Rise of the Machine (Learning)

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ANZTB - 2017

@Stefowilso

DON'T
BE
SCARED

DATA ANALYTICS

V R

DATA MINING

A R

A I

NEURAL NETWORKS

MACHINE LEARNING

CHATBOT

N L U

N L P

PREDICTIVE ANALYTICS

BIG DATA

DEEP LEARNING

Artificial Intelligence

The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

Machine Learning

Machine learning is a type of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed. Machine learning focuses on the development of computer programs that can change when exposed to new data

Chatbot

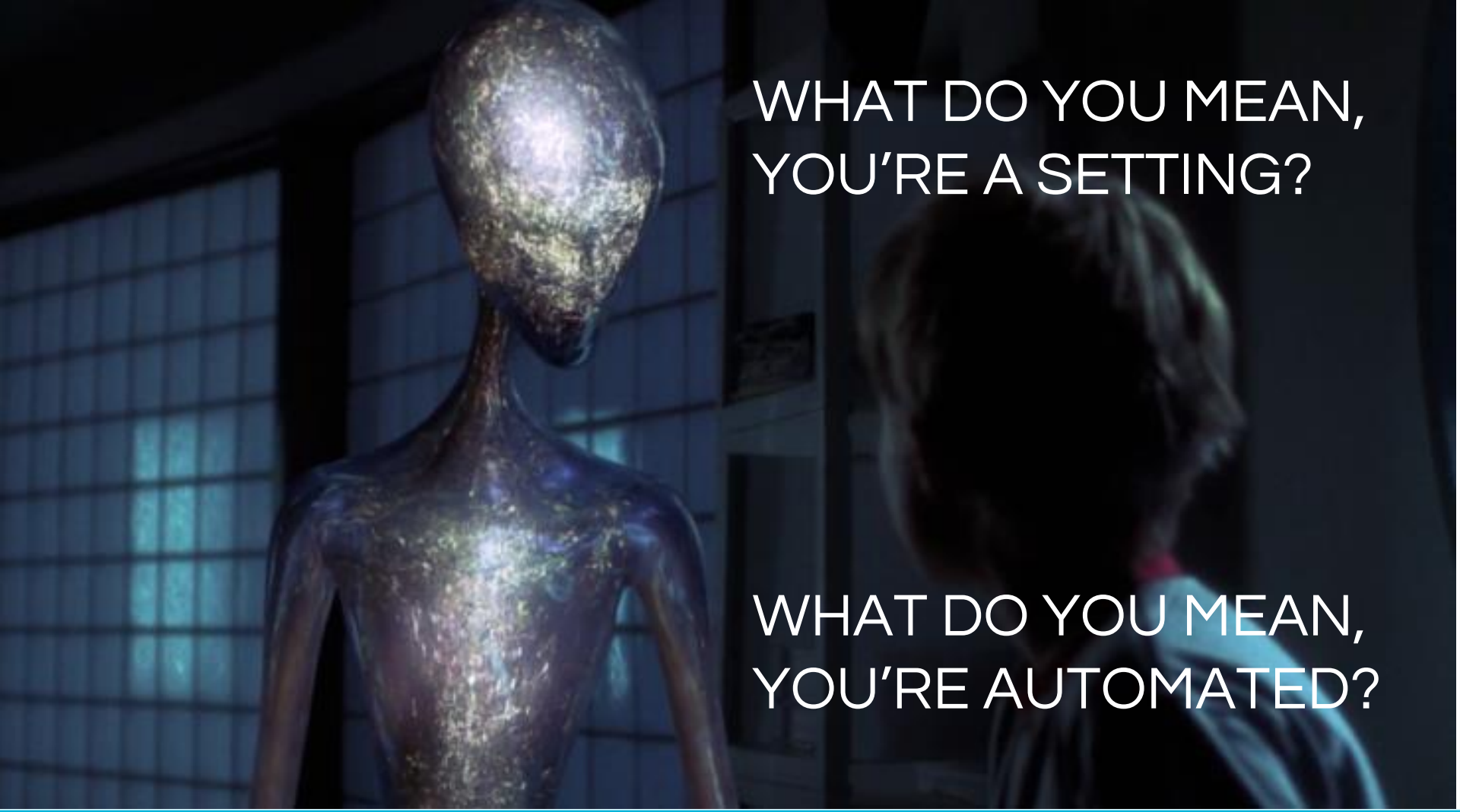
A computer program designed to simulate conversation with human users

Natural Language Processing

Natural language processing (NLP) is the ability of a computer program to understand human speech as it is spoken. NLP is a component of artificial intelligence (AI).

FAUX MACHINE LEARNING
MACHINE LEARNING
CHATBOTS
THE PAST & FUTURE

FAUX
ex machina
WHAT HAPPENS TO ME IF I FAIL YOUR TEST?

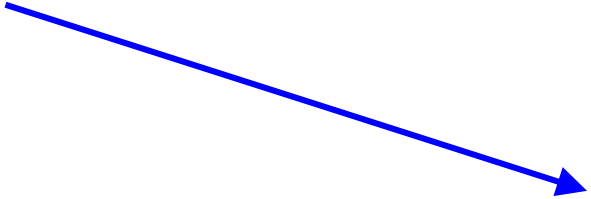

WHAT DO YOU MEAN,
YOU'RE A SETTING?
WHAT DO YOU MEAN,
YOU'RE AUTOMATED?

