Machine Learning for Asset Allocation with Python

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Topics

1. Modern Asset Allocation: the Max Sharpe Ratio Portfolio
2. Risk parity and Risk Budgeting: allocating risk equally across assets
3. Hierarchical Risk Parity: overcoming problems related to the instability of the covariance matrix
    a. Denoising anddetoning a covariance matrix using random matrix theory
    b. Hierarchicalclustering: Pythonimplementation from scratch
    c. Matrix Seriation
    d. Recursive bisection
    e. HRP: putting all together
4. Hierarchical Equal risk contribution: making use of the clusters.
5. How to buildan asset allocation API in Python. High level design andimplementation
6. Back testing allocation strategies in Python

Programming Language and libraries

- Python
- Pandas
- Numpy
- JupyterLab
- Scipy
- Sklearn
- Plotly

Reading list

- Marcos M. Lopez de Prado, Machine Learning For Asset managers
- Thierry Roncalli, Introductionto Risk Parity and Budgeting