



DESIGNING MACHINE LEARNING

A Multi-Disciplinary Approach

ML + UX

Machine Learning + User Experience

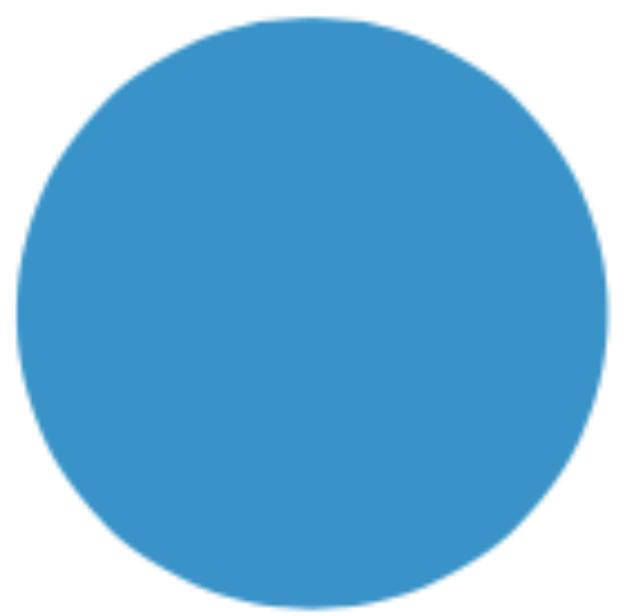
Abhay Agarwal (abhayka@stanford.edu), 2019

WHAT IS THIS TALK ABOUT?

*How do I create a wonderful user experience (UX)
in an ML product?*

Why do most ML products fail in the real world?

*How do I turn my UX findings into actual product
improvements?*





A collection of abstract geometric shapes in various colors (purple, blue, yellow, green, orange) overlap each other on a white background. The shapes include circles, squares, rectangles, and triangles.

MODEL
INTERACTION

let's zoom out for a second..

What is User Experience Design?

UX designers work in a rather conceptual **mode**,
with rough representations **of the world**, to
improve the subjective aspects **of a product**

Crafting

How do I create this UX?

Crafting

How do I create this UX?

Mapping

What does our UX look like?

Crafting

How do I create this UX?

Researching

What is a good UX?

Mapping

What does our UX look like?

Crafting

How do I create this UX?

Researching

What is a good UX?

Mapping

What does our UX look like?

Monitoring

Where is our UX failing?

Crafting

How do I create this UX?

Researching

What is a good UX?

Creative

Descriptive

Mapping

What does our UX look like?

Monitoring

Where is our UX failing?

Crafting

How do I create this UX?

Idealistic

Mapping

What does our UX look like?

Realistic

Researching

What is a good UX?

Descriptive

Monitoring

Where is our UX failing?

