

Artificial intelligence & machine learning

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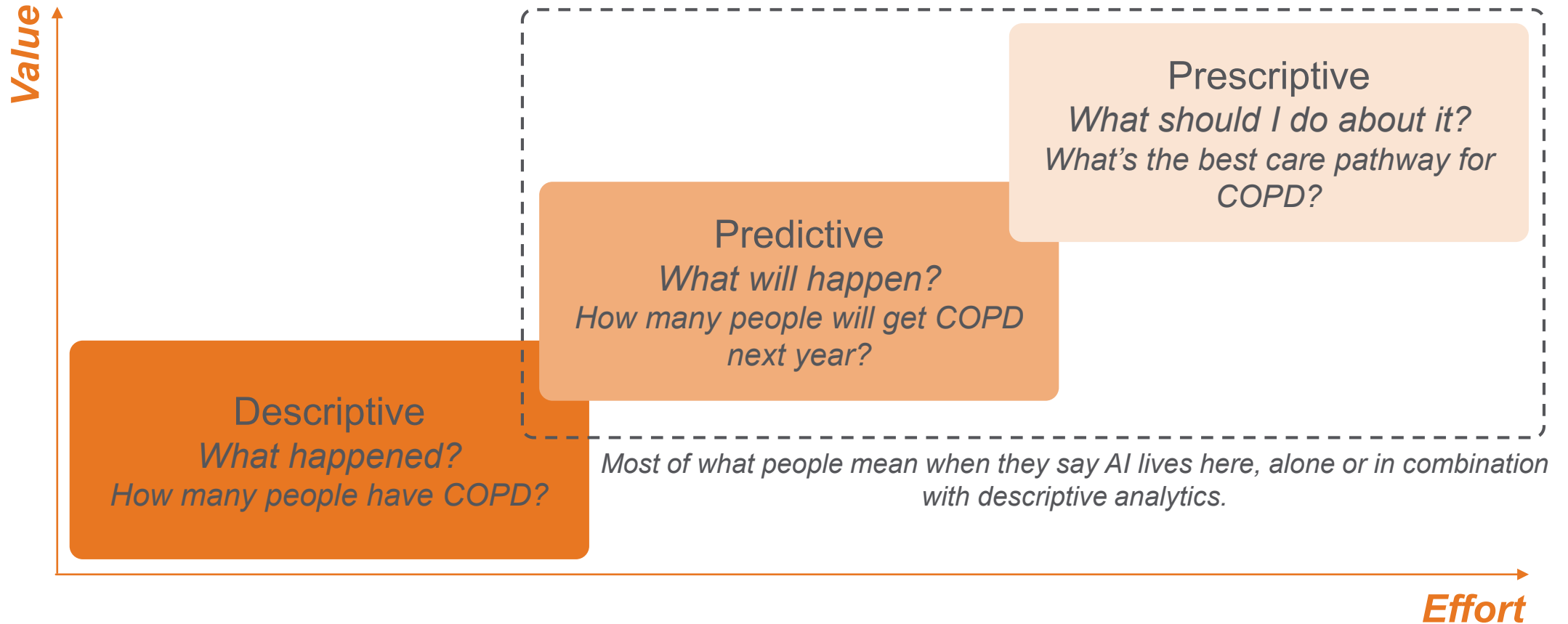


