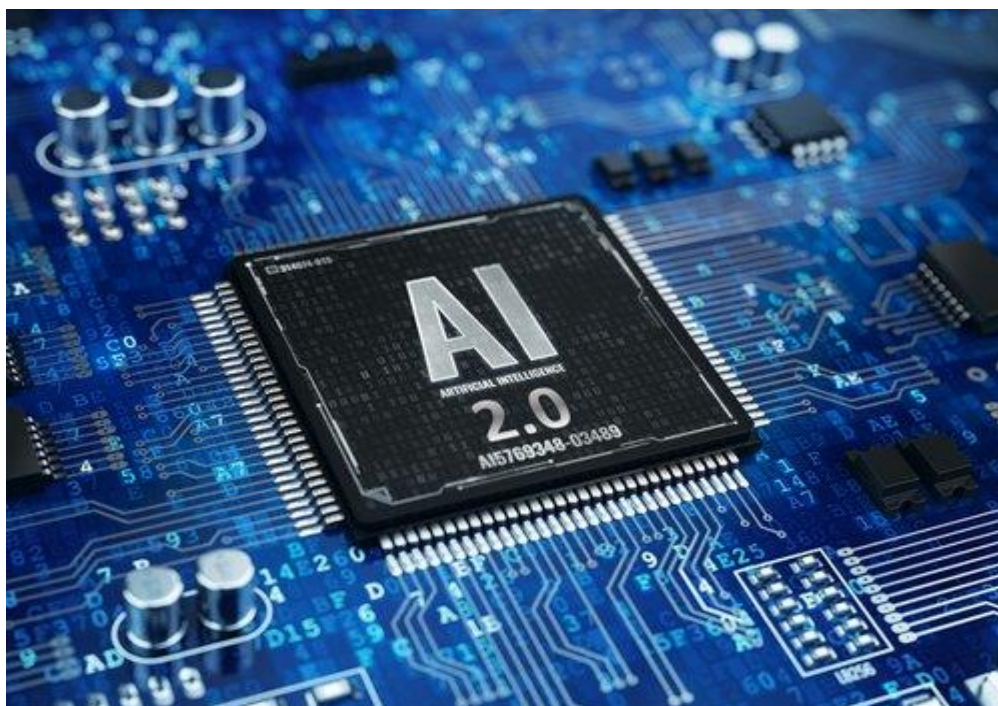


# Identification of Hazardous Stocks

Next-Generation AI Technology in Finance

# User Guide

Version 4.2, January 2019



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## INTRODUCTION

Stock interaction takes the form of large, complex and dynamic networks, that change constantly. The nature and structure of this complexity must be analyzed in order to better understand risk and volatility. This is because complexity is a new and hidden form of risk.

In contexts of high complexity these networks are intricate and may contain numerous hubs, which concentrate risk. But to reduce the exposure of a portfolio, it is important to position oneself in a given stock universe away from these hubs. We identify these hubs.

UR's stock complexity analysis and rating system measures the complexity of stocks belonging to a given universe (set of stocks) from which one wishes to extract a portfolio. The system analyzes the universe of stocks, determines all the significant correlations between them, and computes the complexity of the universe itself. Finally, this complexity is broken down into components, providing a Complexity Ranking (rating) of the stocks in the context of a particular universe.

What characterizes a hub is a large number of correlations with other stocks and the nature of these correlations. But conventional linear correlation – which is most popular in the financial industry - often provides misleading results. It can strongly overestimate a correlation or miss it altogether. This is because linear correlations cannot capture non-linear aspects of data. Since correlations play a central role in portfolio design or in measuring risk, it is paramount to get them right.

We have developed a more relevant and modern generalized correlation, which takes into account non-linear aspects of data. The method is based on brand new 'cognitive AI' technology which treats scatter plots as images, emulating an expert actually looking at data without the need to build math models.