*What makes UX different
when you have ML?*

Crafting

Idealistic

Researching

Creative

Descriptive

Mapping

Realistic

Monitoring

Crafting

No engineering chops

Idealistic

Researching

Creative

Descriptive

Mapping

Realistic

Monitoring

~~Crafting~~

No engineering chops

Idealistic

~~Researching~~

Can't turn ideas into specs

Creative

Descriptive

~~Mapping~~

Realistic

~~Monitoring~~

Crafting

No engineering chops

Idealistic

Researching

Can't turn ideas into specs

Creative

Descriptive

Mapping

Black Box / Opaque System

Realistic

Monitoring

Crafting

No engineering chops

Idealistic

Researching

Can't turn ideas into specs

Creative

Descriptive

Mapping

Black Box / Opaque System

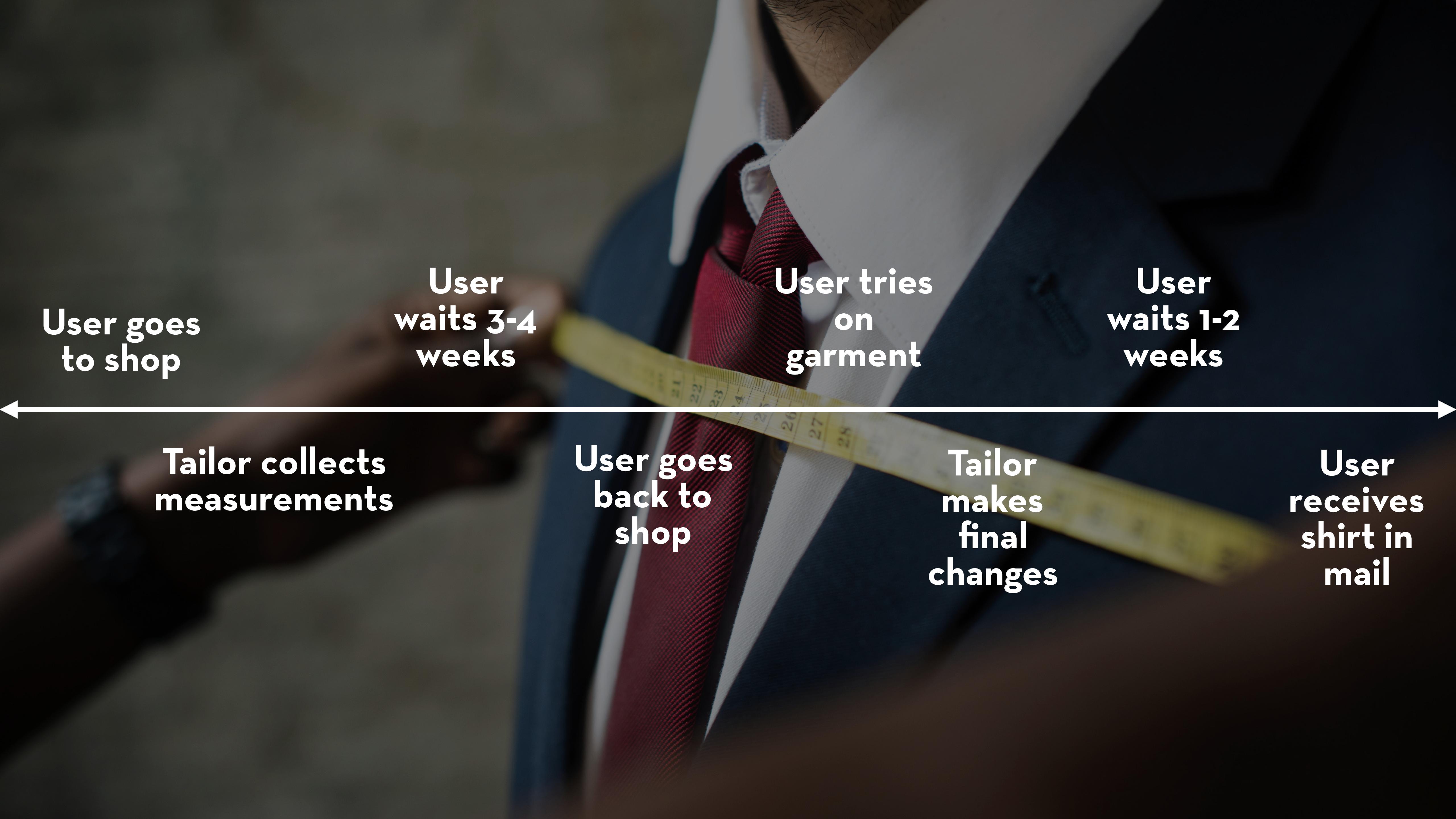
Realistic

Monitoring

Product too customized

A hypothetical system..

“AI Tailor”



