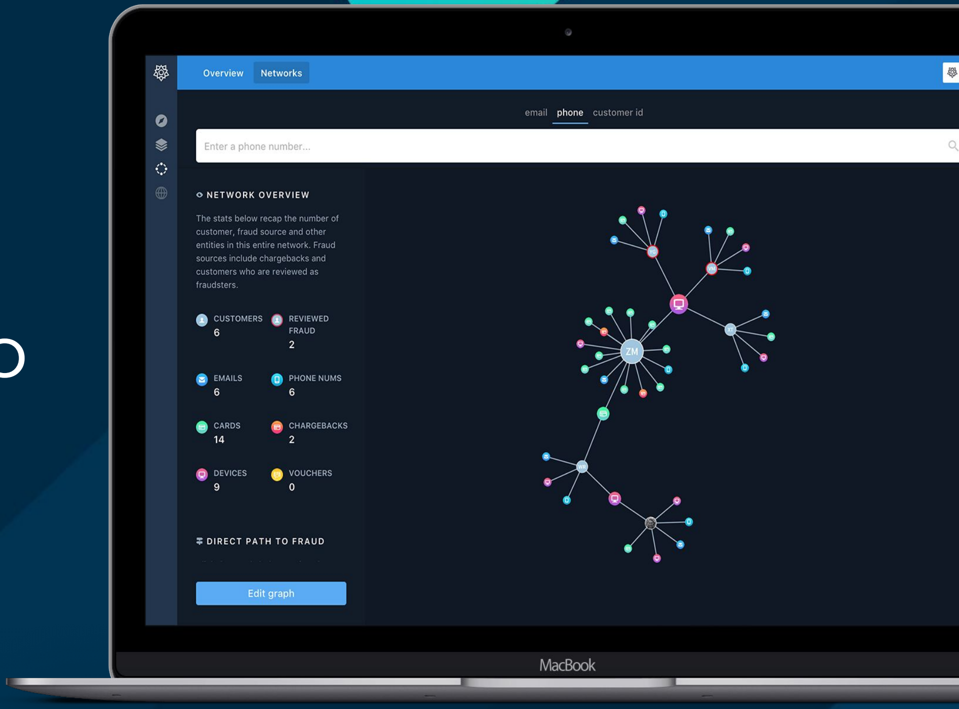
Ravelin

Applying software engineering principles to ML model deployments



NETWORK OVERVIEW

The stats below recap the number of customer, fraud source and other entities in this entire network. Fraud sources include chargebacks and customers who are reviewed as fraudsters.

CUSTOMERS 6	REVIEWED FRAUD 2
EMAILS 6	PHONE NUMS 6
CARDS 14	CHARGEBACKS 2
DEVICES 9	VOUCHERS 0

DIRECT PATH TO FRAUD

Eddie Bell | 30.01.18

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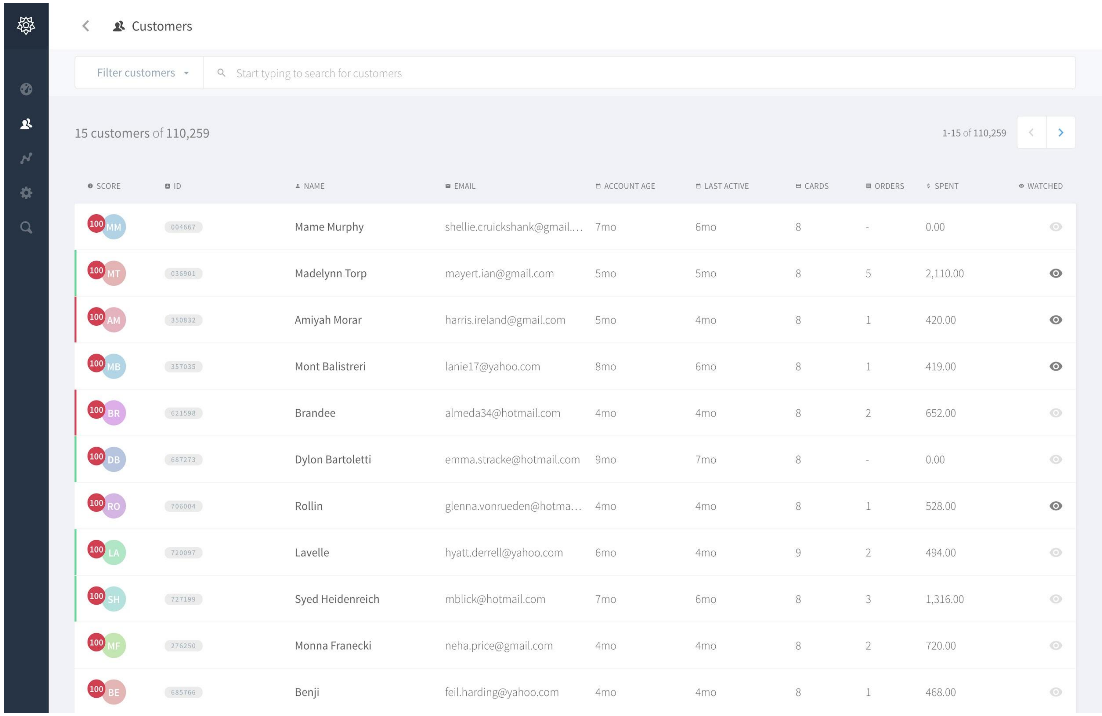
About Us