Disclosures

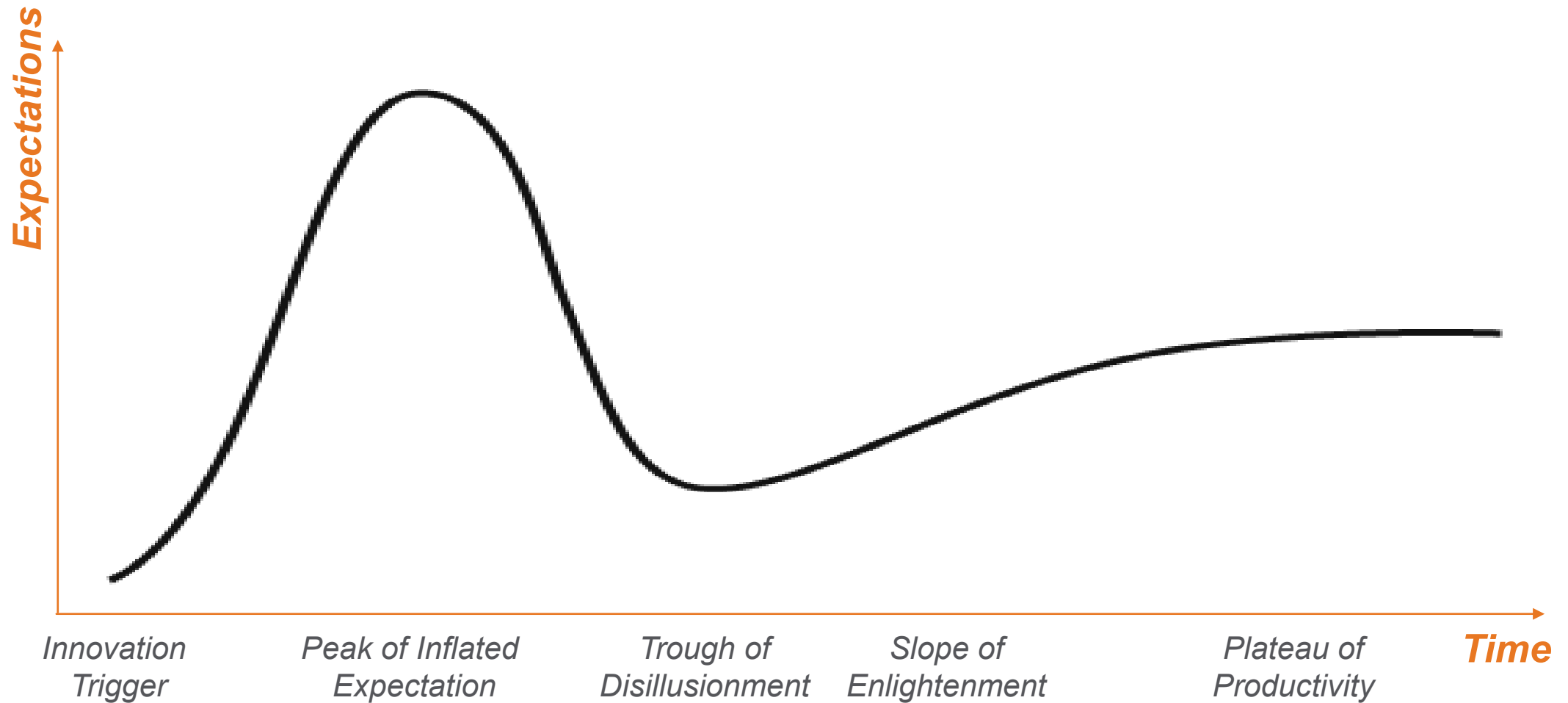
Financial Disclosures:

- None

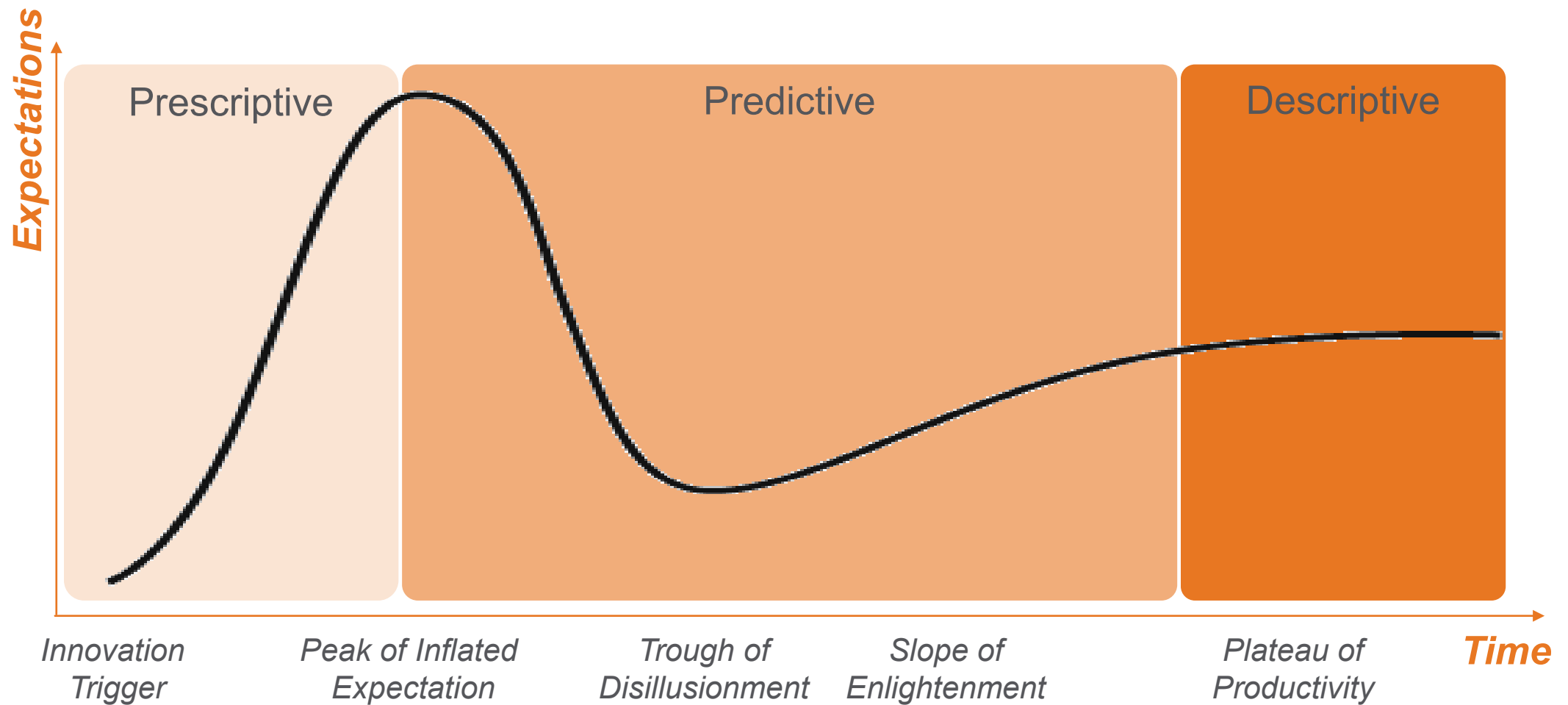
Analytics is a spectrum, AI is a subset



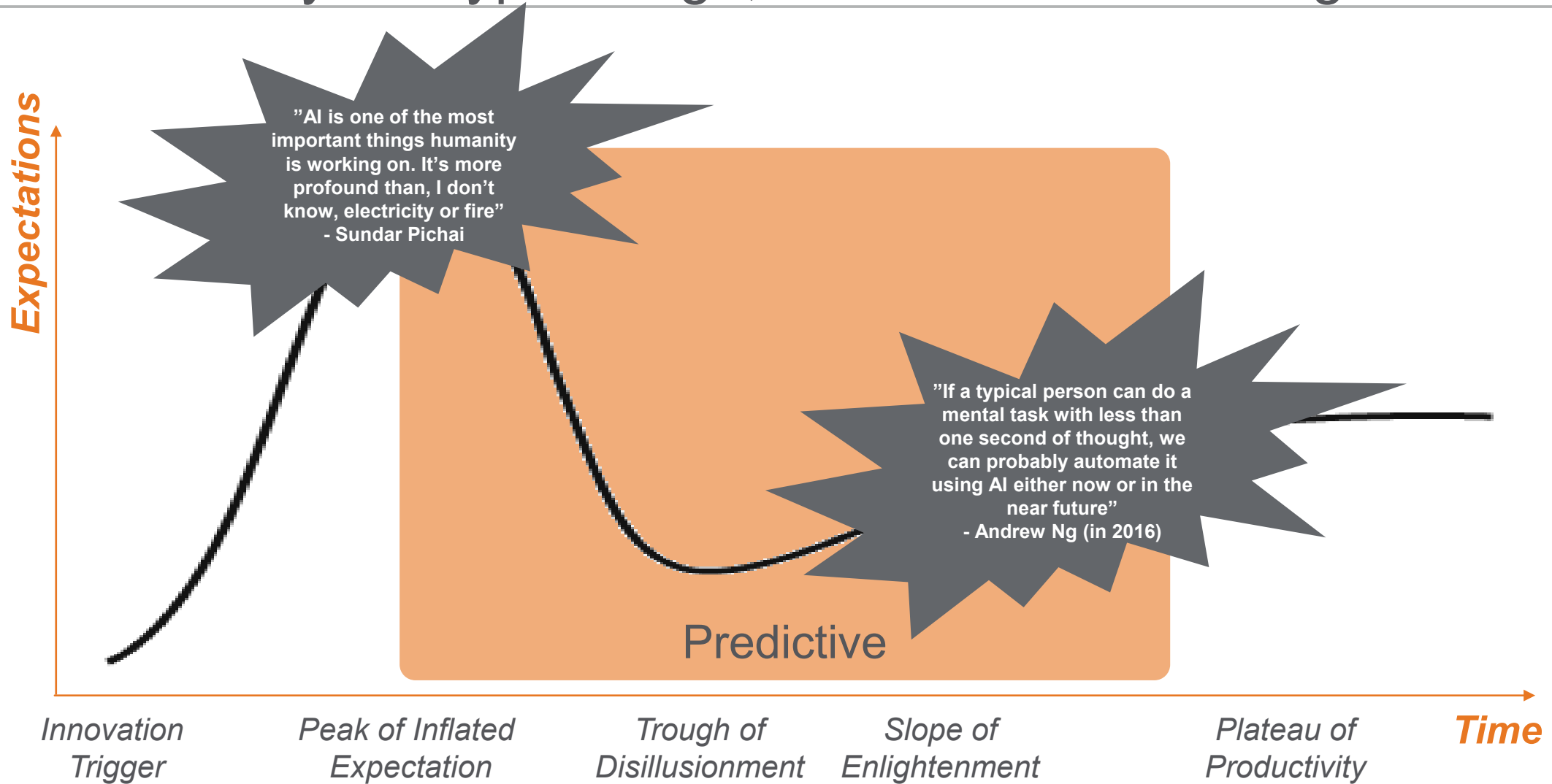
Across that spectrum there are gaps between hype and value