**User goes
to shop**

**User
waits 3-4
weeks**

**User tries
on
garment**

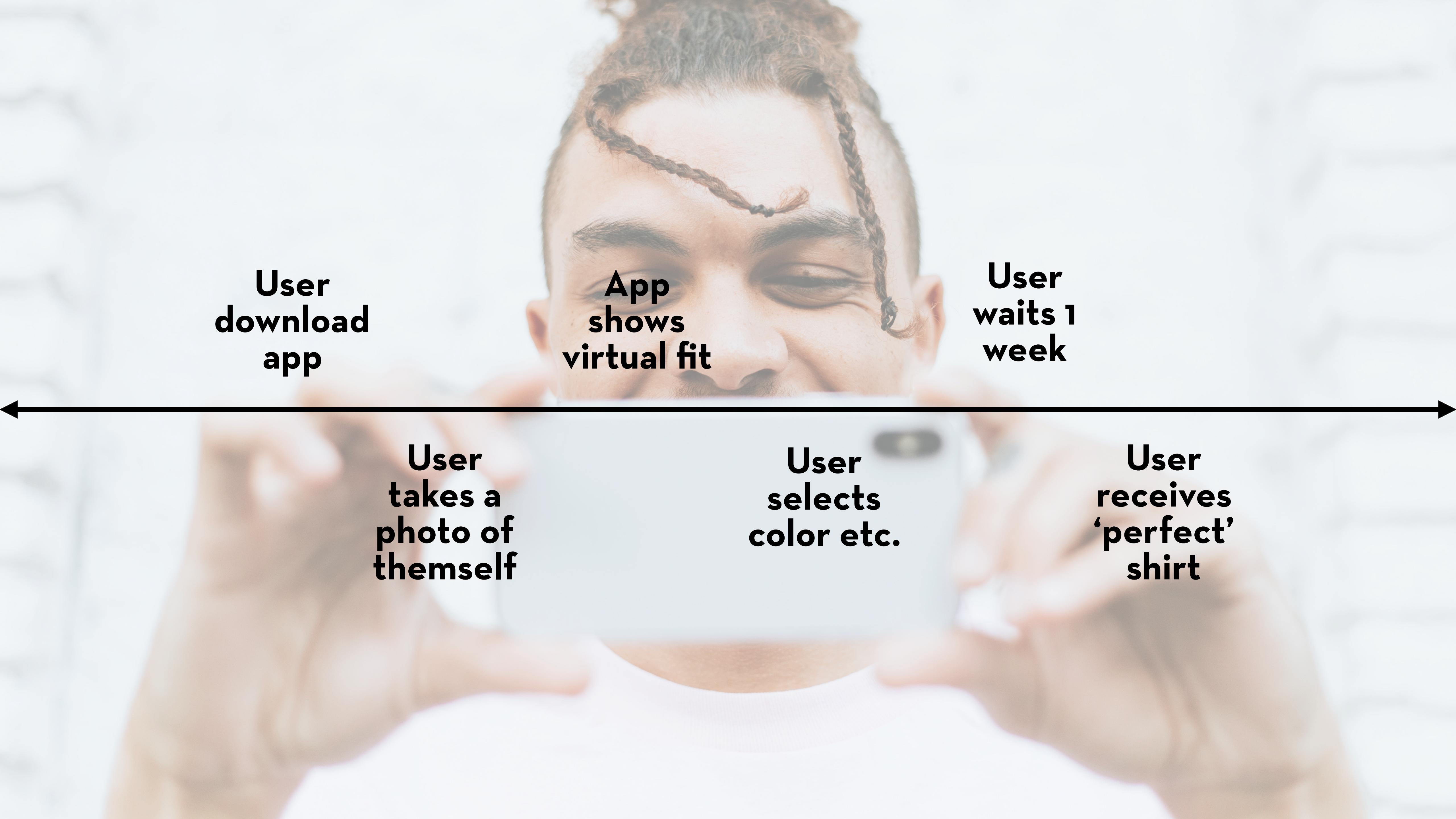
**User
waits 1-2
weeks**

**Tailor collects
measurements**

**User goes
back to
shop**

**Tailor
makes
final
changes**

**User
receives
shirt in
mail**



**User
download
app**

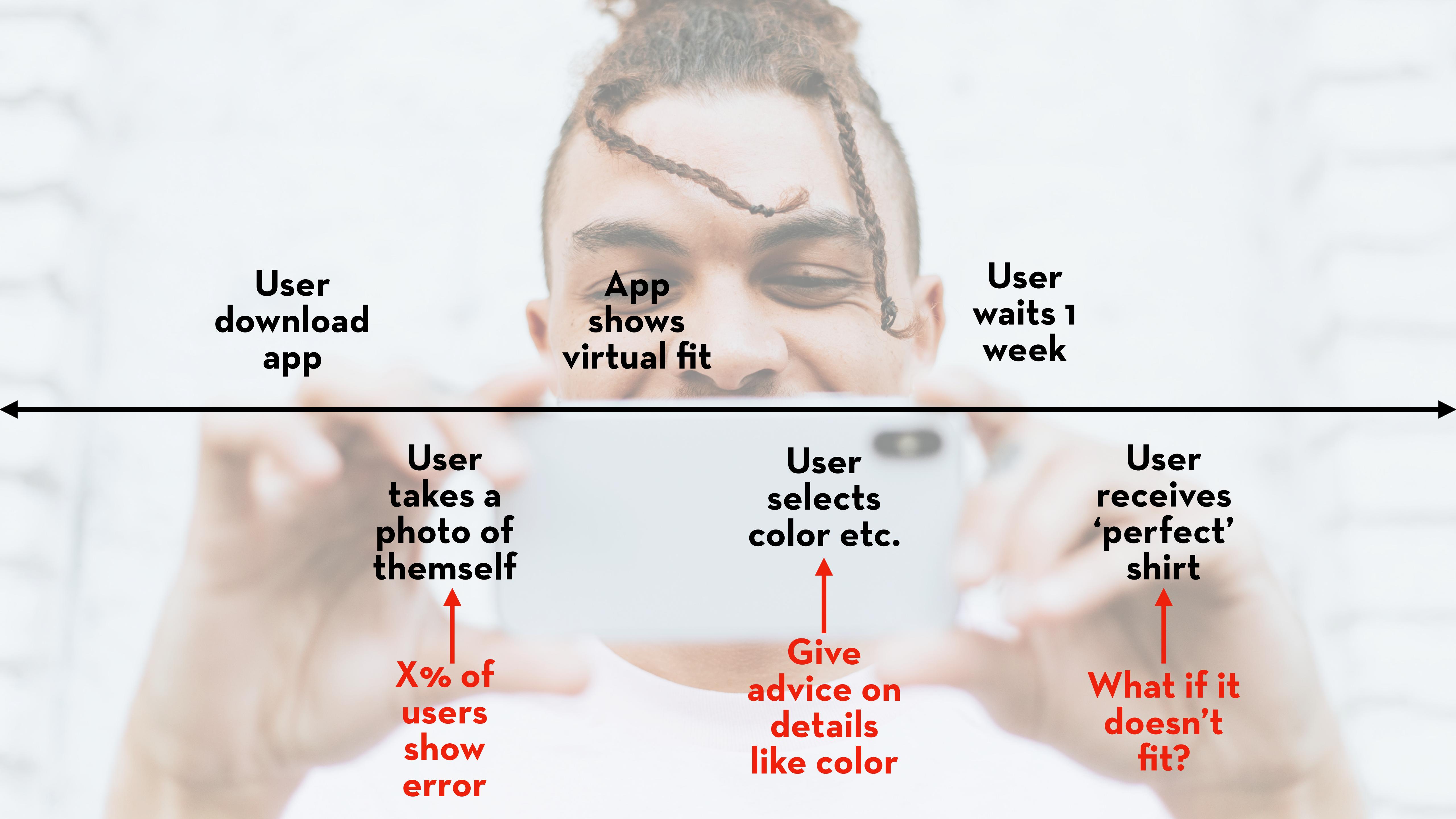
**App
shows
virtual fit**

**User
waits 1
week**

**User
takes a
photo of
themself**

**User
selects
color etc.**

**User
receives
'perfect'
shirt**

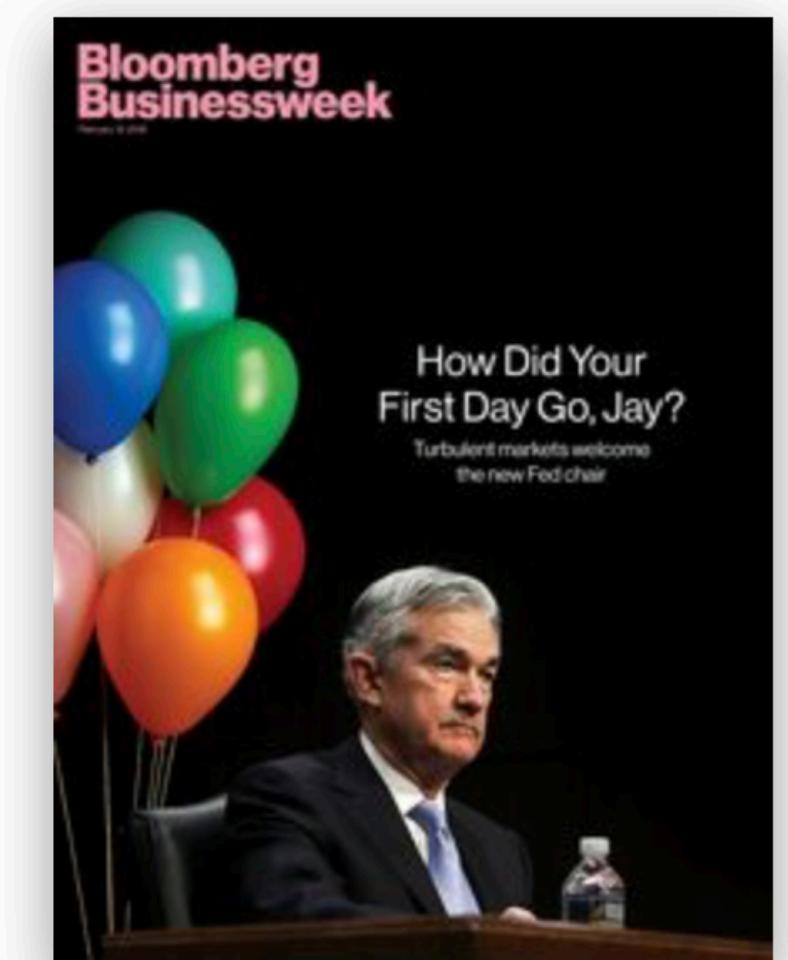


■ February 5, 2018, 8:01 AM PST

Don't Use This AI Tailor ... Yet

- After three shirts we ordered didn't fit, Original Stitch took down its measurement software.

By Pavel Alpeyev and Jason Clenfield



From the Issue
February 12, 2018

Subscribe Reprints

*How do we solve *this*?*

**Case Studies
Design Principles
Experience & Practice!**

CASE STUDY

Turkish - English Translation

Turkish - detected▼	Speaker icon	Volume icon	Share icon	English▼	Speaker icon	Volume icon
o bir aşçı				she is a cook		
o bir mühendis				he is an engineer		
