



QUANTIFYING RISK, ENABLING OPPORTUNITY

Machine Learning - Humans in the loop

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Organization: alis_
Date: 20 August 2019

All started with a simple Script

Has been running for 7 Years, every 15 minutes.

 S023 - Email Attachments to Google Drive ☆ 📁

File Edit View Insert Format Data Tools Add-ons Help [All changes saved in Drive](#)

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fx File Types

	A	B	C	D
1	Gmail Label Name	Team Drive	Google Drive Folder	File Types
15	trades/absa capital	18 TRADING	\\00 Broker Confirmations\\Contract Notes\\Absa Capital	all
16	trades/avior	18 TRADING	\\00 Broker Confirmations\\Contract Notes\\Avior	pdf
17	trades/deutsche securities	18 TRADING	\\00 Broker Confirmations\\Contract Notes\\Deutsche Securities	pdf
18	trades/macquarie	18 TRADING	\\00 Broker Confirmations\\Contract Notes\\Macquarie	pdf
19	trades/merrill lynch	18 TRADING	\\00 Broker Confirmations\\Contract Notes\\Merrill Lynch	pdf
20	trades/nedbank	18 TRADING	\\00 Broker Confirmations\\Contract Notes\\Nedbank	all
21	trades/rmbms	18 TRADING	\\00 Broker Confirmations\\Contract Notes\\RMBMS	pdf
22	trades/taquanta	18 TRADING	\\00 Broker Confirmations\\Contract Notes\\Taquanta	all
23	trades/jpm	18 TRADING	\\00 Broker Confirmations\\Contract Notes\\JPM	pdf

The cumulative impact of automating something super basic is often massive.

Rezco: Uniting man and machine learning for higher returns with Google Cloud

Rezco leveraged Google serverless products and machine learning tools to automate administrative tasks and built a financial trading platform with AI.

Google Cloud Results

- Built an AI trading platform with Google Cloud Machine Learning and TensorFlow models
- Used Google Cloud Functions to schedule and execute repetitive administrative tasks, letting staff concentrate on business-critical work
- Empowered workers to innovate and take control of data with Google

<https://cloud.google.com/customers/rezco-siatik-systems/>

Cut days of work
to minutes with
Google Cloud
Functions



About Rezco

Formed in 1981, Rezco is a specialized investment boutique managed by a team of dedicated investment professionals who handle in excess of ZAR7 billion in assets.