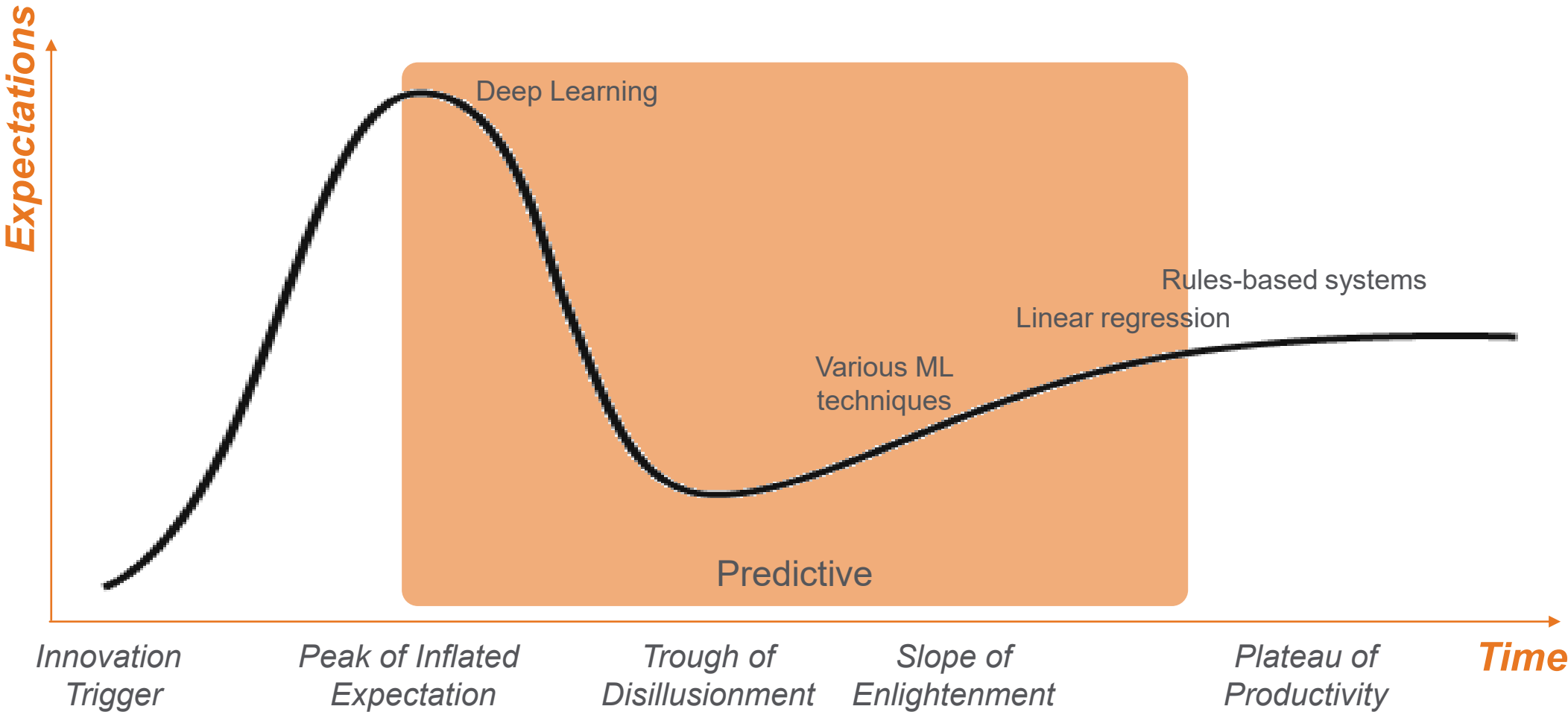
Traditional analytics doing the heavy lifting today – AI is up next