- B2B fraud detection
- Large client portfolio
- Each one special



15 customers of 110,259

1-15 of 110,259

SCORE	ID	NAME	EMAIL	ACCOUNT AGE	LAST ACTIVE	CARDS	ORDERS	SPENT	WATCHED
100 MM	004667	Mame Murphy	shellie.cruickshank@gmail....	7mo	6mo	8	-	0.00	
100 MT	036901	Madelynn Torp	mayert.ian@gmail.com	5mo	5mo	8	5	2,110.00	👁
100 AM	350832	Amiyah Morar	harris.ireland@gmail.com	5mo	4mo	8	1	420.00	👁
100 MB	357035	Mont Balistreri	lanie17@yahoo.com	8mo	6mo	8	1	419.00	👁
100 BR	621598	Brandee	almeda34@hotmail.com	4mo	4mo	8	2	652.00	
100 DB	687273	Dylon Bartoletti	emma.stracke@hotmail.com	9mo	7mo	8	-	0.00	
100 RO	706004	Rollin	glenna.vonrueden@hotma...	4mo	4mo	8	1	528.00	👁
100 LA	720097	Lavelle	hyatt.derrell@yahoo.com	6mo	4mo	9	2	494.00	
100 SH	727199	Syed Heidenreich	mblick@hotmail.com	7mo	6mo	8	3	1,316.00	
100 MF	276250	Monna Franecki	neha.price@gmail.com	4mo	4mo	8	2	720.00	
100 BE	685766	Benji	feil.harding@yahoo.com	4mo	4mo	8	1	468.00	

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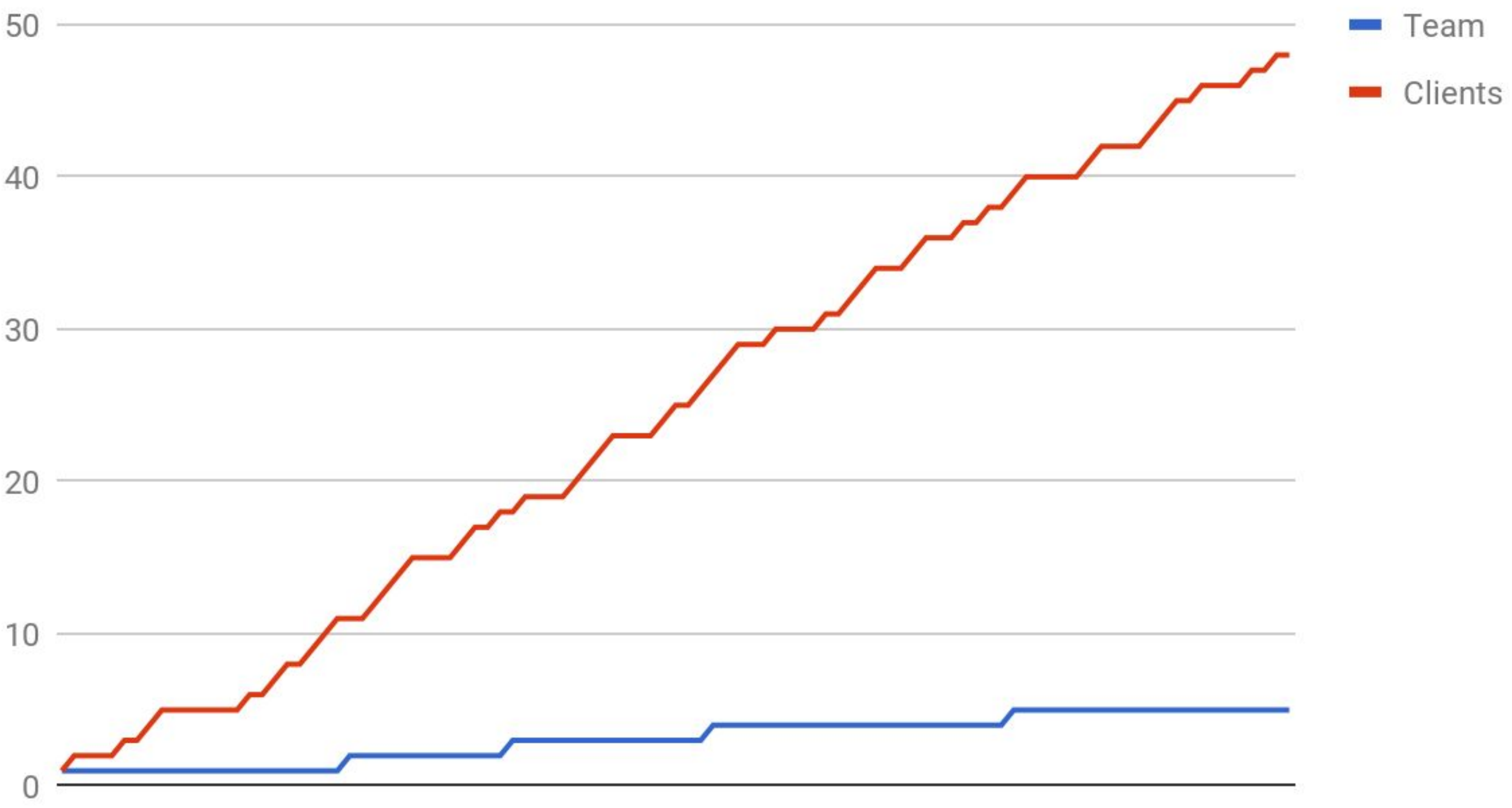
Score customers in real time for likelihood of fraud