Industries: Financial Services & Insurance

Location: South Africa

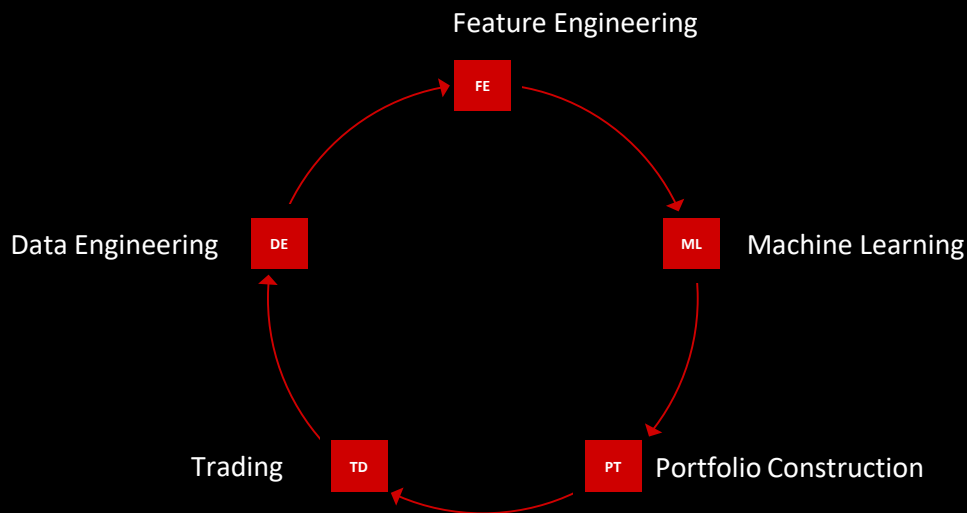


About Siatik Systems

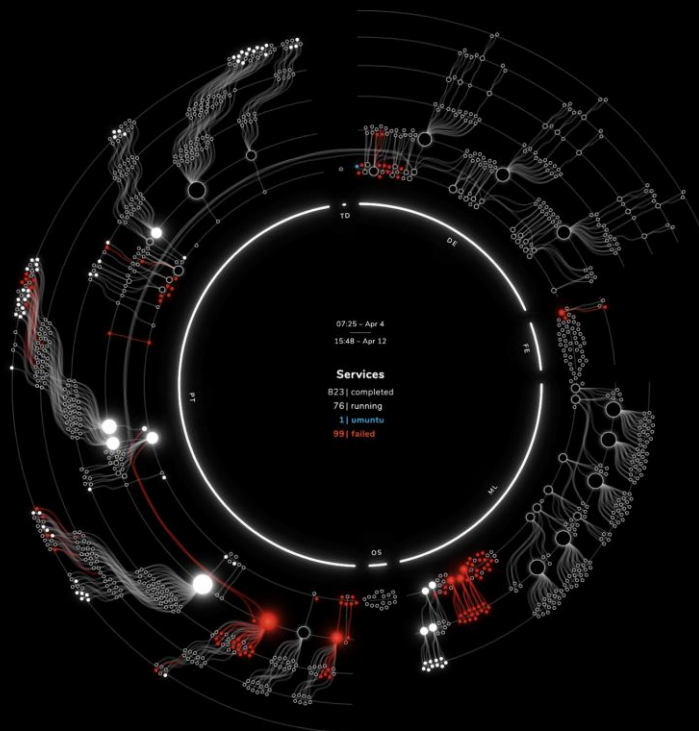
Seamlessly bring together
technology and human talent
to find great investment opportunities



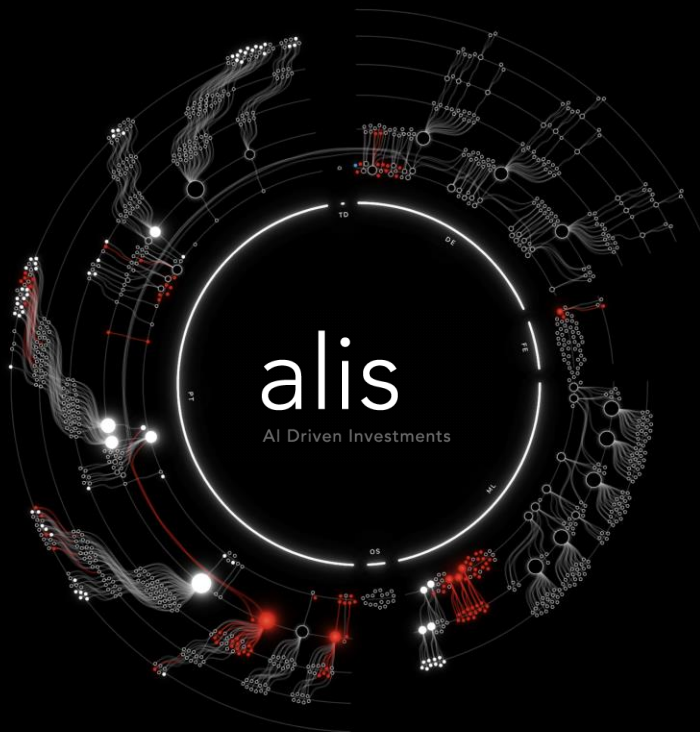
What we do.



How we
structure
the problem



The Reality.



alis
AI Driven Investments

An **event based**
operating system which
allows us to
frictionlessly develop,
train, test and deploy
deep learning models
across assets and
markets

Meet.

Everything as Events.