Predictive analytics hype is high, but real value is being delivered



A broad range of techniques comprise predictive analytics

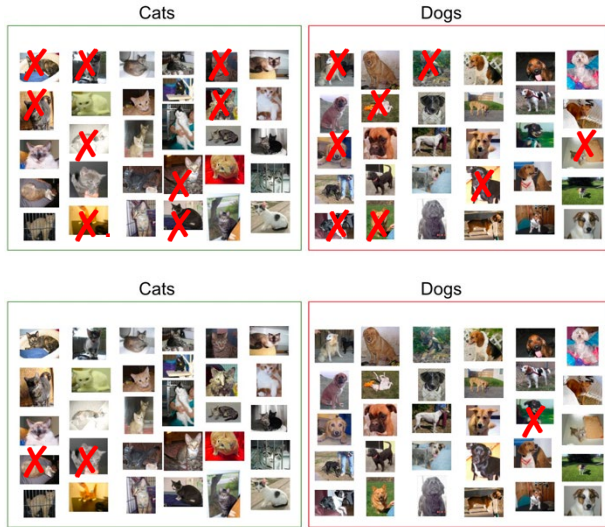


Machine learning delivers value through scaled pattern recognition

Guess

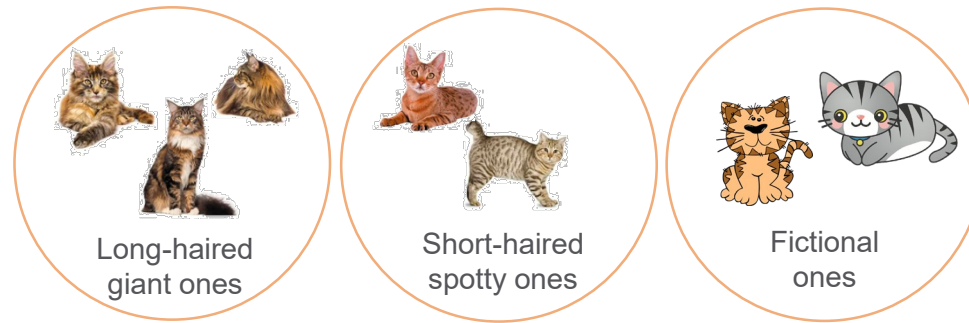


Learn from your mistakes



Define some measure of similarity

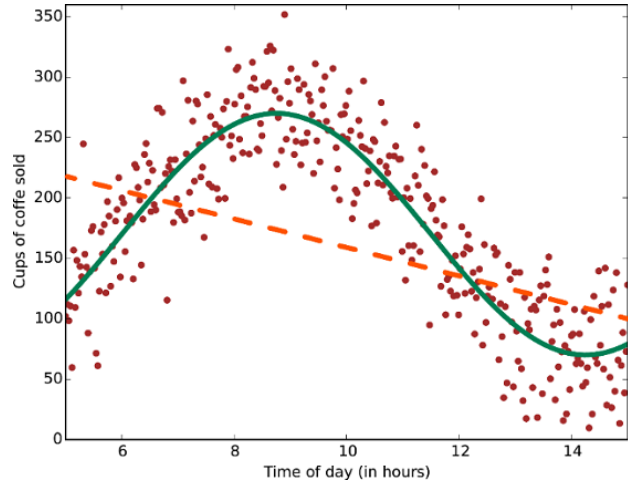
Calculate similarity score for every example



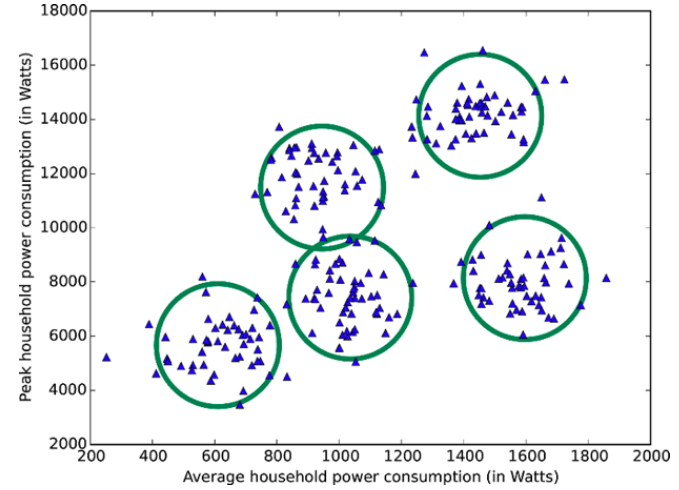
Group by similarity

Sounds easy, right? Now try it with hundreds or thousands of features! You can't but a machine can.

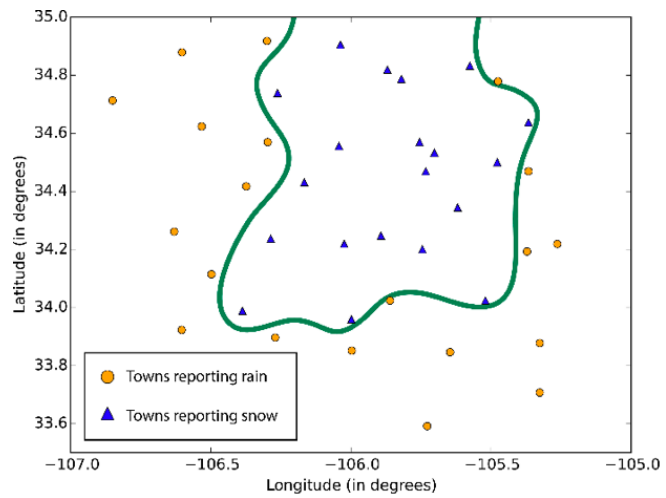
ML applies very well to several basic and common problems ...



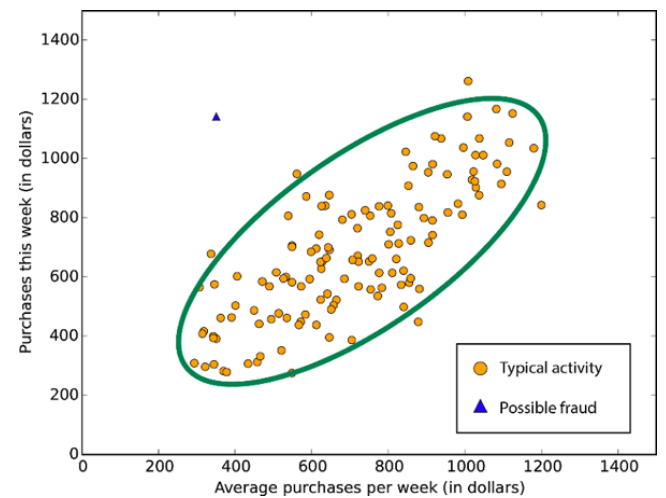
Regression:
predict a
continuous-valued
output



Clustering:
group similar
things (w/o
knowing what
they are)



Classification:
distinguish
between 2 (or
more) known
groups



Anomaly Detection:
find outliers

... but you need to define what the model needs to achieve

A 99.9% accurate model is good, right?
Compared to what?



vs.