THE FIRST FORAY
Transformers: The Game developer Traveller's Tales publisher Activision
© GameWallpapers.com hosted by JTLnet.com

TESTING THE WAF

Web Application Firewall

go.xero.com



Checking for:
Dodgy people
(Source IP, Geolocation)

Dodgy input/signatures
(HTTP headers, Cookies)

AWS

MODES
Simulation vs Active

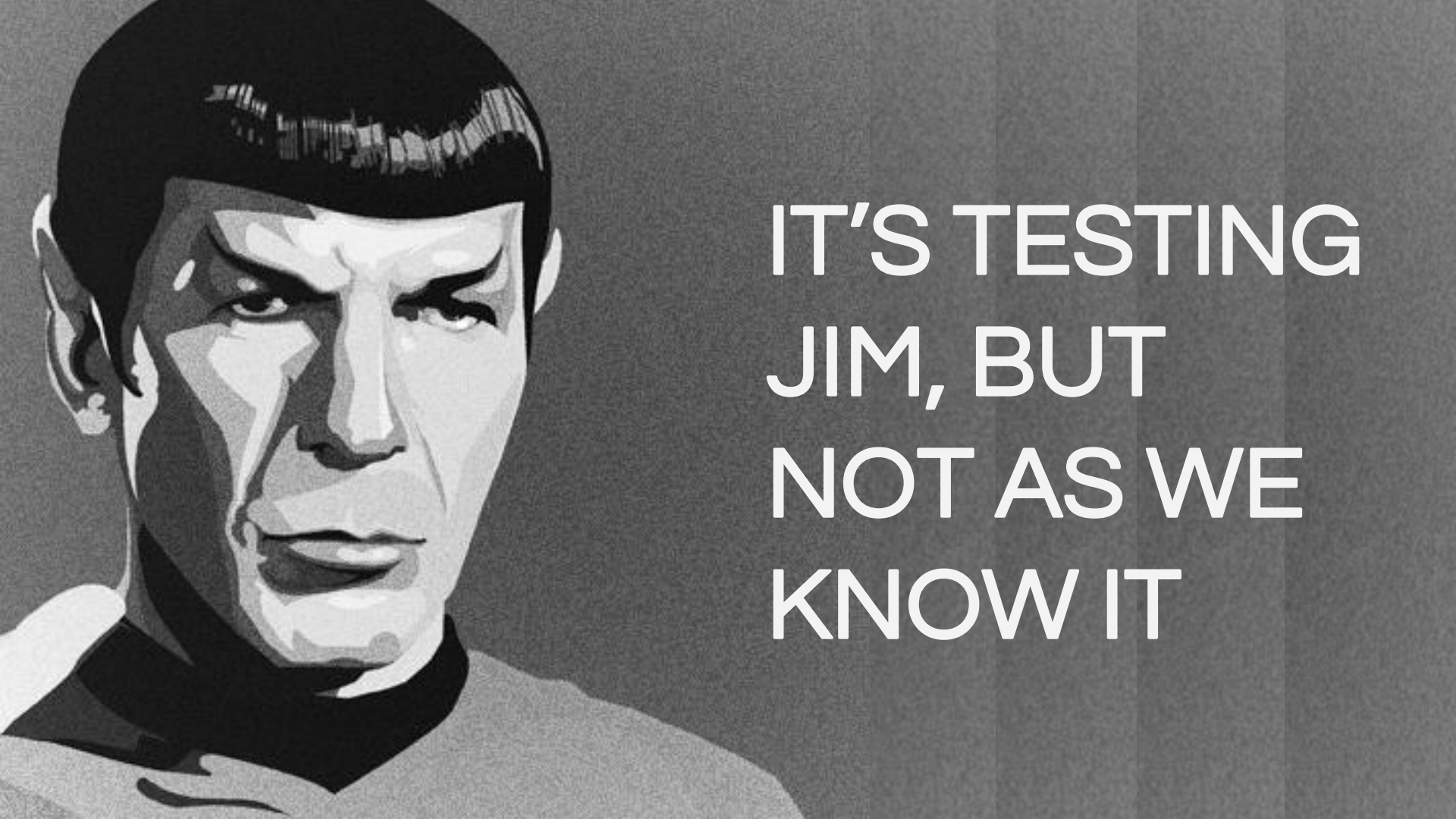
- **Simulation** = Imperva WAF is monitoring traffic, and will give us risk-based alerts based on the rules set, and will let the traffic through

- **Active** = Imperva WAF will enforce rules and give us risk-based alerts. High risk alerts with high probability (i.e. hardly ever legit) are blocked.