Jan Krynauw

CEO, actuary
17 years finance exp



James Spanjaard

CIO, Harvard MBA, ex
Boston Consulting
Group - ai initiative



Nic Murhpy

Bridge Engineer
MSc (cum laude) in Advanced Analytics



Nicholas Breckwoldt

Machine Learning Engineer
PhD (cum laude) (Chemical Engineering)



Raven Aucamp

Data Engineer
BSc Hons Astrophysics



Richardt Benade

Data engineer

CORE
TEAM

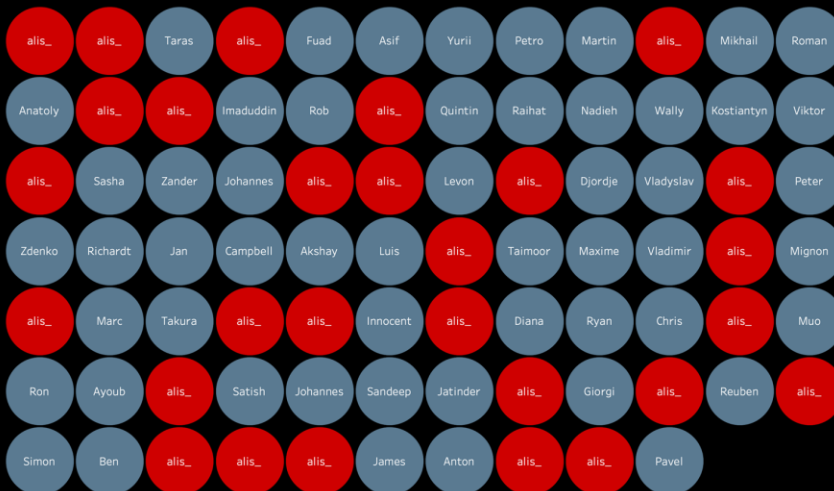


ANALYSTS

GLOBAL
PARTNERS



Our Team.



Our Team.



Communication.

alis_ → Human

<https://public.os.alis.fund>

alis_

?

Human

?

DE

FE

ML

PT

TD

Human in the Loop... or Not?



Data Pipelines are Hard

We source data from various sources / technologies /
humans
alis_ handles 99.9% of pipelines.



alis_

Human

What about inconsistencies?

Latest original.csv	Latest corrected.csv
1 Bond Data;;	1 Bond Data,,,
2 Trade Date::2019/04/03;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	2 Trade Date::2019/04/03,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
3	3
4 Bond Code;Pricing Class Code;ISIN No;Issuer;Issuer C	4 Bond Code;Pricing Class Code;ISIN No;Issuer;Issuer
5	5
6 AA06;FRN;ZAG000114836;ANGLO AMERICAN SA FINANCE LIM	6 AA06,FRN,ZAG000114836,ANGLO AMERICAN SA FINANCE LIM
7 AA07;V;ZAG000114828;ANGLO AMERICAN SA FINANCE LIMITE	7 AA07,V,ZAG000114828,ANGLO AMERICAN SA FINANCE LIMITE
8 ABCPI3;CPI;ZAG000073669;ABSA BANK LIMITED;H10;ZAG;ZAF	8 ABCPI3,CPI,ZAG000073669,ABSA BANK LIMITED,H10,ZAG,ZAF
9 ABFN08;FRN;ZAG000084757;ABSA BANK LIMITED;H10;ZAG;ZAF	9 ABFN08,FRN,ZAG000084757,ABSA BANK LIMITED,H10,ZAG,ZAF
10 ABFN09;FRN;ZAG000084765;ABSA BANK LIMITED;H10;ZAG;ZAF	10 ABFN09,FRN,ZAG000084765,ABSA BANK LIMITED,H10,ZAG,ZAF
11 ABFN10;FRN;ZAG000109919;ABSA BANK LIMITED;H10;ZAG;ZAF	11 ABFN10,FRN,ZAG000109919,ABSA BANK LIMITED,H10,ZAG,ZAF
12 ABFN12;FRN;ZAG000114455;ABSA BANK LIMITED;H10;ZAG;ZAF	12 ABFN12,FRN,ZAG000114455,ABSA BANK LIMITED,H10,ZAG,ZAF
13 ABFN13;FRN;ZAG000126160;ABSA BANK LIMITED;H10;ZAG;ZAF	13 ABFN13,FRN,ZAG000126160,ABSA BANK LIMITED,H10,ZAG,ZAF
14 ABFN14;FRN;ZAG000126178;ABSA BANK LIMITED;H10;ZAG;ZAF	14 ABFN14,FRN,ZAG000126178,ABSA BANK LIMITED,H10,ZAG,ZAF
15 ABFN15;FRN;ZAG000130949;ABSA BANK LIMITED;H10;ZAG;ZAF	15 ABFN15,FRN,ZAG000130949,ABSA BANK LIMITED,H10,ZAG,ZAF
16 ABFN16;FRN;ZAG000130964;ABSA BANK LIMITED;H10;ZAG;ZAF	16 ABFN16,FRN,ZAG000130964,ABSA BANK LIMITED,H10,ZAG,ZAF
17 ABFN17;FRN;ZAG000136607;ABSA BANK LIMITED;H10;ZAG;ZAF	17 ABFN17,FRN,ZAG000136607,ABSA BANK LIMITED,H10,ZAG,ZAF
18 ABFN18;FRN;ZAG000139684;ABSA BANK LIMITED;H10;ZAG;ZAF	18 ABFN18,FRN,ZAG000139684,ABSA BANK LIMITED,H10,ZAG,ZAF
19 ABFN20;FRN;ZAG000144213;ABSA BANK LIMITED;H10;ZAG;ZAF	19 ABFN20,FRN,ZAG000144213,ABSA BANK LIMITED,H10,ZAG,ZAF
20 ABFN21;FRN;ZAG000144221;ABSA BANK LIMITED;H10;ZAG;ZAF	20 ABFN21,FRN,ZAG000144221,ABSA BANK LIMITED,H10,ZAG,ZAF