In essence, UR's system ranks stocks based on complexity – this is called Complexity Profiling. The importance of this cannot be overstated. Highly complex stocks in general:

- are correlated with many other stocks- they are the hubs of the stock universe
- can be source of high volatility
- may increase portfolio risk
- may reduce portfolio performance
- can behave in unpredictable fashion – this is the essence of high complexity

These are the reasons why inexperienced investors should stay away from complex financial products.

The goal is, therefore, not to indicate which stocks to pick, or how to build portfolios – it is simply to indicate complex and potentially hazardous stocks. Such stocks may be found at the top of the Complexity Ranking.

The tool may be found at [www.assetdynex.com](http://www.assetdynex.com)

Two versions are available: a demo version and a commercial version.

## **DEMO VERSION**

In the demo version users type in or paste a list of tickers into the input area. The system retrieves price data from IEX (<https://iextrading.com/>) and processes exclusively those securities that are available therein. The demo version is limited to 100 stocks. The system considers the last 60 days of price data. This number cannot be changed in the demo version.

## **COMMERCIAL VERSION**

The commercial version is limited to 1000 stocks. In this case, users upload their own data in CSV (Comma Separated Values) files. This means they may choose any given source of data.

In no case is user's data stored.

Both versions are powered by our complexity analysis engine which resides in the Amazon WS cloud.

A special version, without the limitation of 1000 stocks, is available upon request.

In order to obtain your access credentials, contact us at:

<http://www.universal-ratings.com/contact/>

# 1. DEMO VERSION

Defining a stock universe is simple. Just paste a comma separated list of tickers into the input area. The maximum number of tickers in the demo version is 100.

Type Ticker Symbol  Analyze

When ready click "Analyze". This is what the system returns:

Ticker Symbol	Search Last price
AEP American Electric (AEP)	74.44
AES The AES Corporati (AES)	15.39
ALK Alaska Air Group (ALK)	64.14
AXP American Express (AXP)	98.55
BA Boeing Company (T (BA)	352.9
CAT Caterpillar Inc. (CAT)	132.1
CHRW C.H. Robinson Wor (CHRW)	85.63
CNP CenterPoint Energ (CNP)	29.38
CSCO Cisco Systems In (CSCO)	43.49
CSX CSX Corporation C (CSX)	65.22
CVX Chevron Corporati (CVX)	112.54
D Dominion Resource (D)	69.85
DAL Delta Air Lines (DAL)	48.56
DIS Walt Disney Compa (DIS)	112.65
DUK Duke Energy Corpo (DUK)	84.61
ED Consolidated Edis (ED)	75.93
EIX Edison Internatio (EIX)	59.32
EXC Exelon Corporatio (EXC)	45.79
EXPD Expeditors Intern (EXPD)	68.4
FDX FedEx Corporation (FDX)	170.99
FE FirstEnergy Corpo (FE)	38.37
GE General Electric (GE)	8.94
GS Goldman Sachs Gro (GS)	176.93
JPM JP Morgan Chase & (JPM)	99.91
MS Morgan Stanley Co (MS)	41.74
WMT Wal-Mart Stores (WMT)	94.84
XOM Exxon Mobil Corpo (XOM)	71.72

Name:  Proceed

Once a name has been introduced, clicking on "Proceed" starts the execution.

Processing requires a few seconds. Make sure to enable pop-ups in your browser.

When processing is finished, the following appears:

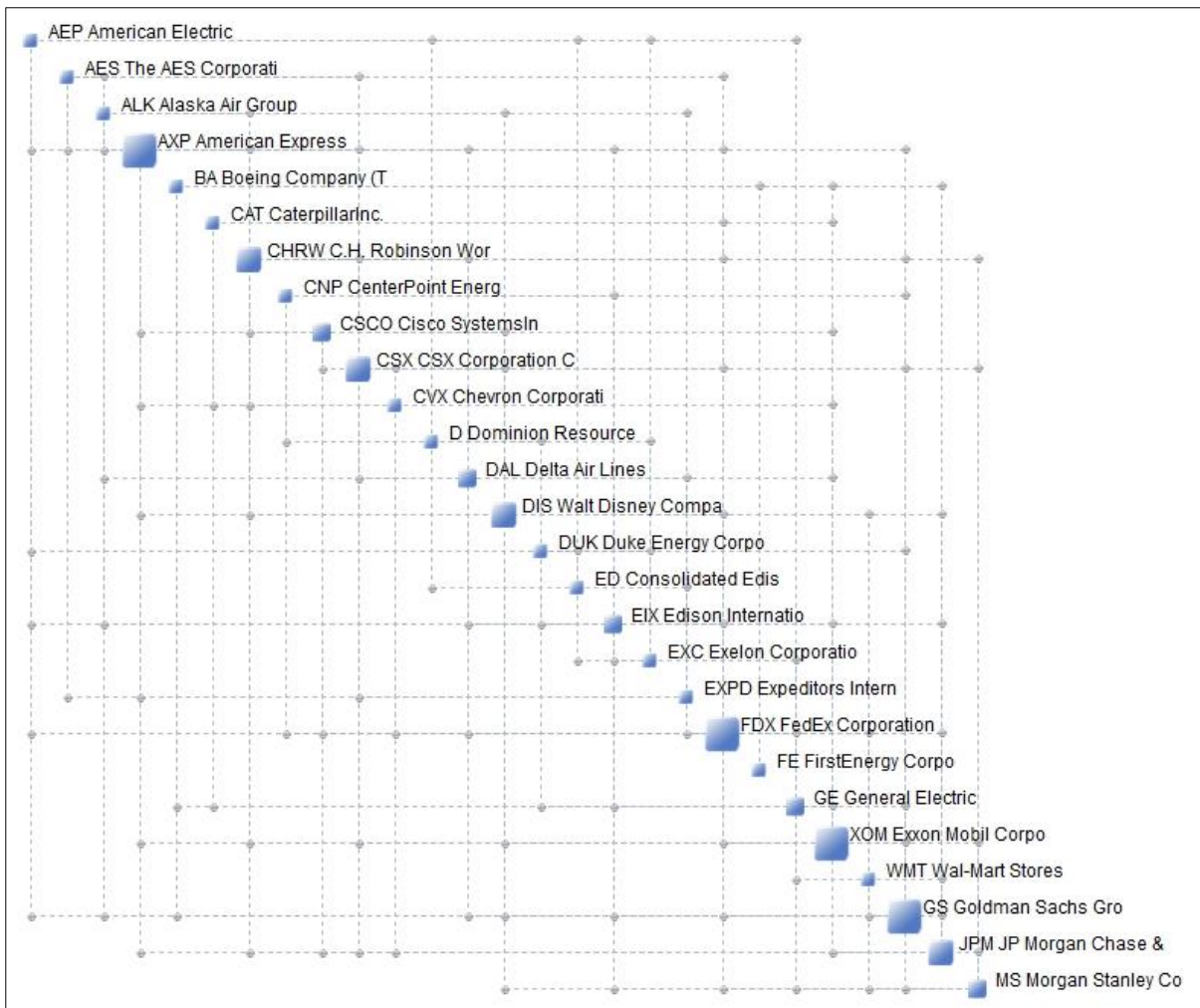


There are two outputs that are available to the user:

- A stocks map navigation tool (interactive web-based app)
- A text file containing the Complexity Ranking of all stocks

**STOCKS MAP**

The system builds a stock map, which may be navigated interactively. An example is shown below. The hazardous stocks are represented by the larger boxes on the diagonal. This functionality is reserved to more experienced users.



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Keep in mind that the stock map, as well as the stocks Complexity Ranking, change every day. This suggests that hazardous stocks should be identified periodically, for example once a week.

### COMPLEXITY RANKING

An example of the text file containing the ranking of all stocks in a small universe is shown below:

AEP, AES, ALK, AXP, BA, CAT, CHRW, CNP, CSCO, CSX, CVX, D, DAL, DIS, DUK, ED, EIX, EXC, EXPD, FDX, FE, GE, XOM, WMT, GS, JPM, MS

The ranking is in percentage. Stock number 20 is responsible for over 11% of the complexity of the universe of 25 stocks. The last six stocks contribute very little complexity to the universe and are almost fully decoupled from the other stocks.