Nonsense model (no strikes) accuracy ~99.996%¹

Human accuracy ~95%²





1. Wikipedia lightning strike model
2. Nvidia developer blog human accuracy model

First we need to understand model errors

There are 2 ways to get a prediction right (TP, TN)

There are 2 ways to get a prediction wrong (FP, FN)

In a way, we want to understand when the model confuses one thing for another, so ...

		Actual Outcome	
			
Predicted Outcome		True Positive ✓	False Positive ✗
		False Negative ✗	True Negative ✓

...then we can map this to cost / benefit for our use case

How good is good enough?

What is the benefit to me of being right?

What is the cost to me of being wrong?

		Actual Outcome	
		Pos	Neg
Predicted Outcome	Pos	\$5,000	-\$100
	Neg	-\$1,000	\$0

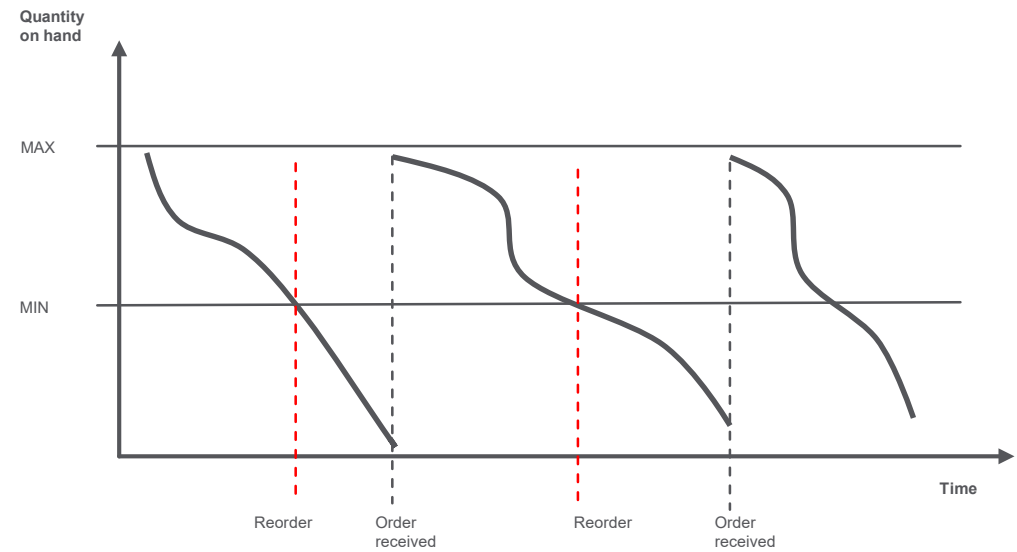
You also need to know how 'explainable' your solution needs to be