alis_ enters UMUNTU state

07:25 – Apr 4

15:48 – Apr 12

reset

Services

178 | completed

0 | running

1 | **umuntu**



alis_ Human

alis_ enters UMUNTU state

Show Project Description

DE ... FE



jse-bond-data



Today

UM...

jse-bon...

jse-bond-data



Assigned To
Jan Krynauw



Due Date
Today

ALIS Task State

UMUNTU

Domain

DE | Data Engineering

Service

jse-bond-data

Version

r1-0

Parent Service

—



Expected delimiter "," was not found in .csv file.



Tasks

DE



Feature Engineering

Smart approaches to search in the low signal to noise
ocean of possible features, normalizations and
interactions



How to avoid boiling the ocean?

basic set of inputs

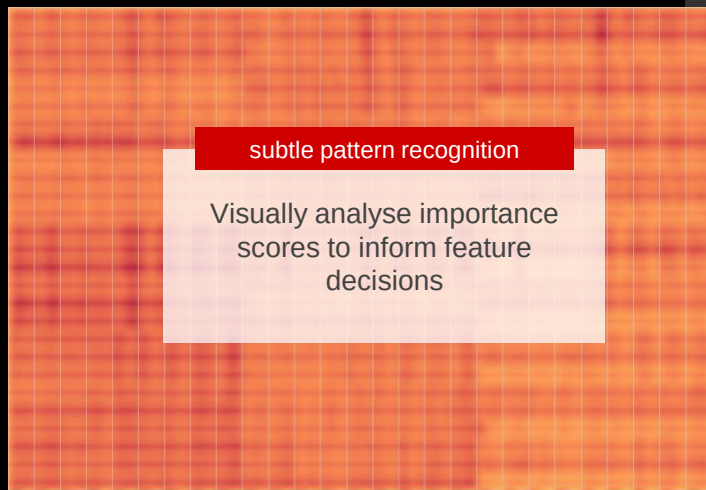
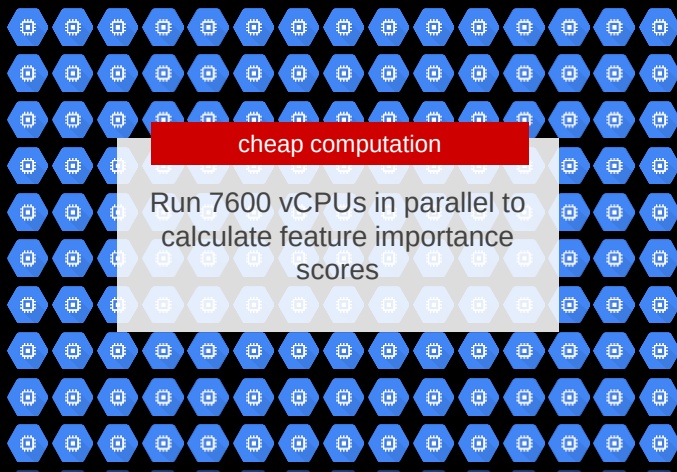
180,000+ features*