No.	Variable Name	% Contribution to Total Complexity
20	FDX FedEx Corporation	11.22
25	GS Goldman Sachs Gro	10.79
4	AXP American Express	8.99
23	XOM Exxon Mobil Corpo	8.86
10	CSX CSX Corporation C	7.51
7	CHRW C.H. Robinson Wor	7.21
26	JPM JP Morgan Chase &	7.08
14	DIS Walt Disney Compa	5.92
27	MS Morgan Stanley Co	4.89
17	EIX Edison Internatio	4.64
13	DAL Delta Air Lines	4.30
9	CSCO Cisco SystemsIn	3.04
22	GE General Electric	3.02
3	ALK Alaska Air Group	2.52
11	CVX Chevron Corporati	2.39
1	AEP American Electric	2.03
24	WMT Wal-Mart Stores	1.91
19	EXPD Expeditors Intern	1.65
2	AES The AES Corporati	1.19
5	BA Boeing Company (T	0.96
15	DUK Duke Energy Corpo	0.77
6	CAT CaterpillarInc.	0.69
8	CNP CenterPoint Energ	0.65
18	EXC Exelon Corporatio	0.38
16	ED Consolidated Edis	0.18
12	D Dominion Resource	0.15
21	FE FirstEnergy Corpo	0.01

The simple format of the file makes it easy to parse.

## 2. COMMERCIAL VERSION

The full version is limited to 1000 stocks. In this case, users upload their own data in CSV (Comma Separated Values) files. This means they may choose any source of data.

In order to guarantee data anonymity, it is not necessary to indicate which stocks are being analyzed. An example of input file is shown below.

Stock 1	Stock 2	Stock 3	Stock 4	Stock 5	Stock 6	Stock 7	Stock 8	Stock 9	Stock 10	Stock 11	Stock 12	Stock 13	Stock 14	Stock 15	Stock 16
32.25	47.24	70.48	50.03	49.9	73.93	44.11	43.07	22.9	42.5	46.13	33.07	42.62	20.22	33.6	37.74
31.53	47.4	71.48	49.93	49.4	73.95	44.17	43.68	22.9	42.54	46.06	33.35	43.21	20.18	33.65	38.13
31.06	47.11	70.85	49.45	48.74	72.18	43.82	43.75	22.9	42.03	45.25	33.3	43.52	19.76	33.39	37.35
30.1	47.00	69.6	49.1	47.35	72.6	44.1	44.35	22.95	41.5	45.32	32.5	42.8	19.72	32.98	36.75
30.76	47.28	68.4	48.11	47.1	73.23	44.33	45.35	22.95	42.00	45.27	32.67	42.93	19.59	33.05	36.53
30.14	47.25	67.05	48.00	47.31	73.53	44.6	46.86	23.28	41.9	45.27	32.83	43.05	19.97	33.7	36.62
31.05	47.95	67.36	48.01	47.72	72.5	43.94	49.05	23.15	42.26	45.11	32.55	43.1	19.51	33.35	36.25
32.3	48.95	68.78	49.35	48.7	78.45	44.35	49.95	23.9	42.87	45.78	33.33	43.75	20.23	34.22	36.5
32.39	48.84	68.81	48.35	48.68	78.2	43.88	50.09	23.43	42.38	45.74	33.13	43.8	19.68	33.35	35.72
32.95	48.63	69.04	48.95	49.35	77.82	43.8	50.65	23.4	42.75	45.8	33.3	44.03	19.5	33.95	36.5
33.00	49.6	70.1	49.2	49.6	79.48	44.37	51.25	24.09	42.93	45.7	33.62	44.18	19.72	34.64	36.12
32.4	48.9	70.14	49.4	49.1	78.78	45.1	51.35	24.15	42.94	45.37	33.11	44.2	19.86	34.66	35.45
31.75	49.06	69.9	49.3	50.26	78.95	45.3	50.51	24.07	42.83	44.95	32.8	44.5	19.95	34.77	35.2
32.2	49.65	71.49	49.58	50.2	77.56	44.91	50.42	24.15	43.17	45.1	32.73	44.43	20.21	34.7	35.85
32.5	49.88	69.75	49.85	49.95	77.08	45.00	51.02	24.57	43.00	45.25	32.22	44.15	20.00	34.37	36.2
32.75	49.9	70.1	50.52	49.94	77.1	45.24	50.57	24.6	42.95	45.45	32.05	44.1	20.05	34.3	35.65
32.1	49.5	70.6	50.95	49.39	77.35	45.65	50.53	24.65	43.04	45.49	31.87	44.15	20.1	34.8	35.8
31.95	49.6	70.8	50.85	49.55	76.48	45.23	50.51	24.75	42.68	45.1	31.73	44.55	20.01	34.55	35.37
32.18	49.49	71.6	51.00	49.9	76.72	45.67	50.46	25.27	43.26	44.8	31.6	44.99	20.2	34.4	35.52
32.25	49.63	71.5	51.33	49.52	78.18	46.05	50.6	25.35	43.56	44.4	31.95	45.34	20.58	34.99	35.65
32.93	50.28	70.9	51.37	50.1	79.2	46.5	50.51	25.34	44.75	44.53	32.4	46.9	20.85	35.21	36.54