MODES
Learning vs Active

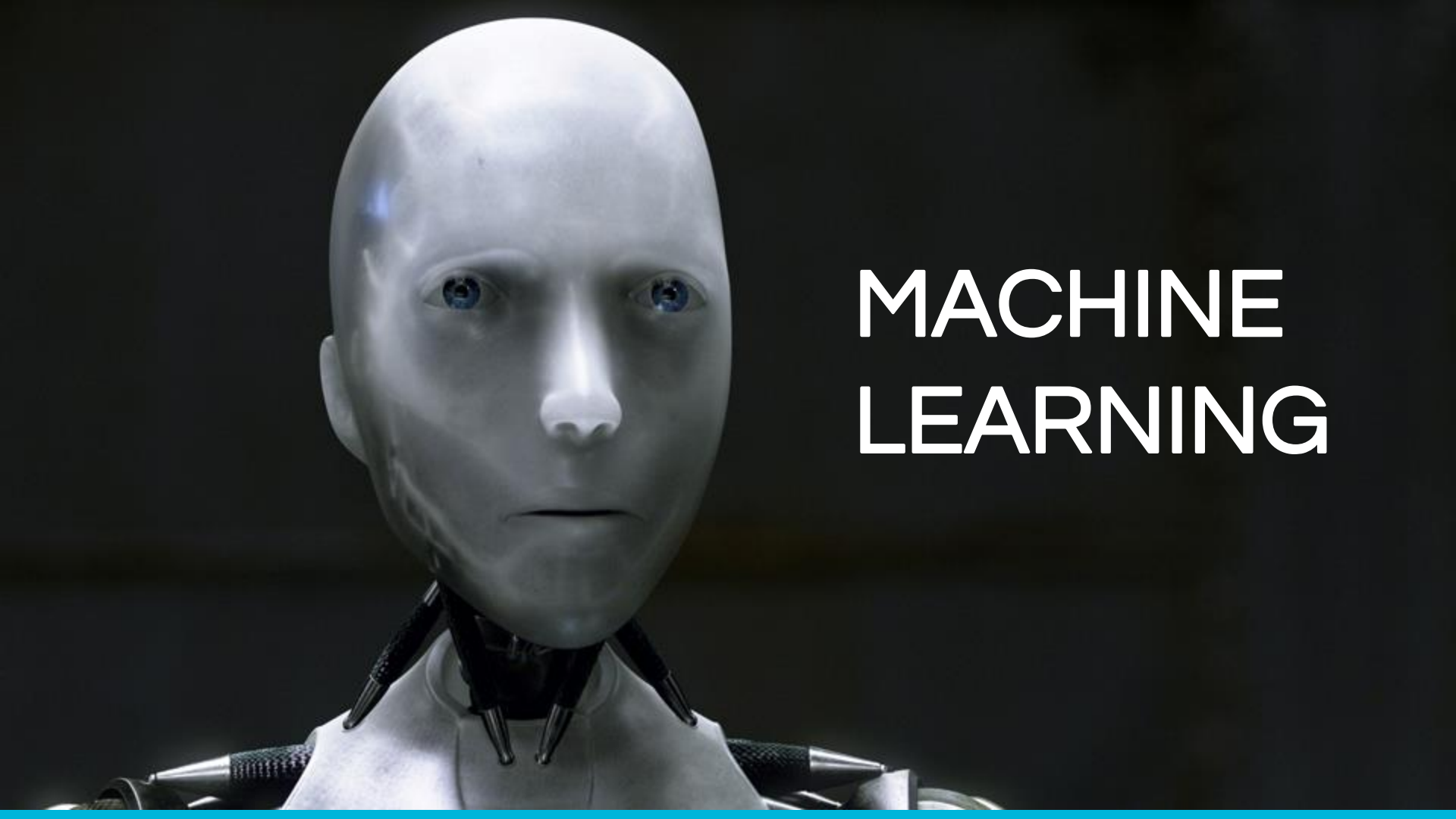
- **Learning** = Imperva WAF is monitoring that URL and collecting information to understand normal patterns (e.g. parameter length used, methods used, etc). Traffic is let through.

- **Active/Not learning** = Imperva WAF creates rules based off the behavior it has learned and throws low, medium, or high alerts (i.e. blocks traffic) based off those rules.


IT'S TESTING
JIM, BUT
NOT AS WE
KNOW IT

WHAT DID WE LEARN?

- Our team really disliked testing without a purpose
- Management didn’t really understand the terms exploratory and regression testing
- Our known testing techniques didn’t work
- It’s all about the data


MACHINE
LEARNING

TYPES OF LEARNING

Supervised Learning

Creating functions from known data sets, also known as labeled training data
Task Driven learning using Classification and Regression

Unsupervised Learning

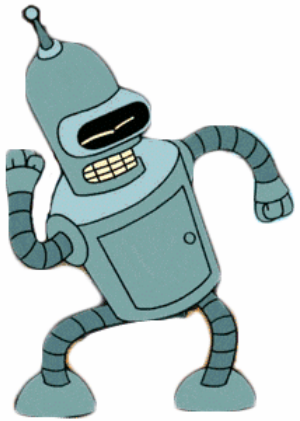
Training Data no longer used and any manual labels are removed
Machine is learning on it's own using data driven clustering

Reinforcement Learning

Algorithm is learning to react to an environment on it's own. There is a decision making process and reward system in place

XPLORE

2016



Joe's garage

Brad.stillwell LastName

Dashboard | Accounts | Payroll | Reports | Contacts | Settings

Bank Accounts ›

BenderBank 111001010111

986.64 Statement Balance | 616.65 Balance in Xero

7 Oct 2015 Reconciliation Report | Manage Account

What's this?

Turn off Suggestions | Stop Auto Rec

Reconcile (3) | Bank statements | Account transactions

What's this?

Review your bank statement lines...