Regression examples

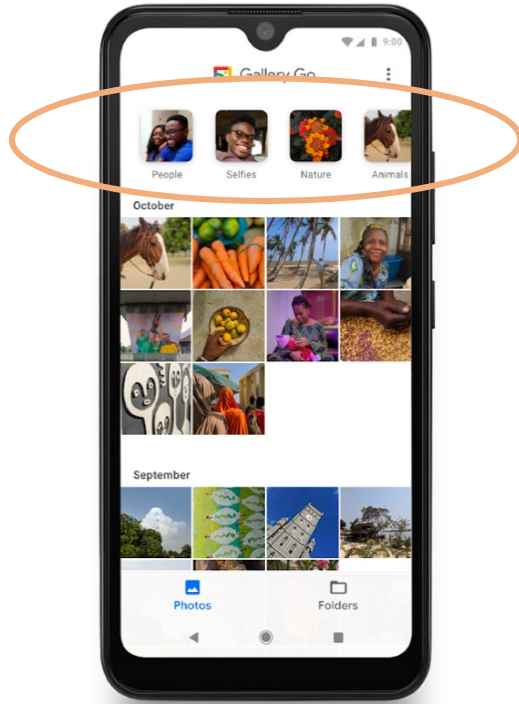


Predicting the next stock market close

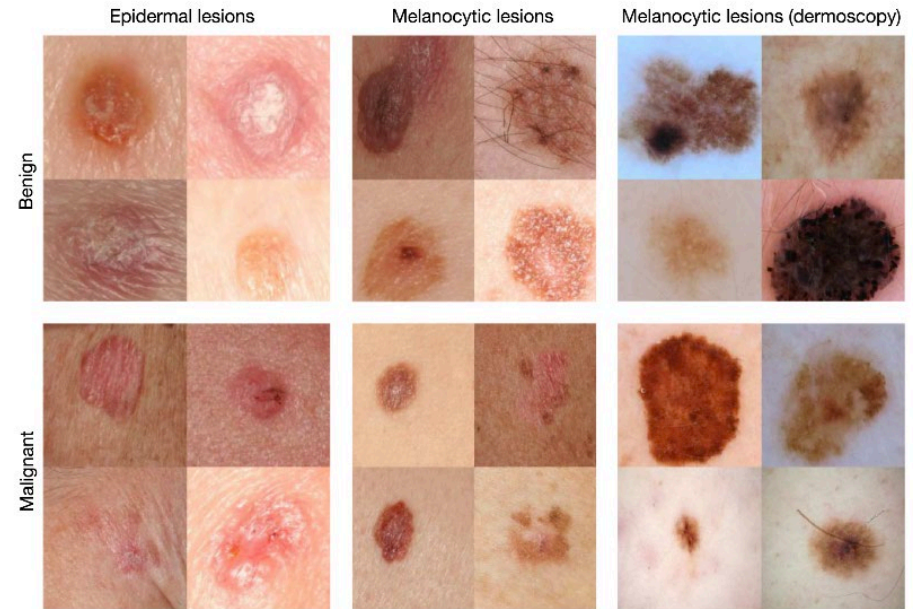


Predicting the next Rx inventory stock-out

Classification examples

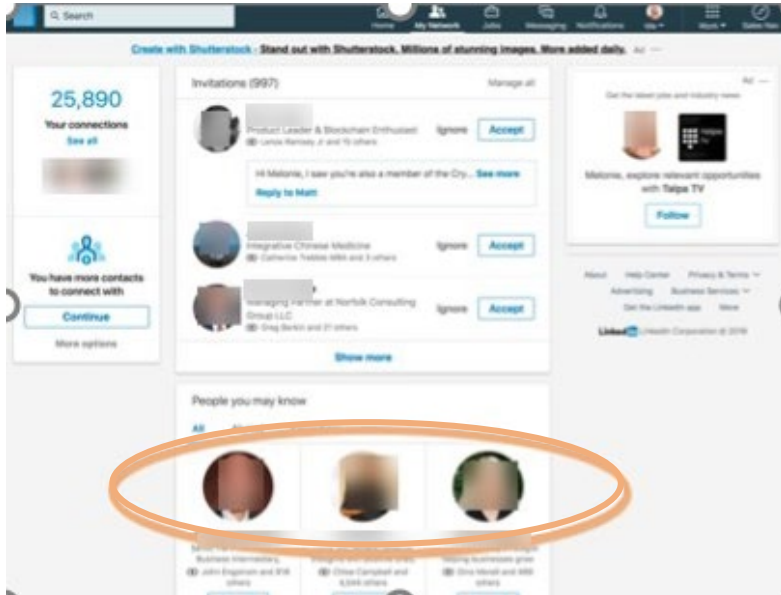


Grouping photos in your phone's gallery

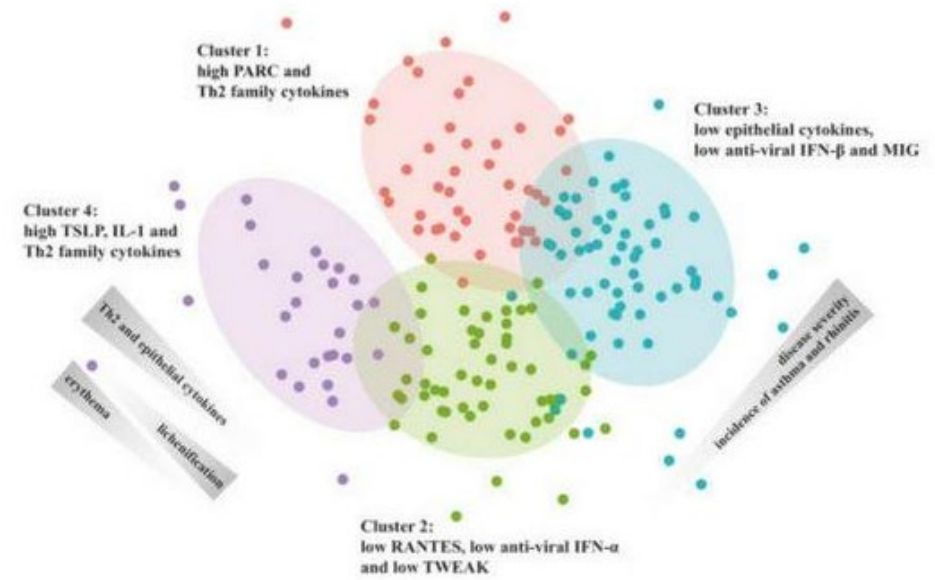


Using your phone to diagnose melanoma

Clustering examples



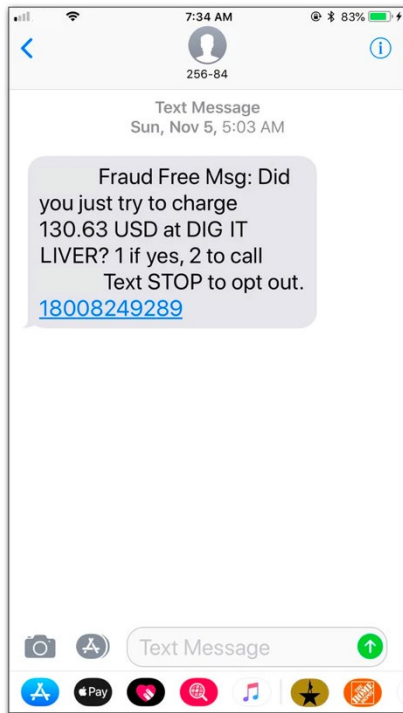
Finding people like you to connect professionally