*150 inputs x 200 points in time x 6 transforms

21



Exploit strengths of man vs machine



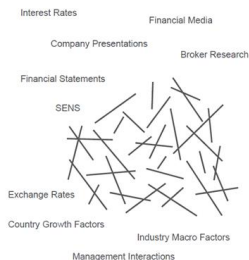


Portfolios

Translate the predictions from the ML models into the language of an analyst.



01 SOURCES OF INFORMATION

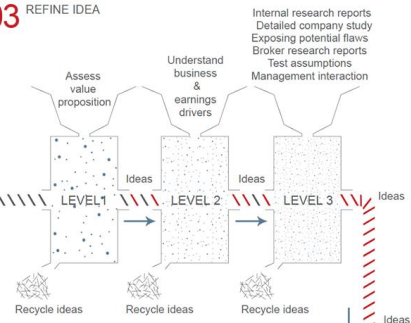


02 SORT, PROCESS & FILTER

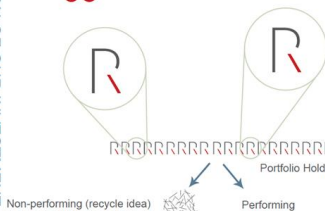
- Generate ideas using wealth of experience
- Expertise and experience enable us to establish importance
- Search for value gems
- Objective is to find mispriced sectors, asset classes or securities
- Identify ideas



03 REFINE IDEA



06 ASSESSMENT OF DECISIONS



- Continuous portfolio monitoring
- Rebalance portfolio based on current environment
- Review ideas and test investment case

05 PORTFOLIO CONSTRUCTION



- Allocate ideas to conviction buckets
- Apply discretion/judgement within buckets

04 INTEGRATING INVESTMENT IDEAS WITH EXISTING PORTFOLIO



- Review relative values
- Apply macro views
- Review suitability of ideas vs current holdings
- Review exposure to industries, countries, themes



alis_ Human

alis_ as a member of the Investment Team

	Add Task			Rob	Simon	Industry	Mode...	Prediction Vi...	
8	✓	Cobham PLC	Idea Fact...	alis_	👍	Indus...	196	https://analyt...	 >
9	✓	Lockheed Martin Corp	Idea Fact...	alis_	👍			https://analyt...	 >
10	✓	Amazon.com Inc	Idea Fact...	alis_	👍			https://analyt...	 >
11	✓	PNC Financial Services Gr	Idea Fact...	ali...	👍			https://analyt...	 >
12	✓	Regions Financial Corp	Idea Fact...	alis_	👍			https://analyt...	 >
13	✓	Citizens Financial Group Inc	Idea Fact...	alis_	👍			https://analyt...	 >
14	✓	UnitedHealth Group Inc	Idea Fact...	alis_	👍			https://analyt...	 >
15	✓	eBay Inc	Idea Fact...	alis_	👍			https://analyt...	 >
16	✓	Comerica Inc	Idea Fact...	alis_	👍	Finan...	183	https://analyt...	 >