	Spent	Received
Create rule 7 Oct 2015 briscoes te rapa te rapa nz nz More		123.33
Create rule 7 Oct 2015 gilmours hamilton hamilton nz nz More		123.33
Create rule 7 Oct 2015 nz transport agency agency More		123.33

OK

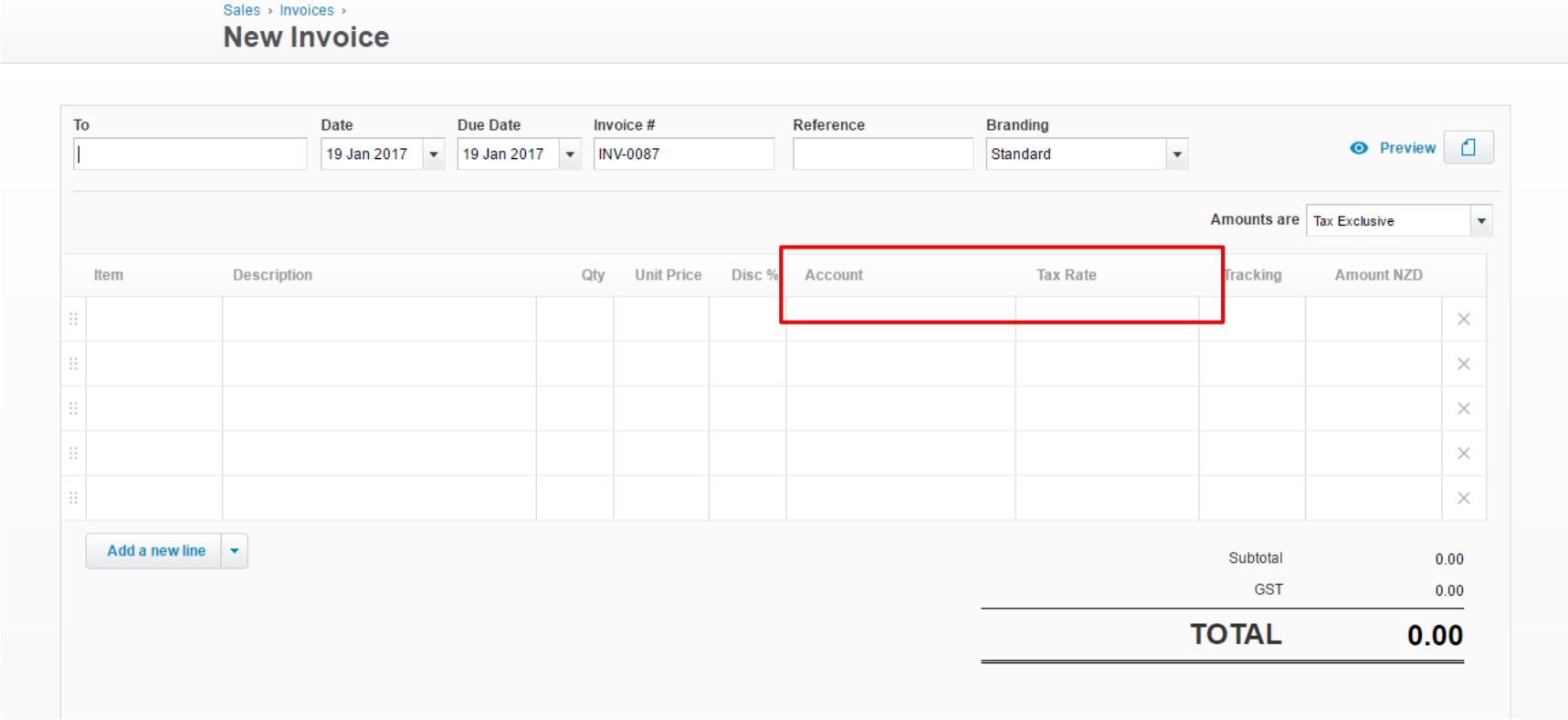
OK

...then match with your transactions in Xero

	Spent	Received
Match | Create | Transfer | Discuss — Find & Match Who: briscoes te rapa — What: 429 - General Expenses Why: te rapa nz nz No GST — Add details		
Match | Create | Transfer | Discuss — Find & Match Who: gilmours hamilton — What: 429 - General Expenses Why: hamilton nz nz No GST — Add details		
Match | Create | Transfer | Discuss — Find & Match Who: nz transport agency — What: 810 - NZTA Clearing Accoun Why: agency No GST — Add details		

COULD WE DO MORE?

INVOICING WITH MACHINE LEARNING?



SIMPLE RULES VS MACHINE LEARNING

Would simple rules be good enough?

- Last used account code
- Most frequently used
- Default sales code

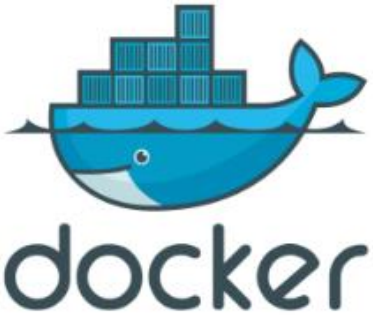
What Models could we use?