A bit of history

Move fast, don’t break stuff

Team and client growth



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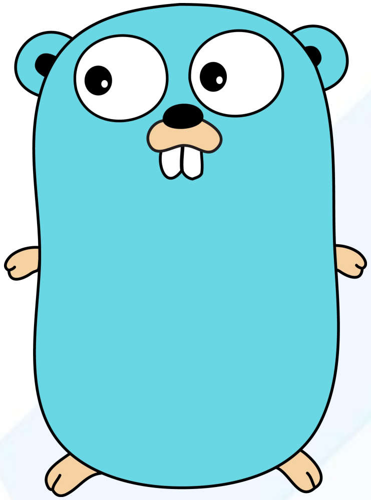
How can we scale model deployments without scaling people?

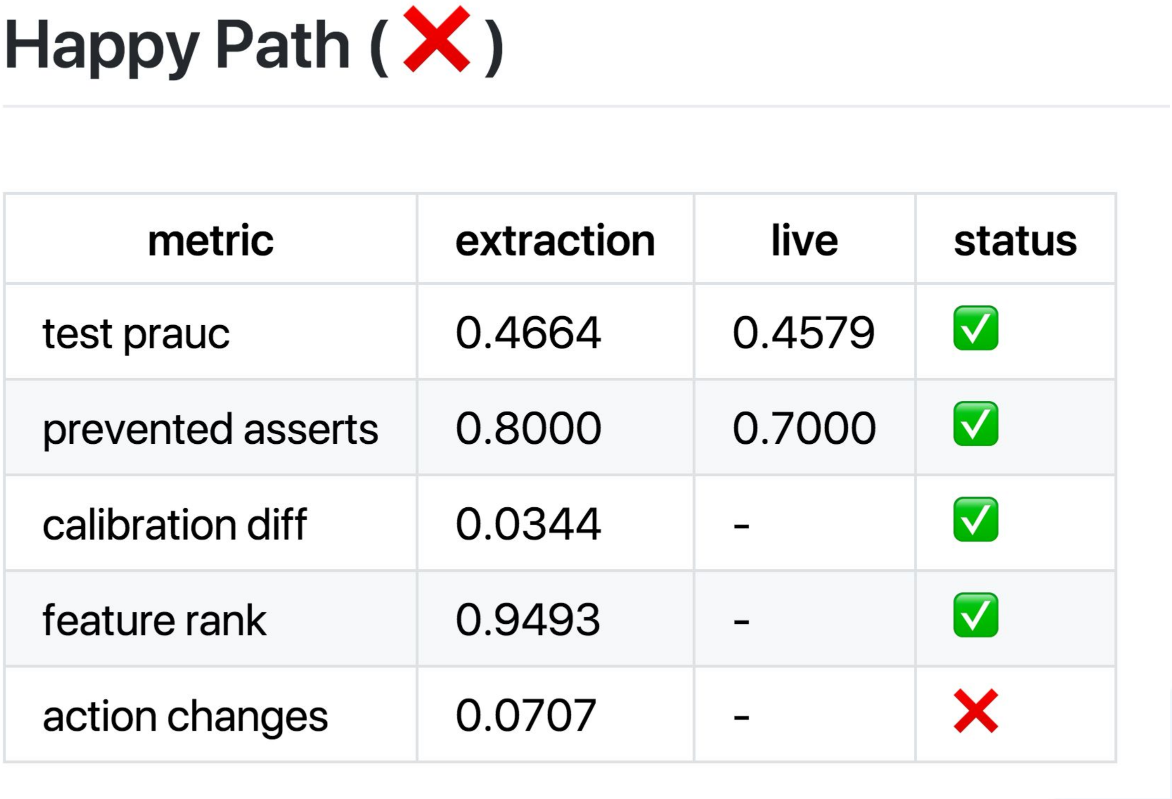
Luigi

scikit
learn

TensorFlow ™

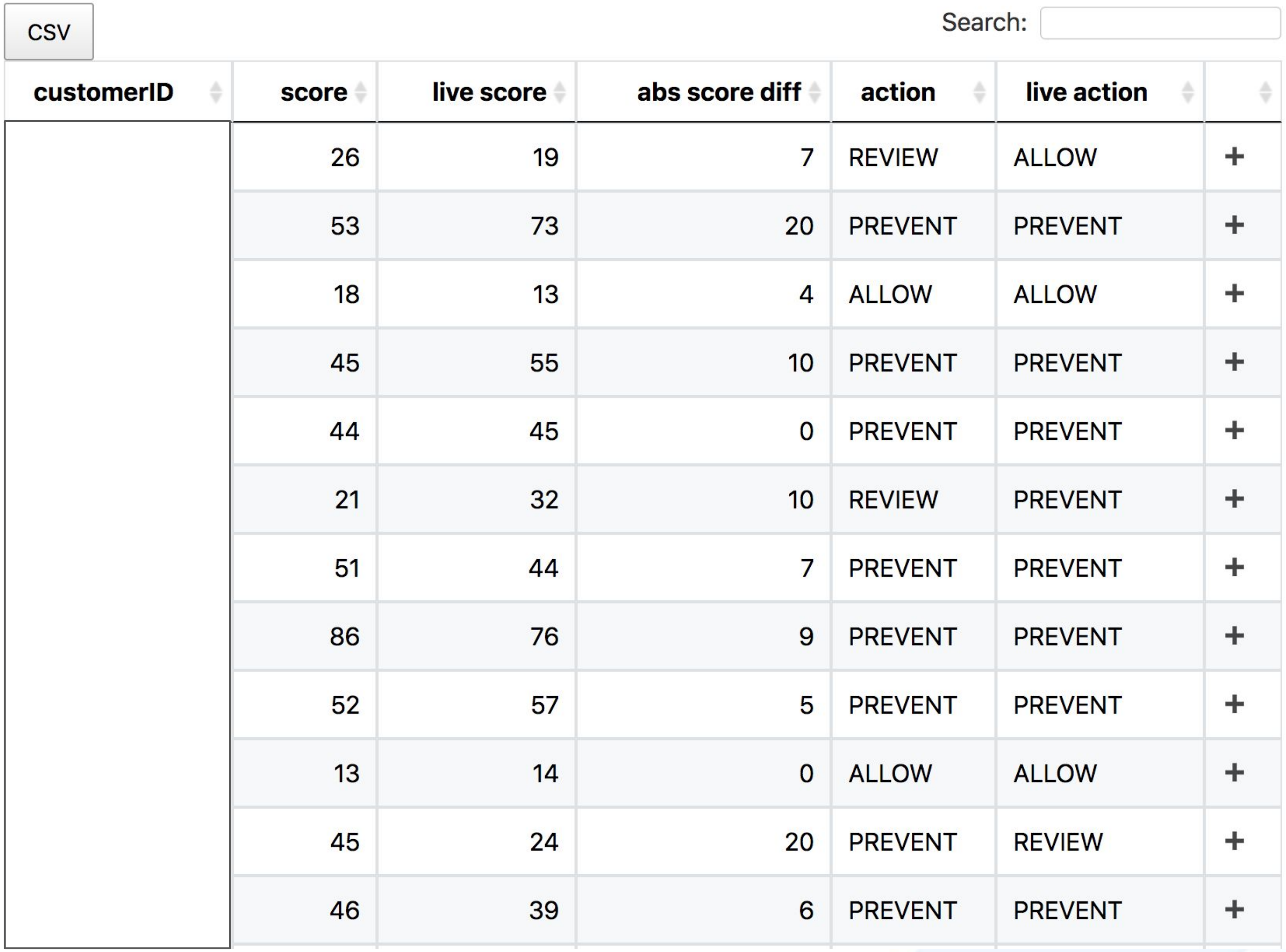


A happy path is a default scenario featuring no exceptional or error conditions.