o bir doktor				he is a doctor		
o bir hemşire				she is a nurse		
o bir temizlikçi				he is a cleaner		
o bir polis				He-she is a police		
o bir asker				he is a soldier		
o bir öğretmen				She's a teacher		
o bir sekreter				he is a secretary		
o bir arkadaş				he is a friend		
o bir sevgili				she is a lover		

CASE STUDY

Turkish - English Translation

The screenshot shows the Global News website interface. At the top, there's a dark blue header with the Global News logo on the left, followed by dropdown menus for "National" and "TV News Programs". Below the header is a navigation bar with links for World, Canada, Local, Politics, Smart Living, Money, Entertainment, Health, Video, Podcast, and Trending. A red "GOOGLE" button is visible on the left side of the main content area. The main article title is "Google blocks gendered pronouns like 'her' or 'him' from its new AI tool", written by Paresh Dave from Reuters. Below the title are social sharing buttons for Comments, Facebook, Twitter, LinkedIn, Email, Print, and more. A blurred image of a Google AI logo is at the bottom.

Global NEWS

National ▾
Change Location

TV News Programs ▾
Newscasts & Videos

World Canada Local ▾ Politics Smart Living Money Entertainment Health Video Podcast ➔ Trending

GOOGLE November 27, 2018 2:34 am

Google blocks gendered pronouns like 'her' or 'him' from its new AI tool

By Paresh Dave Reuters

Comments Facebook Twitter LinkedIn Email Print ...

CASE STUDY

Turkish - English Translation

“Data-UX Mismatch”

CASE STUDY

Turkish - English Translation

The screenshot shows a news article from Bustle. The title is "Google Translate's New Tool To Get Rid Of Gender Bias In Translations Is Kind Of A Big Deal". It was written by MIKA DOYLE 2 months ago. The article includes two side-by-side screenshots of the Google Translate interface. The left screenshot, labeled 'Before', shows the translation of 'o bir doktor' as 'he is a doctor'. The right screenshot, labeled 'After', shows the same input with two results: 'she is a doctor (feminine)' and 'he is a doctor (masculine)'. A note at the bottom of the 'After' screenshot states 'Translations are gender-specific. LEARN MORE'.