- Multinomial Naive Bayes
- Logistic regression

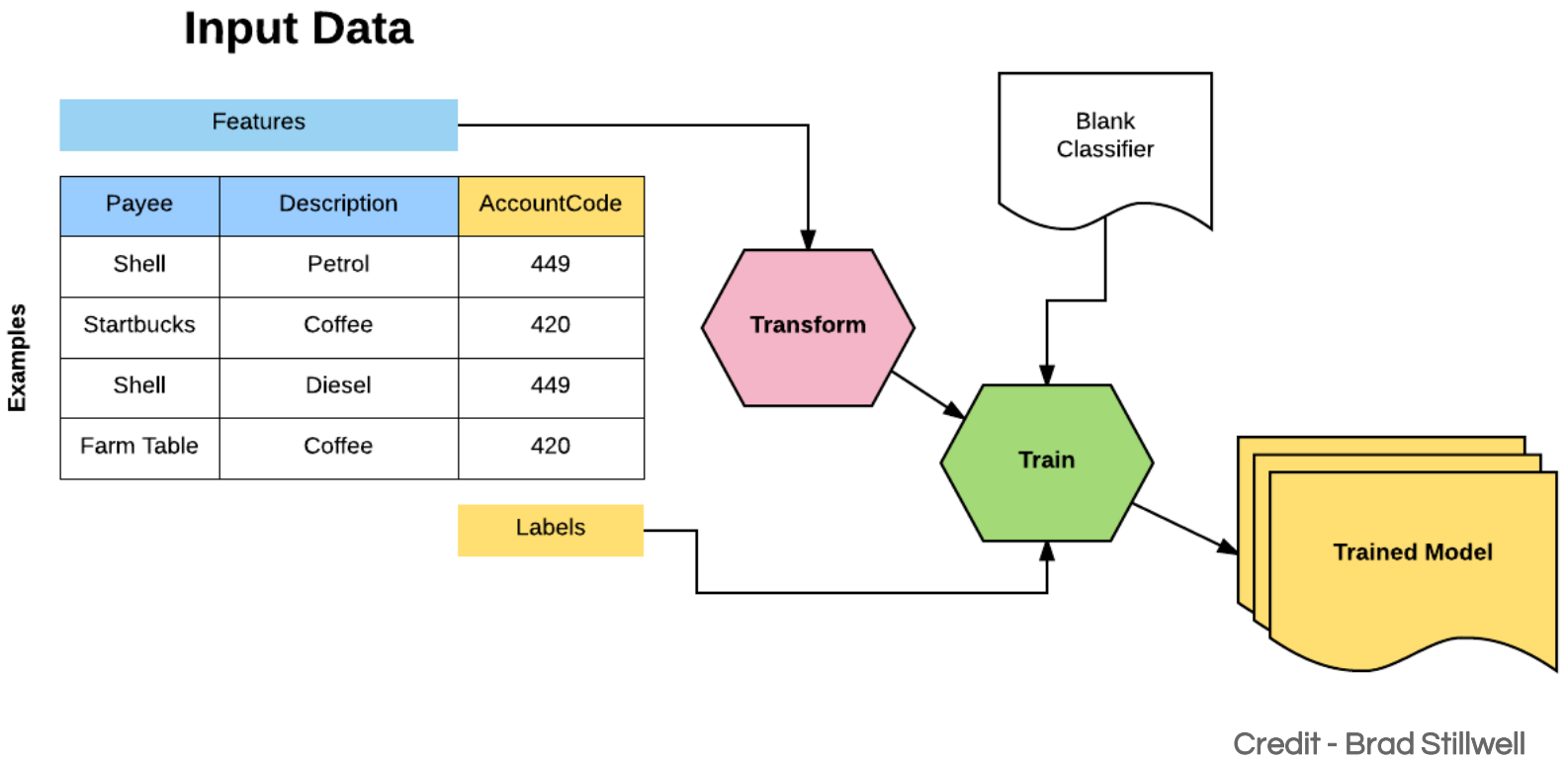
Invoicing Simulator in Python

- Common way to compare methods
- F1 scores (1 is perfect, 0 is opposite)
- 2000 Organisations + 2 accounts
- 150 Invoices
- How much data do we need?