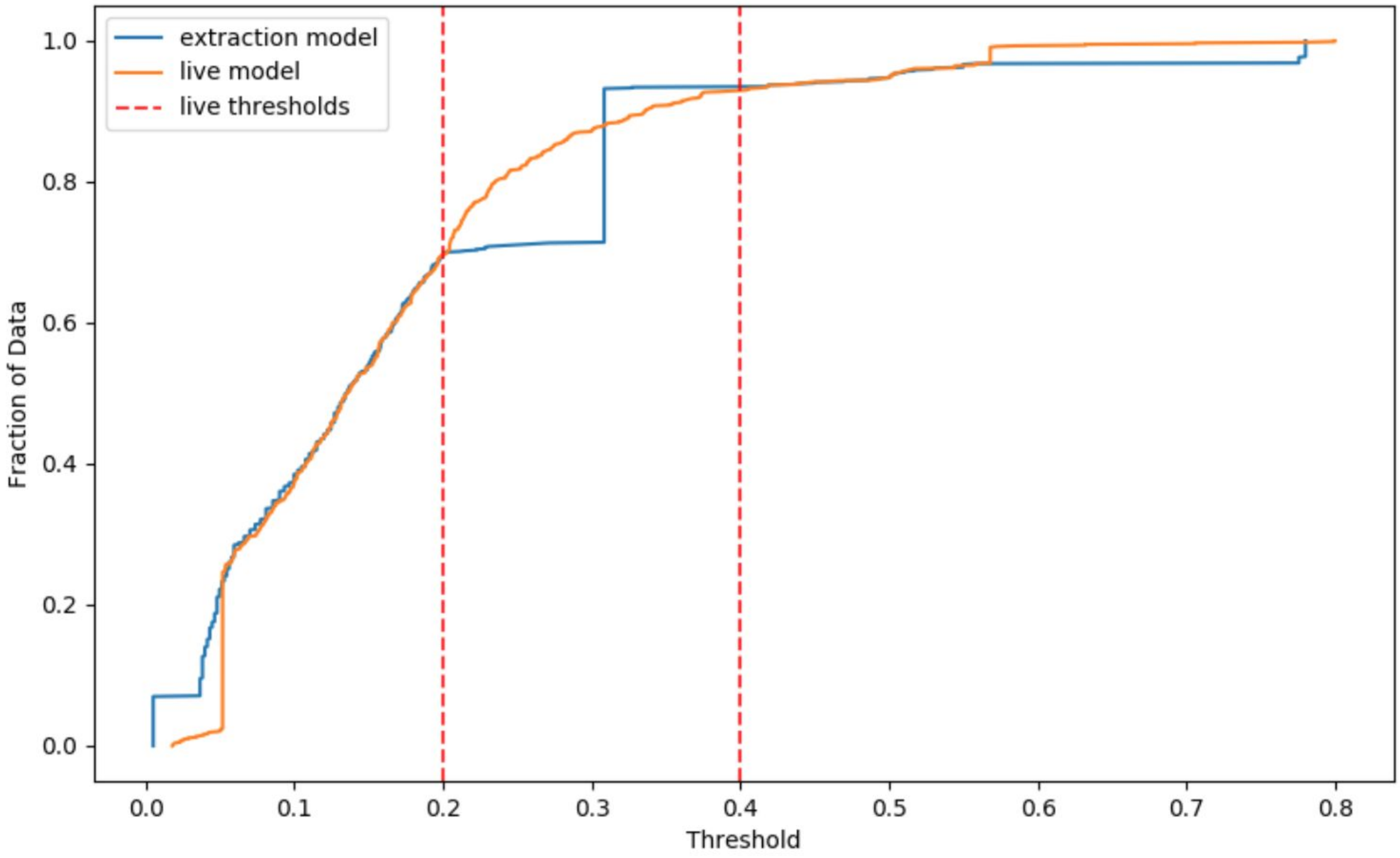


Happy Path (❌)

metric	extraction	live	status
test prauc	0.4664	0.4579	✅
prevented asserts	0.8000	0.7000	✅
calibration diff	0.0344	-	✅
feature rank	0.9493	-	✅
action changes	0.0707	-	❌



customerID	score	live score	abs score diff	action	live action	
	26	19	7	REVIEW	ALLOW	+
	53	73	20	PREVENT	PREVENT	+
	18	13	4	ALLOW	ALLOW	+
	45	55	10	PREVENT	PREVENT	+
	44	45	0	PREVENT	PREVENT	+
	21	32	10	REVIEW	PREVENT	+
	51	44	7	PREVENT	PREVENT	+
	86	76	9	PREVENT	PREVENT	+
	52	57	5	PREVENT	PREVENT	+
	13	14	0	ALLOW	ALLOW	+
	45	24	20	PREVENT	REVIEW	+
	46	39	6	PREVENT	PREVENT	+


extraction model
live model
live thresholds
1.0
0.8
0.6
0.4
0.2
0.0
Fraction of Data
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Threshold

