Data Analysis Skill Test

4intelligence

General guidelines

- The candidate must send us back a clean and reproducible code via github link in whatever coding language he/she chooses. Prefer notebooks: Rmarkdown for R and Jupyter for Python. We should be able to reproduce any result you migh want to show us
- Due date: 08/07/2020 [Wednesday by 5 PM]
- Reach us at vagas@4intelligence.com.br (mailto:vagas@4intelligence.com.br)

Case 1

- Open the TFP.csv file attached.

- The series is composed by TFP (rtfpna variable) at constant national prices (2005 = 1) for three countries: United States (USA), Canada (CAN) and Mexico (MEX).

1. Make an exploratory data analysis;

2. Forecast 10 years of the series (if you are performing the exercise in R, use package "forecast");

3. Check in the following link pages 2 and 3: https://cran.r-project.org/web/packages/pwt8/pwt8.pdf (https://cran.r-project.org/web/packages/pwt8/pwt8.pdf) to see a list of all variables in the original dataset. Can you think about another feature that could be helpful in explaining TFP series? Explain.

Case 2

- Attached to this test is a .csv file which contains data from Comexstat (http://comexstat.mdic.gov.br/), which is basically the official data source for brazilian exports e imports, maintened by the government;
- The dataset contains all trackings of monthly imports and exports of a range of products (soybeans, soybean meal, soybean oil, corn, wheat and sugar), by brazilian states, by routes (air, sea, ground, etc) e from/to which country;
- We ask you to address a couple quentions below. Remember that data viz is one important skill to show besides any analytical skill. So we encourage you to use and explore a bunch of graphs and tables to show your point.

1. Show the evolution of total monthly and total annual exports from Brazil (all states and to everywhere) of 'soybeans', 'soybean oil' and 'soybean meal';

2. What are the 3 most important products exported by Brazil in the last 5 years?

3. What are the main routes through which Brazil have been exporting 'corn' in the last few years? Are there differences in the relative importancem of routes depending on the product?

4. Which countries have been the most important trade partners for Brazil in terms of 'corn' and 'sugar' in the last 3 years?

5. For each of the products in the dataset, show the 5 most important states in terms of exports?

6. Now, we ask you to show your modelling skills. Feel free to use any type of modelling approach, but bear in mind that the modelling approach depends on the nature of your data, and so different models yield different estimates and forecasts. To help you out in this task we also provide you with a dataset of

possible covariates (.xlsx). They all come from public sources (IMF, World Bank) and are presented in index number format. Question: What should be the total brazilian soybeans, soybean_meal, and corn export forecasts, in tons, for the next 11 years (2020-2030)? We're mostly interested in the annual forecast.