Finding patients like you to optimize your care pathway

1. LinkedIn.com image
2. Journal of Allergy and Clinical Immunology chart

Anomaly detection examples

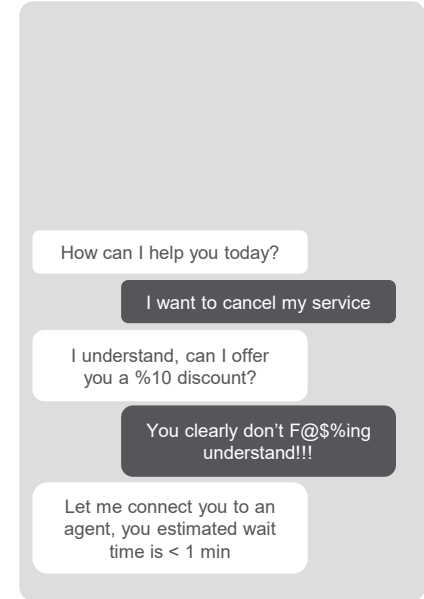
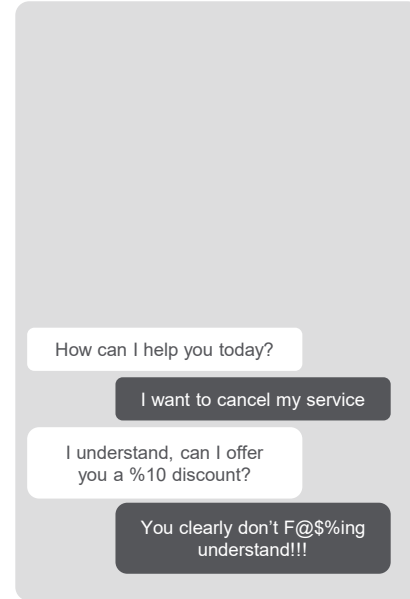
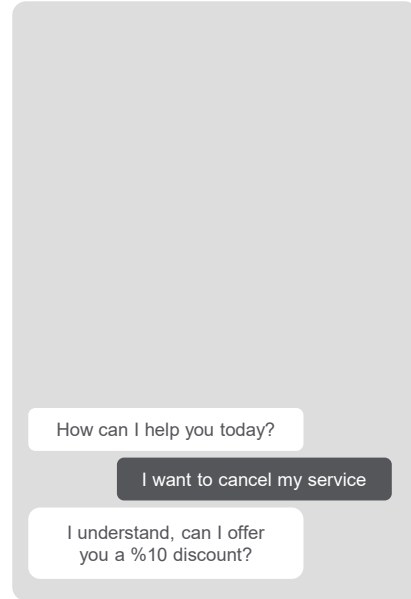
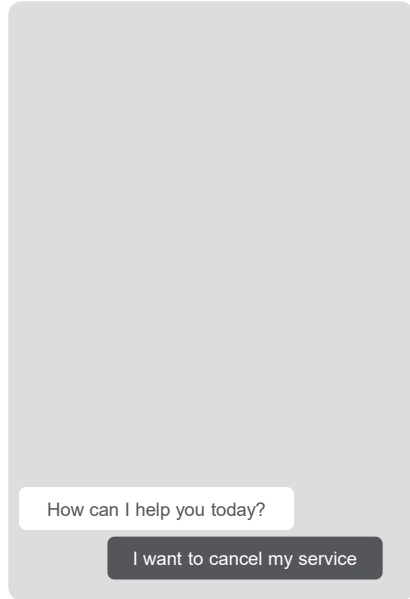
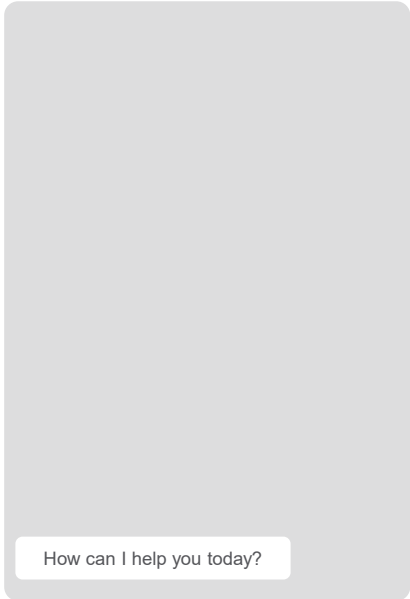


Using spending patterns to find fraudulent charges



Using billing / claims patterns to find fraudulent medical claims

You can build greater value by combining these questions



Classification of request to determine intent

- Example classes:
- Add service
 - Check balance
 - Dispute charge
 - Pay bill
 - Move service
 - Cancel service

Clustering to determine next best offer to retain

- Example offers:
- X% discount
 - Free premium service

Classification to determine customer sentiment

- Example sentiments:
- Happy
 - Frustrated
 - Hopping mad!

Regression to estimate wait time for service rep.

- Example estimates:
- < 1 min.
 - 30-40 mins