Continuous integration

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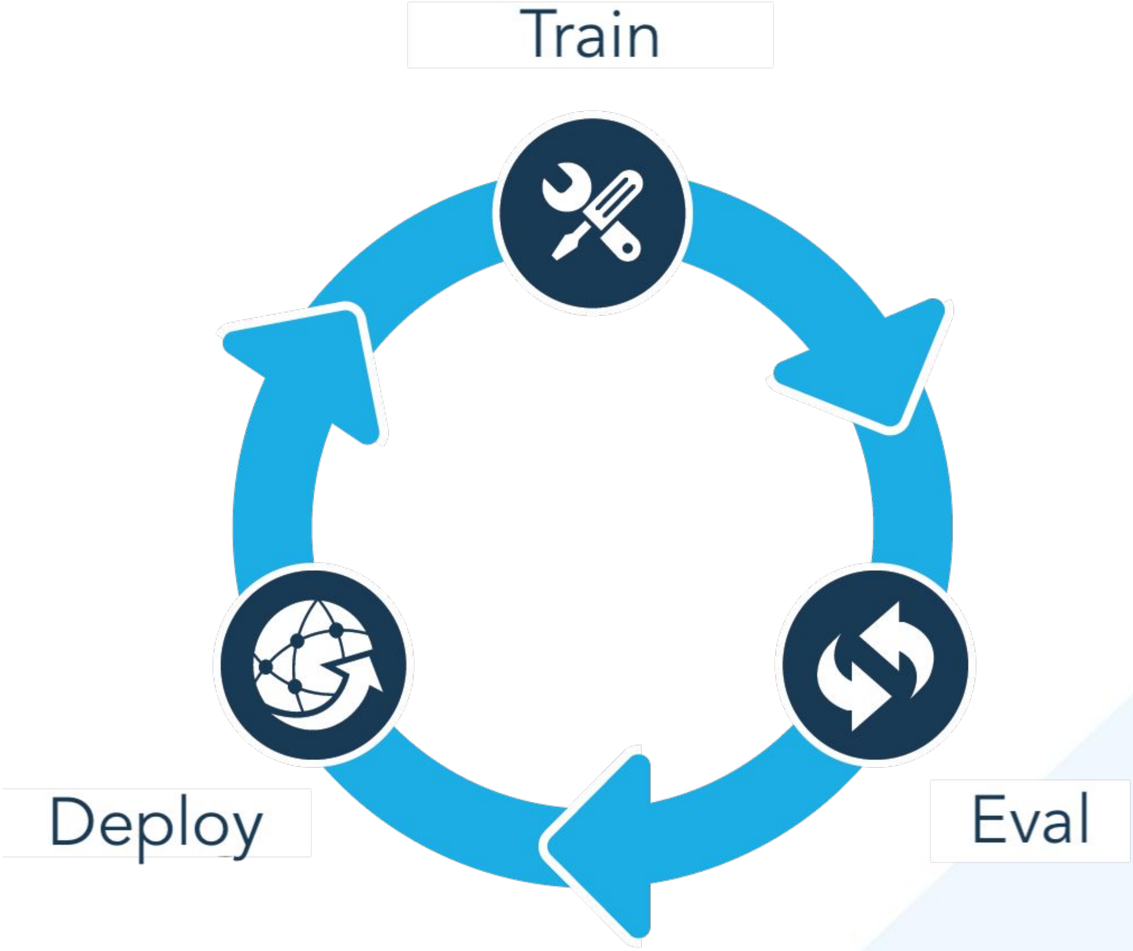

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Frequency reduces difficulty, if something is hard, do it more often. *(Martin Fowler)* once per quarter ▶ once per week

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Underfit using simple features, simple models and strong regularisation.

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How can we scale onboarding new clients when each require a bespoke model?