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✓ 👍

👎

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Machine Learning

Managing the immense dimensionality problems of
modeling in markets

01

Disparate Dirty Datasets

02

Markets are Not Stationary

03

Interactions are non-linear
and high dimensional

04

Large Search Space in
Finance

05

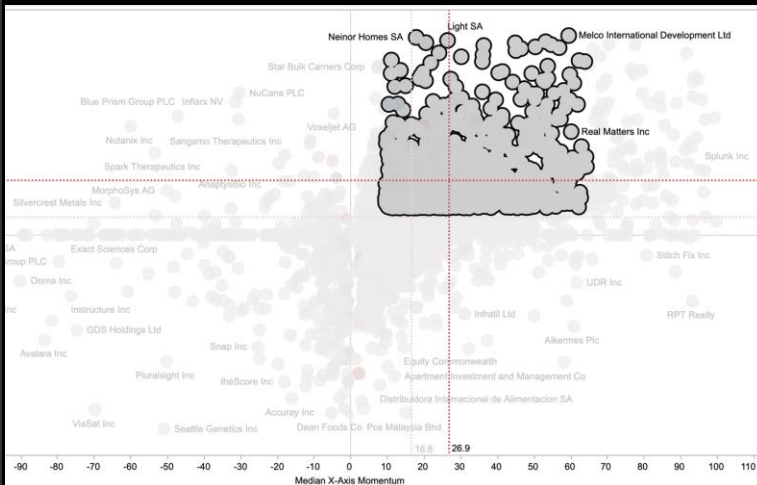
Low Signal to Noise Ratio



What we do is Hard.

Interactions are non-linear and high dimensional

Deep Learning removes friction from traditional screening methods



PE FY0	PE FY1	PE FY2	GPE FY1	GPE FY1 CAGR(1,2)	Growth (-3,-2)	Growth (-2,-1)	Growth (-1,0)	Growth (0,1)	Growth (1,2)	Growth (2,3)	ROA FY0
12.3	15.6	10.9	1.1376	2.74	89.0	15.8	-0.3	-21.4	42.9	40.2	8.4
2.9	7.0	4.0	1.9148	10.43		-622.4	-39.9	-58.5	73.0	28.9	-11.5
8.4	10.4	9.5	0.4794	0.98	25.1	29.7	10.3	-17.5	10.2	8.6	5.7
4.7	5.3	5.3	0.9523	-0.11	8.9	13.6	-12.5	-11.0	-0.6	-1.1	-0.7
23.6	-14.0	80.9	-0.358		43.9	22.0	-68.3	-278.2	-117.3	60.6	0.5
18.5	13.8	11.1	1.8179	1.73				38.1	23.8	12.1	4.1
16.5	16.2	14.4	0.5688	0.78	20.3	-26.1	13.4	2.2	12.6	13.3	9.0
26.2	24.6	22.5	0.3815	0.38	3.6	3.7	3.5	11.3	9.3	9.3	14.8
32.1	23.6	14.2	0.8439	3.65				10.2	108.1	27.4	-3.1
14.0	13.5	12.4	0.557	0.69	-18.8	24.6	14.8	5.7	8.7	8.1	8.5
11.5	11.0	9.6	0.8286	1.37	1.5	-2.5	3.8	4.5	15.2	7.2	4.9
9.7	8.0	7.1	1.7727	1.58	90.9	-54.3	83.3	20.5	12.7	3.7	8.4
19.8	18.8	16.9	0.4427	0.59	15.8	4.8	7.1	7.1	11.1	6.8	18.0
6.7	7.8	7.3	0.6436	0.82	7.7	25.6	-17.5	-12.2	6.4	1.4	3.6
26.8	20.9	18.8	0.7451	0.54	-9.0	-9.5	44.8	29.8	11.3	4.1	8.0
9.4	10.0	9.1	0.5023	0.97	8.3	19.0	15.2	-5.5	9.7	11.1	9.8
11.3	10.7	10.3	0.5126	0.38	-6.6	10.8	3.3	6.1	4.0	7.3	7.7
6.3	5.4	4.7	2.572	2.48	5.3	18.8	33.1	17.2	13.3	10.2	13.2
57.4	39.2	29.0	0.6379	0.90	67.9	-25.5	-33.6	46.4	35.4	15.9	1.9
15.8	15.6	13.3	0.6799	1.12	31.2	-18.2	-27.4	5.0	17.4	11.2	4.6
30.4	23.6	18.4	1.059	1.20	13.5	22.4	29.9	28.4	28.4	24.3	8.9
											2.2
38.7	22.7	18.2	1.1013	1.08	3.8	-5.1	-36.8	70.4	24.5	15.2	2.0
37.8	34.2	29.2	0.4911	0.51	22.2	115.2	-2.4	16.9	17.3	19.0	2.6
5.9	65.1	31.6	0.3838	1.63	31.5	2.8	-32.0	-90.3	106.0	135.8	6.8
12.0	10.0	9.1	1.3039	0.93	9.1	3.4	-1.0	20.9	9.3	8.3	6.1
7.5	9.7	8.8	0.5132	1.10	21.5	36.8	26.2	-22.8	10.7	0.1	8.6
10.1	11.8	10.3	0.4241	1.25	-0.7	4.0	-5.7	-14.7	14.7	12.8	7.6
14.5	12.9	9.6	1.8379	2.71	26.3	-33.5	-29.7	12.5	35.0		3.1
6.1	9.5	8.1	2.3714	1.87	48.6	2.9	-20.7	-35.5	17.8	116.8	3.7
31.7	26.6	22.5	0.7453	0.69	-2.1	-9.5	7.7	19.3	18.3		15.7