The input file should contain only numbers, no names. Data should be end of day closing price or returns.

We suggest the data span at least 30-40 trading days. This means the input file should have at least 30-40 rows. The maximum number of rows is limited to 500.

Once you have your credentials, you may login:

Click on "Upload CSV" to select an input file.





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No. Days: 500, No. Stocks: 117

Clicking on "Select" will upload the file. Click on "Check format" to make sure that the data has the correct format. If this is the case, click on "Run" to commence the analysis.

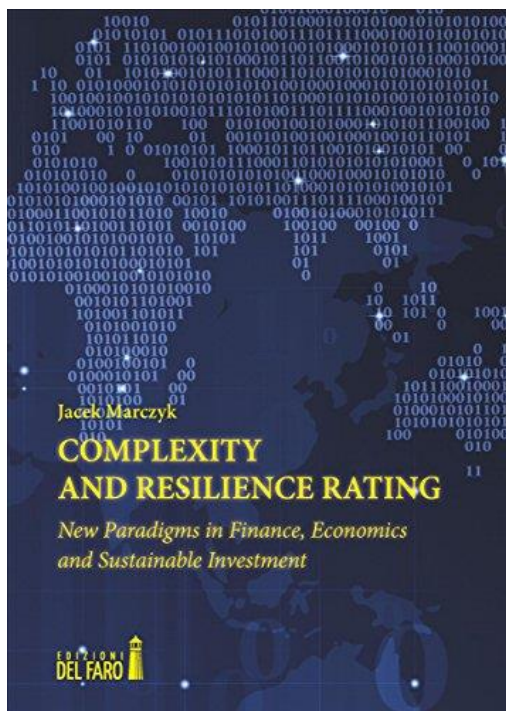
Large cases may take up to 3 minutes.

The output is a text file with the stocks Complexity Ranking as shown below. Stocks are not named.

Position	Complexity (%)
427	0.51
192	0.48
118	0.48
974	0.47
126	0.47
60	0.47
436	0.46
972	0.46
519	0.46
444	0.46
683	0.46
28	0.46
233	0.45
220	0.45
117	0.44
973	0.44
985	0.44
433	0.44
255	0.43
923	0.43
992	0.43
163	0.43
46	0.43
572	0.42
50	0.42
338	0.42
635	0.42
578	0.42
178	0.42
252	0.41
926	0.41
507	0.41
296	0.40
152	0.40
345	0.40
467	0.40
577	0.40

A special B2B version, without the limitation of 1000 stocks, may be made available as a Web Service. In alternative, a site license of the analytical engine may installed at the client's premises.

For more information see *Complexity and Resilience Rating: New Paradigms in Finance, Economics and Sustainable Investment*, by Marczyk, J. Edizioni del Faro., 2015.



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