and upload it on Brightspace.

Some (minimum) properties of the Notebook and your analyses on which we will grade:

- Demonstrate your skills in Python by using typical Python constructs and using the appropriate data structures (lists, dictionaries, tuples, arrays, dataframes, series, recursion, etc.)
- Try to think of reusability of your code. How easy would it be to use your same code if we want to try to do a small variations of your analysis? Can we easily adapt/play around with your code?
- How difficult were your analyses?

EXAMPLES

Here are some example questions you might ask to start the analysis. Please note that these are just examples and that you are expected to come up with your own questions and analyses.

- What is the average spending on education per country as a proportion of their GDP? Which are the first 5 countries that spend the highest percent of their GDP on education?
- Is there a gender difference in early education completion in low income vs. high income countries?
- The EU has the following goal in the Paris agreement: "At least a 40% domestic reduction in greenhouse gases by 2030 compared to 1990 levels" [4]. How is the EU doing at the moment? If they don't change policy (i.e extrapolation of current trends) where will they end up? Can you classify in good/neutral/bad countries?
- What is the trend per continent with respect to gas emissions? How do countries within the same continent behave? Is it fair to make statements over whole continents?
- Suppose that each country has a % growth or reduction of CO2, where do we end up?
- What is the country with the best trend in renewable energy over the last 10 years?

DATA

WORLD DEVELOPMENT INDICATORS

Relevant indicators drawn from the World Development Indicators, reorganized according to the goals and targets of the Sustainable Development Goals, can download the data in .csv format from here – go to the data and resources tab.

ADDITIONAL DATA ACCESSED DIRECTLY FROM THE WEB

With Python it is possible to read data directly from the web. This way your notebook will always use the most up-to-date data available. In addition to the World Development Indicators imported as .csv files, you are asked to find one or more data sources that will make your analysis more meaningful.

These additional data sources should be accessed directly from the web. Only use freely available datasets.

One option is to access additional World Bank data using wbdata. Wbdata is a simple python interface to find and request information from the World Bank's various databases, either as a dictionary containing full metadata or as a pandas DataFrame. If you prefer to use data from other websites, you can scape is using Beautiful Soup.

KNOCK-OUT CRITERIA:

- Make sure your Notebook does not generate errors!
- Make sure that your text is readable.
- Make sure that your code is readable:
  - Use sensible variable names,
  - Break up your code into parts, use (fruitful) functions,
  - Use a clean style – check out pep8 style [5],
  - Document your code using comments.
- Use Python to answer your research questions. Your code should read, clean and format, process and visualize the data. There should be at least some non-trivial processing involved.
- Use at least one additional data source.
- Use multiple types of visualizations of your results.

Note: If uncertain about your analysis content, please contact us using EPA1333 Final Assignment in the subject of your email.

REFERENCES:

[1] https://sustainabledevelopment.un.org/post2015/transformingourworld

[2] http://www.undp.org/content/undp/en/home/sustainable-development-goals.html

[3] https://data.worldbank.org/products/wdi

[4] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[5] http://pep8.org/

Deadline: Friday, November 2nd, 2018, 23:59.