THE SET UP

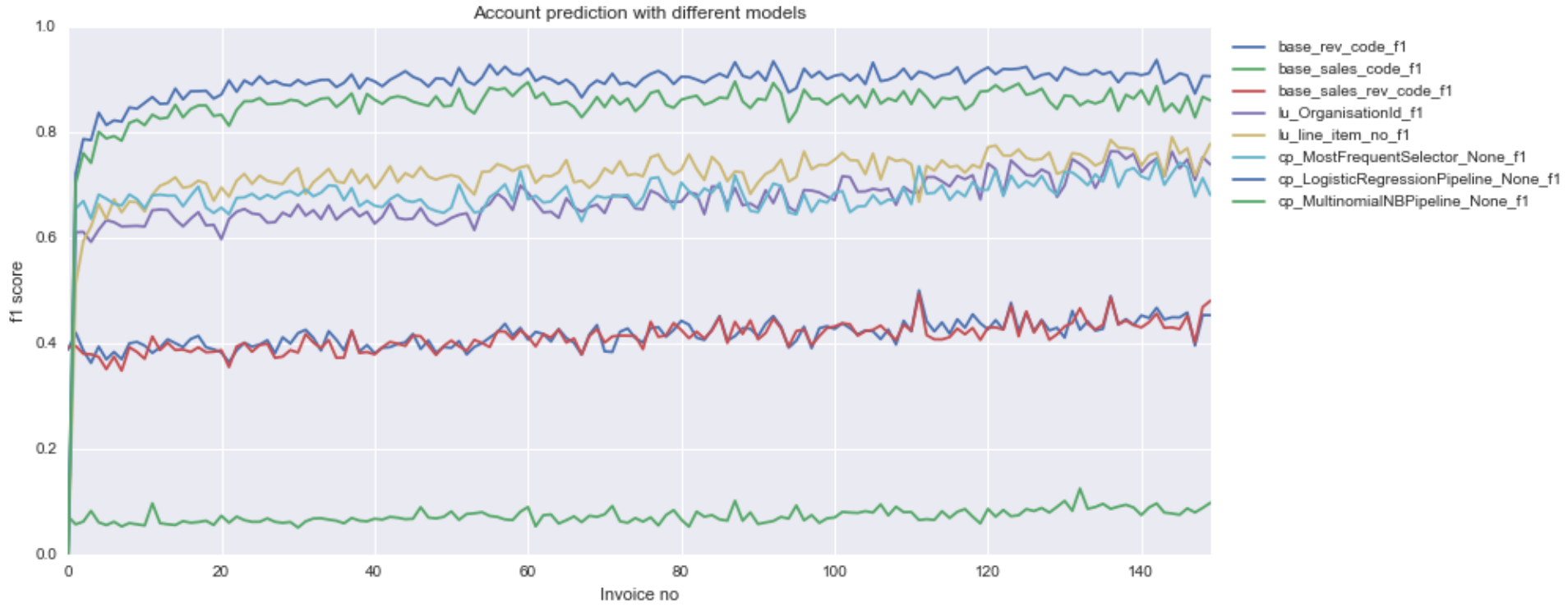


TRAINING MODEL

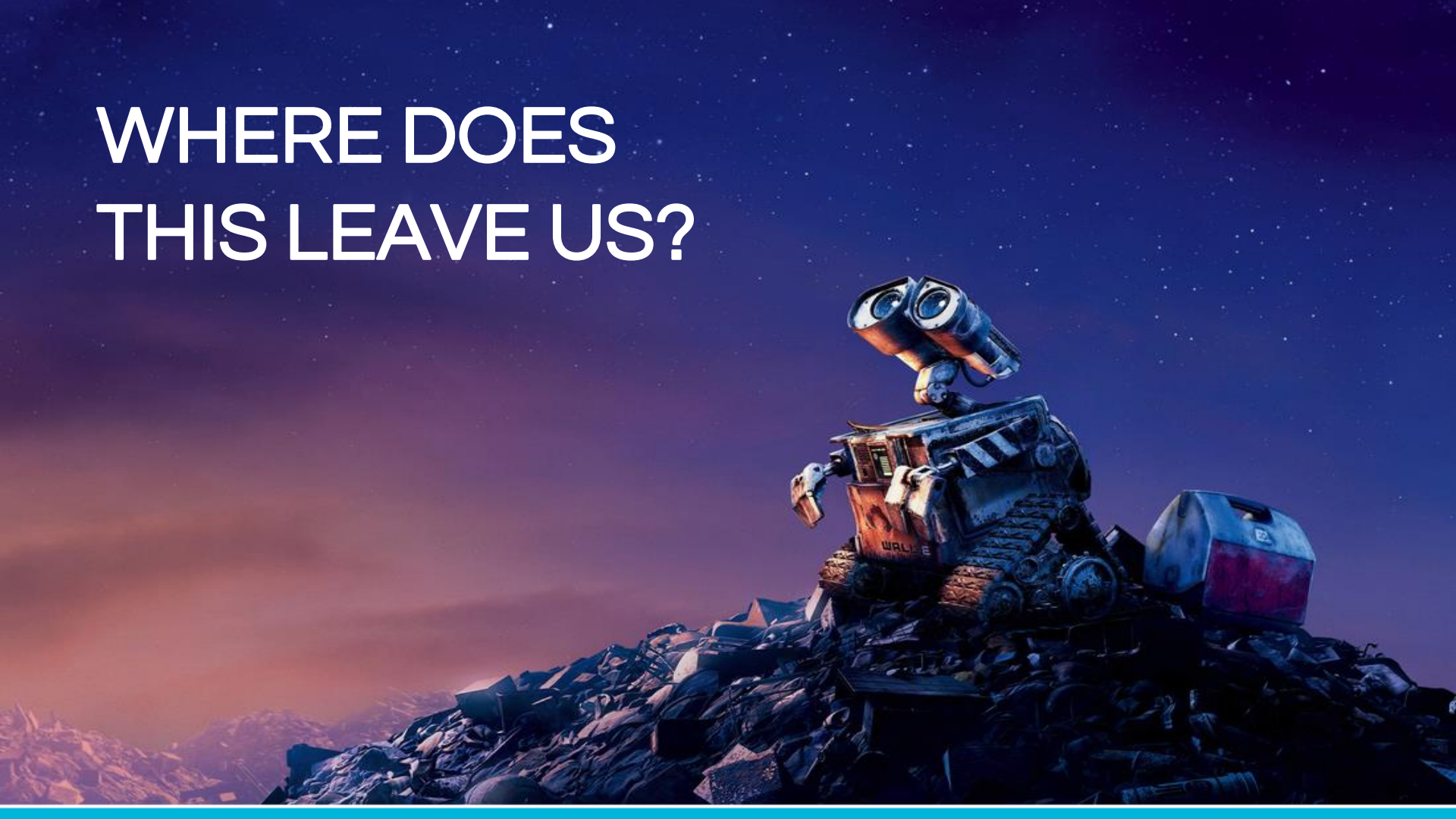


Credit - Brad Stillwell

RESULTS

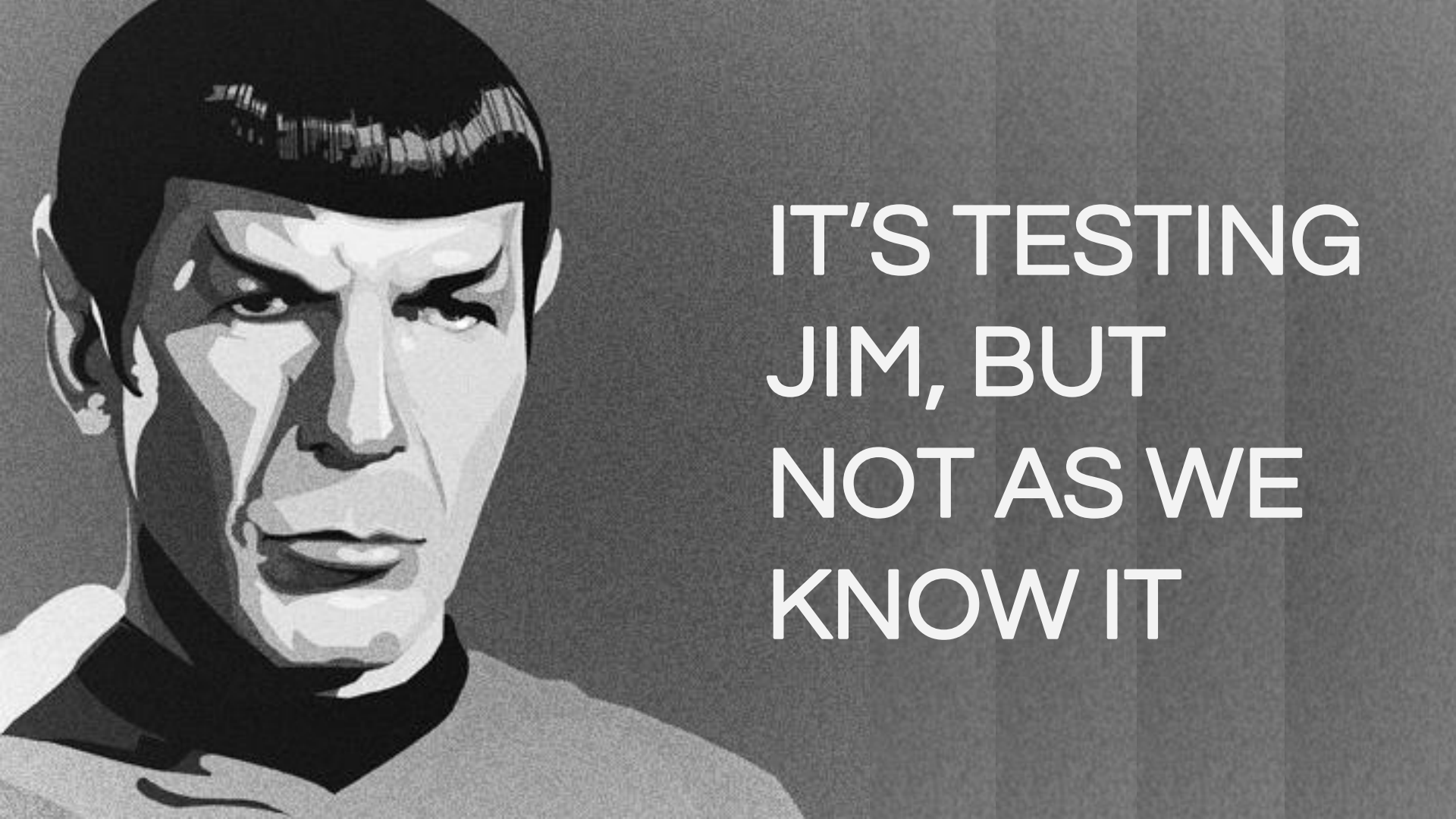

Account prediction with different models
f1 score
Invoice no
1.0
0.8
0.6
0.4
0.2
0.0
0
20
40
60
80
100
120
140
base_rev_code_f1
base_sales_code_f1
base_sales_rev_code_f1
lu_OrganisationId_f1
lu_line_item_no_f1
cp_MostFrequentSelector_None_f1
cp_LogisticRegressionPipeline_None_f1
cp_MultinomialNBPipeline_None_f1

WHERE DOES THIS LEAVE US?



WELLINGTON CoP MISSION STATEMENT

"We aim to deliver experiences that delight customers by influencing the Xero culture to be more quality oriented and transforming our software from 'good' to 'wow'!"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THERE'S A LOT TO DO!