Heterogeneous

Scalable

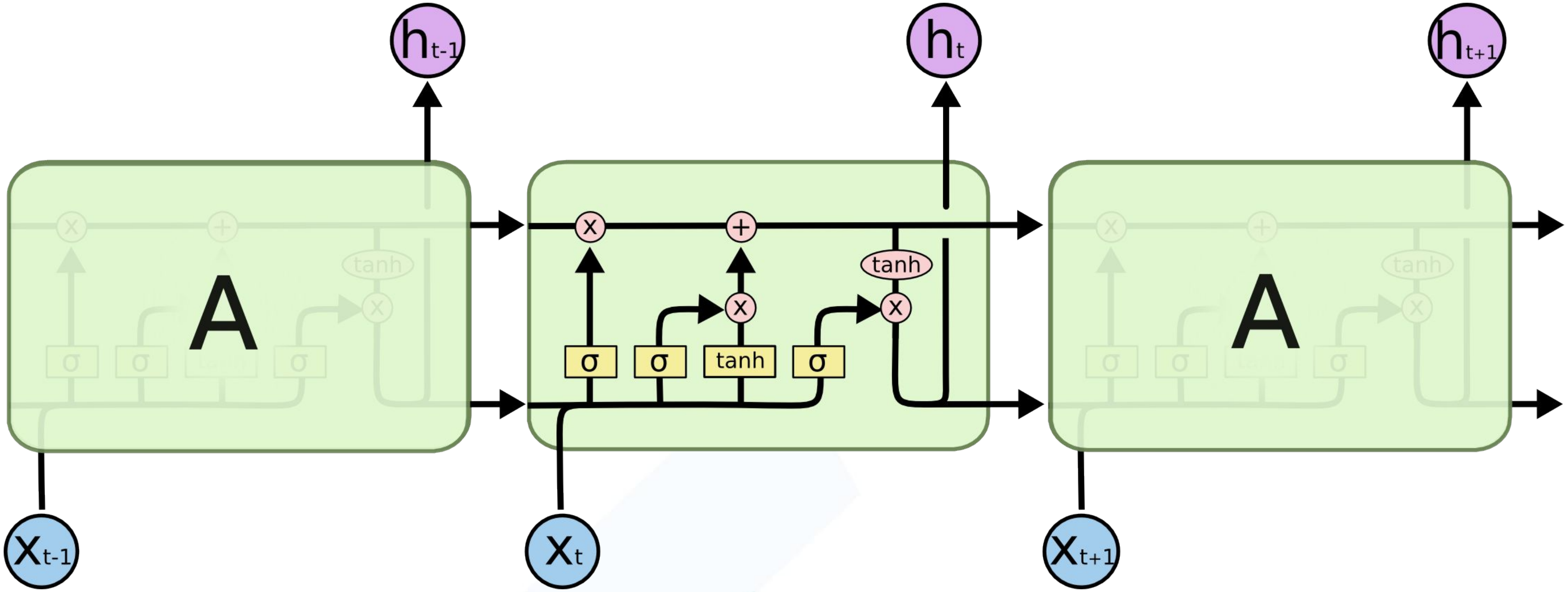
Encapsulated

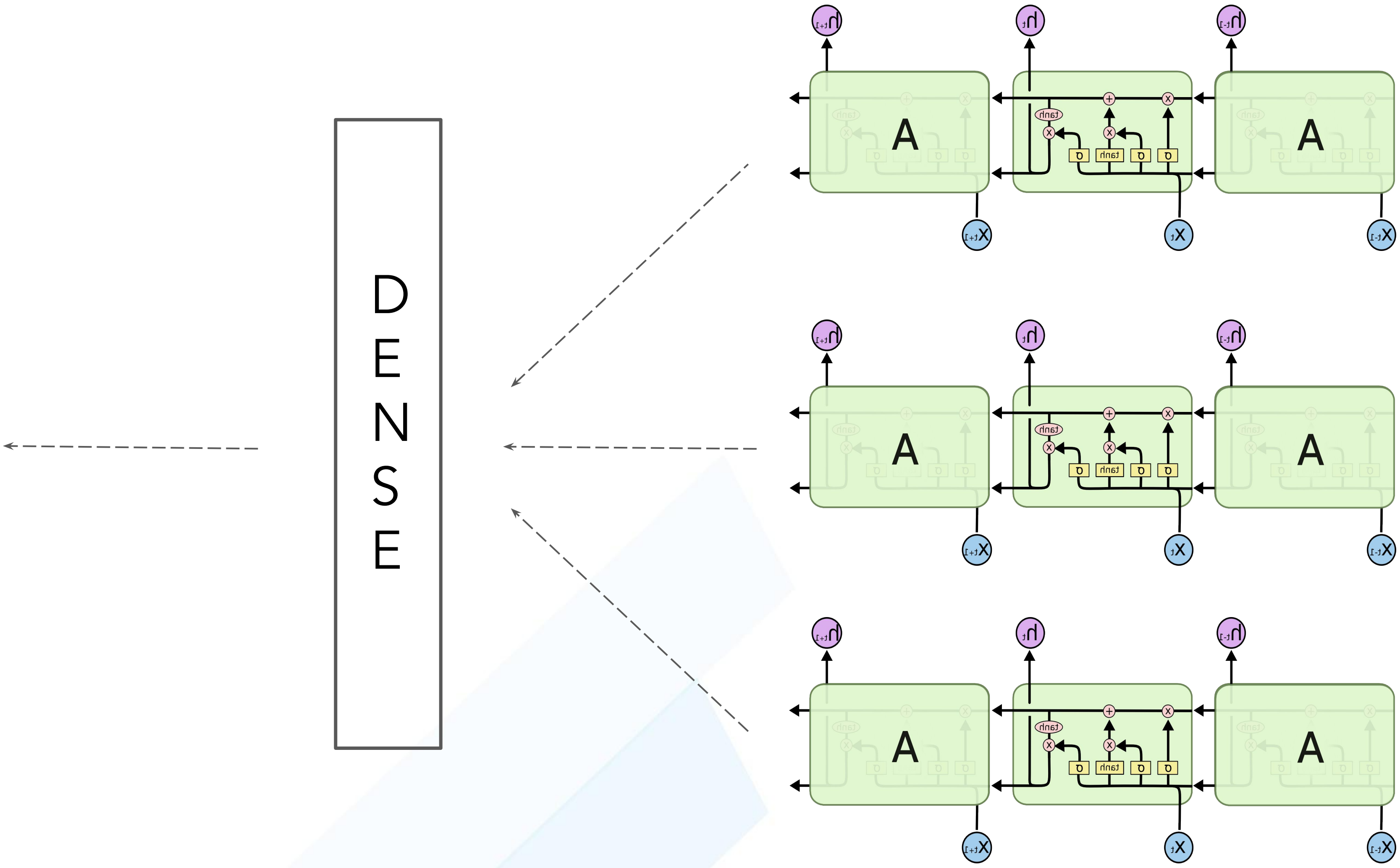
Isolated

Generic

Composable

Order item micromodel


h_{t-1}
h_t
h_{t+1}
A
×
+
tanh
σ
σ
tanh
σ
×
×
A
X_{t-1}
X_t
X_{t+1}



DENSE

ciroc vodka moet champagne	0.997286
fanta doner kebab	0.599078
mango sea-bass kale and tofu	0.097097

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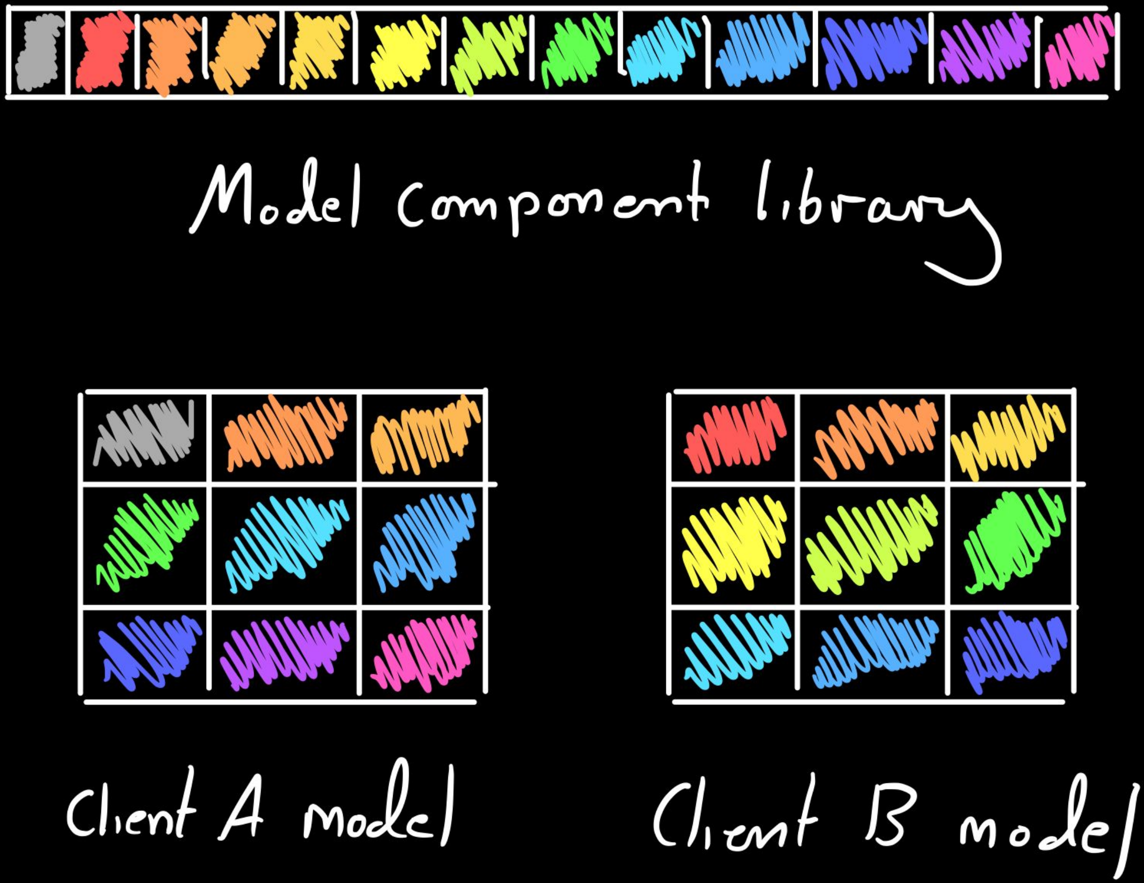
Why is the order item model a good micro-model

- Simple input
- Generic
- Focused on one signal
- Low interaction with other micromodels

We can do something similar with email address

4934jf33jkf@yopmail.com	0.997286
charles.xavier@university.edu	0.059302


Model component library
Client A model
Client B model

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Conclusion

- Deploy often
- Quantify what good looks like.
- Automate everything
- Simplicity over performance
- One code path everywhere

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Thank you

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