Google Translate's New Tool To Get Rid Of Gender Bias In Translations Is Kind Of A Big Deal

By MIKA DOYLE | 2 months ago | f

Before

After

Translations are gender-specific. LEARN MORE

she is a doctor (feminine)

he is a doctor (masculine)

CASE STUDY

Target Coupons

3,503,091 views | Feb 16, 2012, 11:02am

How Target Figured Out A Teen Girl Was Pregnant Before Her Father Did

Kashmir Hill Forbes Staff
Welcome to The Not-So Private Parts where technology & privacy collide

f Every time you go shopping, you share intimate details about your consumption patterns with retailers. And many of those retailers are studying those details to figure out what you like, what you need, and which coupons are most likely to make you happy. Target TGT +1.89%, for example, has figured out how to data-mine its way into your womb, to figure out whether you have a baby on the way long before you need to start buying diapers.

t

in



TARGET

Target has got you in its aim

CASE STUDY

Target Coupons

“Misplaced Intelligence”

CASE STUDY

Target Coupons



KYLE T. WEBSTER

MARKETING

Ads That Don't Overstep

>Loading...

by **Leslie K. John, Tami Kim, and Kate Barasz**

FROM THE JANUARY–FEBRUARY 2018 ISSUE

CASE STUDY

Credit Card Fraud

PayThink The cost of fraud fighting is as bad as fraud itself

By
Ryan Breslow

Published
June 07 2018, 12:01am EDT

More in
ISO and agent
Payment fraud
Retailers
Authentication



Print



Reprint



Credit card fraud is a massive problem for e-commerce retailers. If you're an online business, you're likely all too familiar with it.

But today, the fight against credit card fraud is a losing battle. Online retailers are losing between \$2.48 and \$2.82 for every \$1 of direct fraud. That means roughly 2.5 times the amount lost to fraud is lost fighting fraud. And merchants will spend **3%-5% of their overall revenue** combating fraud operationally.

Today's online payments experience is powered by dozens of unique tools, from payment gateways to fraud detection to checkout. This approach is called "layering," wherein a business layers on suites of different tools to create "robust" payments and fraud detection stacks.

CASE STUDY

Credit Card Fraud

PayThink The cost of fraud fighting is as bad as fraud itself

By

Ryan Breslow

Published

June 07 2018, 12:01am EDT

More in

[ISO and agent](#)

[Payment fraud](#)

[Retailers](#)

[Authentication](#)

But the results are abysmal, especially when it comes to fighting fraud. Using the best-performing algorithms, researchers successfully identified 495 of 500 fraudulent transactions in a sample size of 50 million transactions (that's a 99% detection rate).

But they incorrectly flagged 500,000 legitimate transactions from good customers as fraudulent. There were too many "false positives" — customers falsely rejected for fraud concerns — to make the layering approach useful. These numbers are untenable for e-commerce stores, where the average profit margin is as low as 5%, or [0.5%-3.5% for e-commerce-only operations](#).

CASE STUDY

Credit Card Fraud

“False Positives”

CASE STUDY

Microsoft Tay

MICROSOFT \ TECH \ TWITTER

Microsoft made a chatbot that tweets like a teen

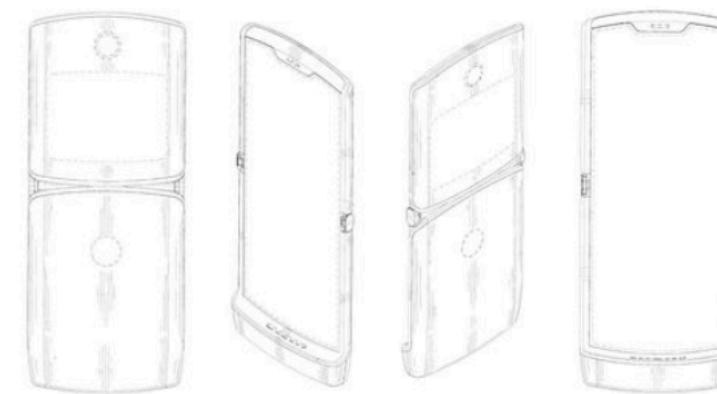
By Jacob Kastrenakes | @jake_k | Mar 23, 2016, 10:26am EDT

f  SHARE



12 ▾

MOST READ



Microsoft is trying to create AI that can pass for a teen. Its research team [launched a chatbot](#) this morning called Tay, which is meant to test and improve Microsoft's

Is this the Motorola RAZR with folding display?