ANALYSIS

- What is a good candidate for machine learning?
- What does success look like? How do you measure it?
- What is a good data set for supervised learning?
- Do you need to A/B test?
- How do you move into production? Do you need a target customer type?

BE CURIOUS

- This is a young field, learn about it and what other people are doing
- How can this new technology help you to do your job?
- How can ML and AI be applied to new features or designs?
- Can you improve the UX by reducing exceptions or possibility of customer error?

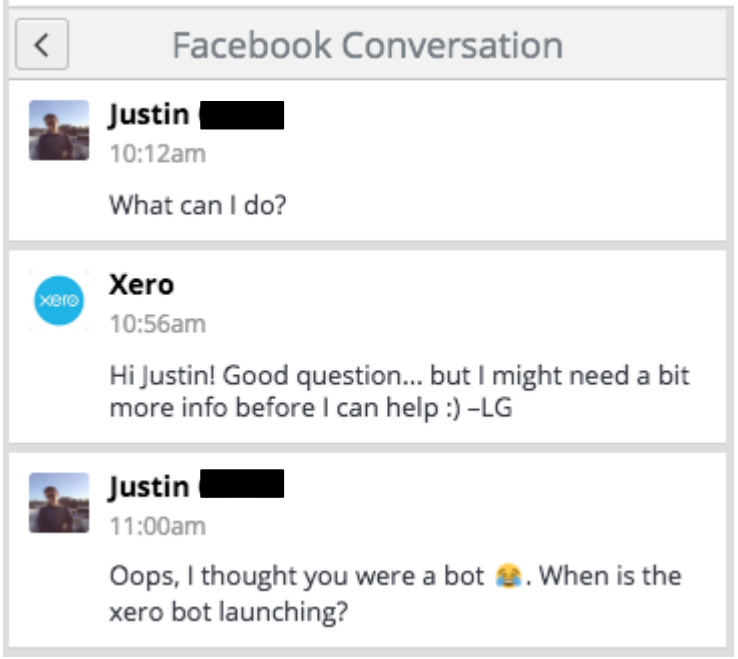
IF YOU WANT TO LEARN MORE...