Curse of Dimensionality

01 Problem type (regression vs classification)

02 Label choice (say 10 label types)

03 **Model architecture** (MLPs, CNNs or RNNs)

04 Model hyperparameters (number of layers, number of hidden units per layer, pooling, dropout)

05 Activation functions (ReLU, leaky ReLU, swish, GELU)

06 More complex architectures (SNN, ResNet, Gated CNN, LSTM, GRUs, Dilated CNNs, Separable CNNs)

07 5 Markets, 11 Sectors

08 Little 't' ...say last 10 years, quarterly models

Number of Models

2 m

Cloud Compute &
Distributed ML &
Workflow **Framework**
(100 000+ teraflops)

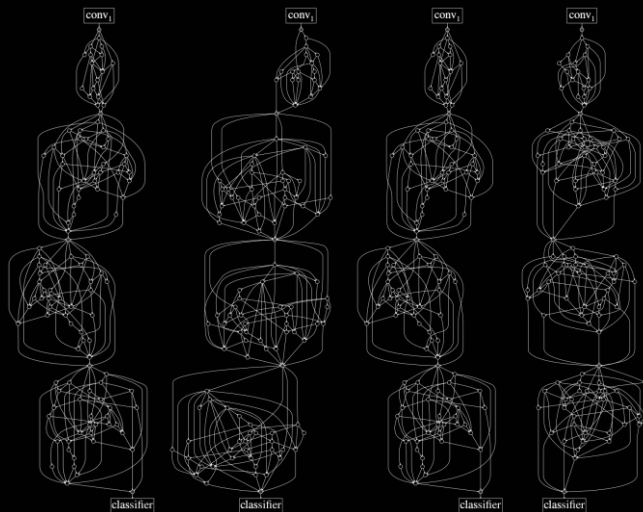


Neural Architecture Search (NAS)

Automate the search for good architectures/hyperparameters with NAS

State-of-the-art results in Computer Vision, beating human-designed architectures

Humans aren't good at high-dimensional search, so we let alis_ handle it

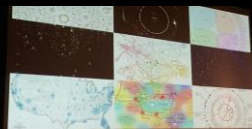




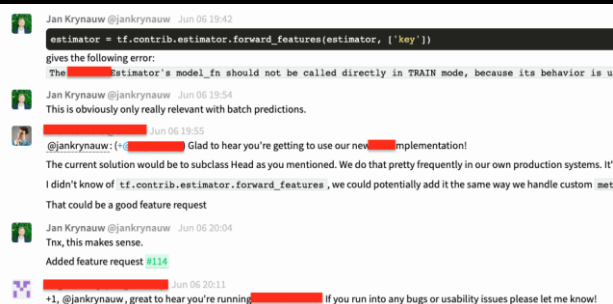
Jan Krynauf and Zander Lee

ALIS_

*Humans In The Loop - New Ways Of Working A
Deep Learning World*



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Collaborative
Community



Thank you

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