Assignment

Overview

In this interesting assignment, we will review your ability to grasp mathematical and analytical concepts, along with Python programming skills – 3 of the most important requirements of data scientists in our organization. This is an internship-to-hire position, and during your internship you will get an opportunity to show your leadership skills and technical expertise to us.

Task

Using the dataset shared with you, please share with us an exploratory fractal analysis of the data. Signal 1 and Signal 2 are the two features and the classes are labelled as A, B and C. Based on your work, we want to understand which class of data is more complex and why. Therefore, your analysis must also include a statistical comparison of the 3 classes and the methods you chose. Please note:

- You must use two or more fractal dimension methods to describe the data
- Feel free to use any Python package of your choice. There are several great and freely available packages to do fractal analysis in GitHub.
- Please use appropriate statistical test(s) to tell us which fractal analysis method gives better results

How to submit

Please submit your work online as Jupyter Notebook or by using Collab. You can also submit your code in GitHub if you have an account. Please send link to your work to interns@teblux.com

When to submit

Please submit your work within 5 days of receiving the assignment.

Tips to get good marks:

- Common methods that we use for our work are the Hurst Exponent, Lyapunov Exponent, Detrended Fluctuation Analysis, Entropy, Higuchi's Fractal Dimensions, and so on. You can use a combination of these methods for your analysis.
- Please see implementation of fractal analysis that are already available
- Please annotate your work and provide as much explanations as possible so that we have a better understanding of your thought process
- We love original work. However, if you are using somebody else' work, please provide link to source.
- Here is a paper using fractal analysis for your reference. This is just to give you an idea of how someone has used fractal analysis. However, there are other great work available via Google search for your reference. This one is just a sample: https://www.pnas.org/content/99/suppl_1/2466

Frequently asked questions:

- **Are your data science tests hard**? Yes, our tests are comparatively harder
- **Why are your tests so hard?** Well, because our work is quite complex. We want to make sure selected interns don't get overwhelmed after they join us and they are comfortable with the work given to them
- **What type of candidates do you prefer?** We really like candidates who are into exploratory research, learns by experiments, is into continuous learning and feels happy to share their knowledge with their colleagues and community.
- **Will someone be assigned to train me during the internship?** Our goal is to help you learn hands-on, independently with minimum supervision. You will be aligned to a 'buddy' who will help you if you are stuck.
- **Why should you do your best in this test?** If you are selected, you can either end up working for us, or get placed in top companies because of our work. That's a great reason to join us we think :)