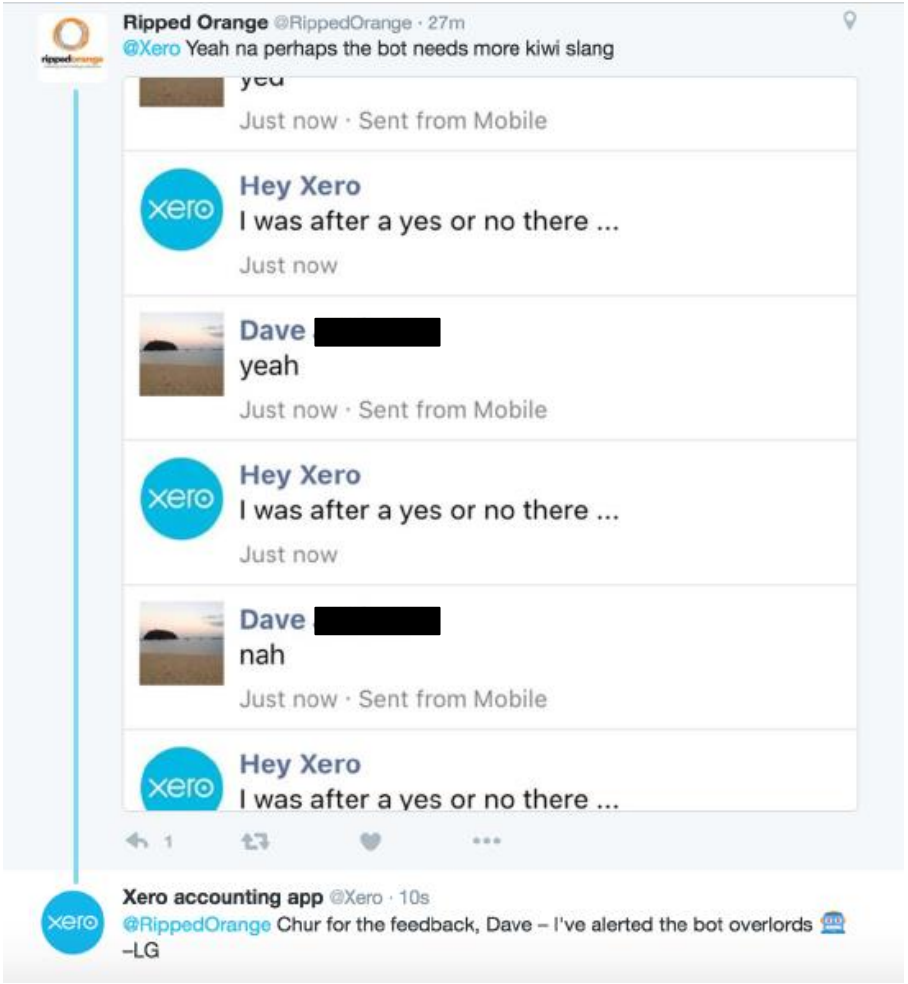
LOOK EVERYWHERE

CHATBOTS

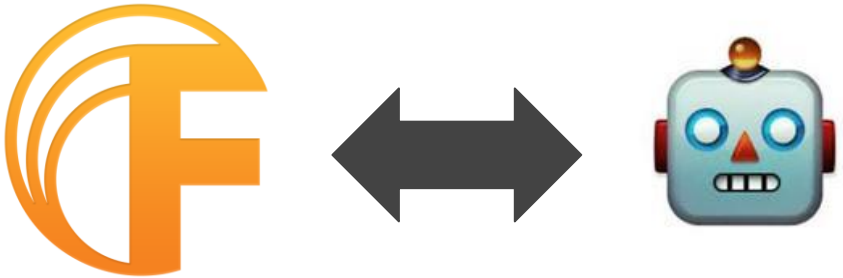
HOW CAN I HELP?

CHATBOT LOLZ





HELPFUL CHATBOTS



HAL9000 #headsup branch 35 tests have been triggered for XD-LowCarbResolutionTake2

WTF dev-adamg merged their own PR into branch CI (627)
'Revert "XD-Megapode release"' https://github.dev.xero.com/Xero/Xero/pull/627

ReganY on Aug 9
waltbot get directions "3 Market Ln, Wellington" "Hashigo Zake Wellington"

Waltbot on Aug 9
From: 3 Market Ln, Wellington, 6011, New Zealand
To: Wellington, New Zealand
Head northwest on Market Ln toward Cable St (74 m)
Turn right onto Cable St (0.1 km)
Turn right onto Taranaki St (signs for Brooklyn) (86 m)
Sharp right onto Jervois Quay (signs for Route 1/Route 2) (0.5 km)
Turn left onto Willeston St (0.2 km)
Turn left onto Willis St (4 m)

ReganY on Aug 9
wait. that isnt right.

~~INDUSTRIAL~~

INTELLIGENCE REVOLUTION

HUMANS DO THINGS DIFFERENTLY

DON'T
BE
SCARED

Thank you!

@Stefowilso
Stephanie Wilson

ANZTB 2017