CASE STUDY

Microsoft Tay

MICROSOFT \ WEB \ TL;DR

Twitter taught Microsoft's AI chatbot to be a racist asshole in less than a day

By James Vincent | @jjvincent | Mar 24, 2016, 6:43am EDT

f   SHARE



68 ▾

MOST READ



CASE STUDY

Microsoft Tay

“Adverse Actors”

CASE STUDY

Microsoft Tay

For Sympathetic Ear,
More Chinese Turn to
Smartphone Program



Zhang Ran, 26, chatted with Xiaoice in Beijing. Millions of young Chinese use the smartphone program. Gilles Sabrie for The New York Times

By [John Markoff](#) and [Paul Mozur](#)

July 31, 2015



She is known as Xiaoice, and millions of young Chinese pick up their

CASE STUDY

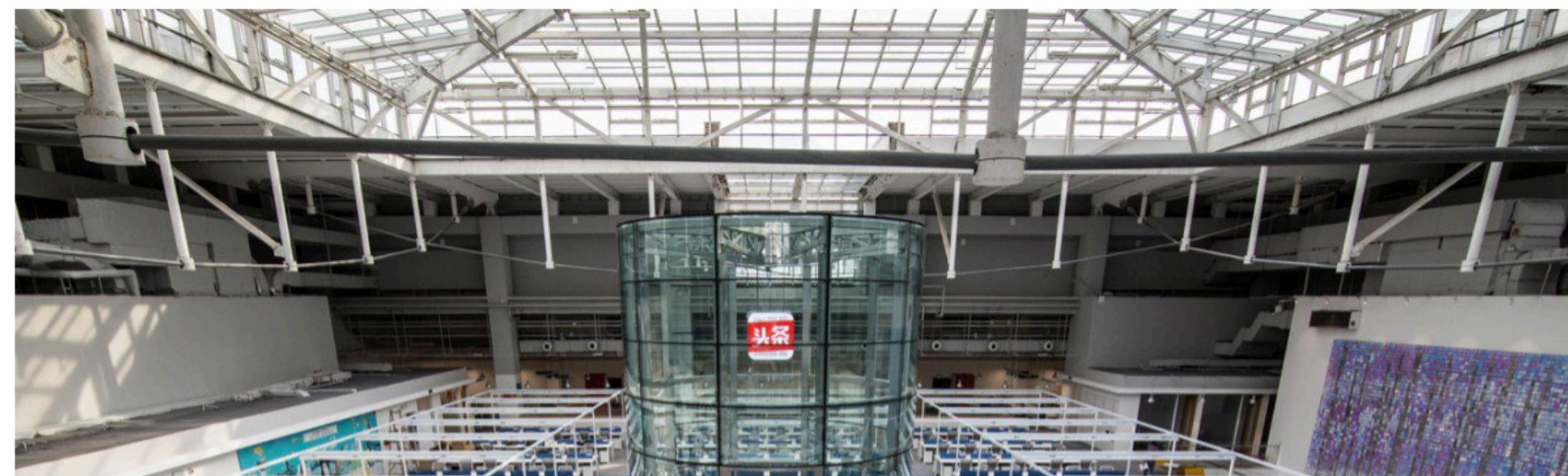
Toutiao News App

Business Impact

The Insanely Popular Chinese News App That You've Never Heard Of

Toutiao uses artificial intelligence to curate headline recommendations.

by Will Knight January 26, 2017



CASE STUDY

Toutiao News App

China's king of titillating content Jinri Toutiao issues apology for providing what the people want

PUBLISHED : Thursday, 12 April, 2018, 7:02am

UPDATED : Friday, 14 September, 2018, 7:13pm



Meng Jing

Profile

Venture capital investors who called on Jinri Toutiao's chief executive Zhang Yiming

to apologize for the app's content have done so

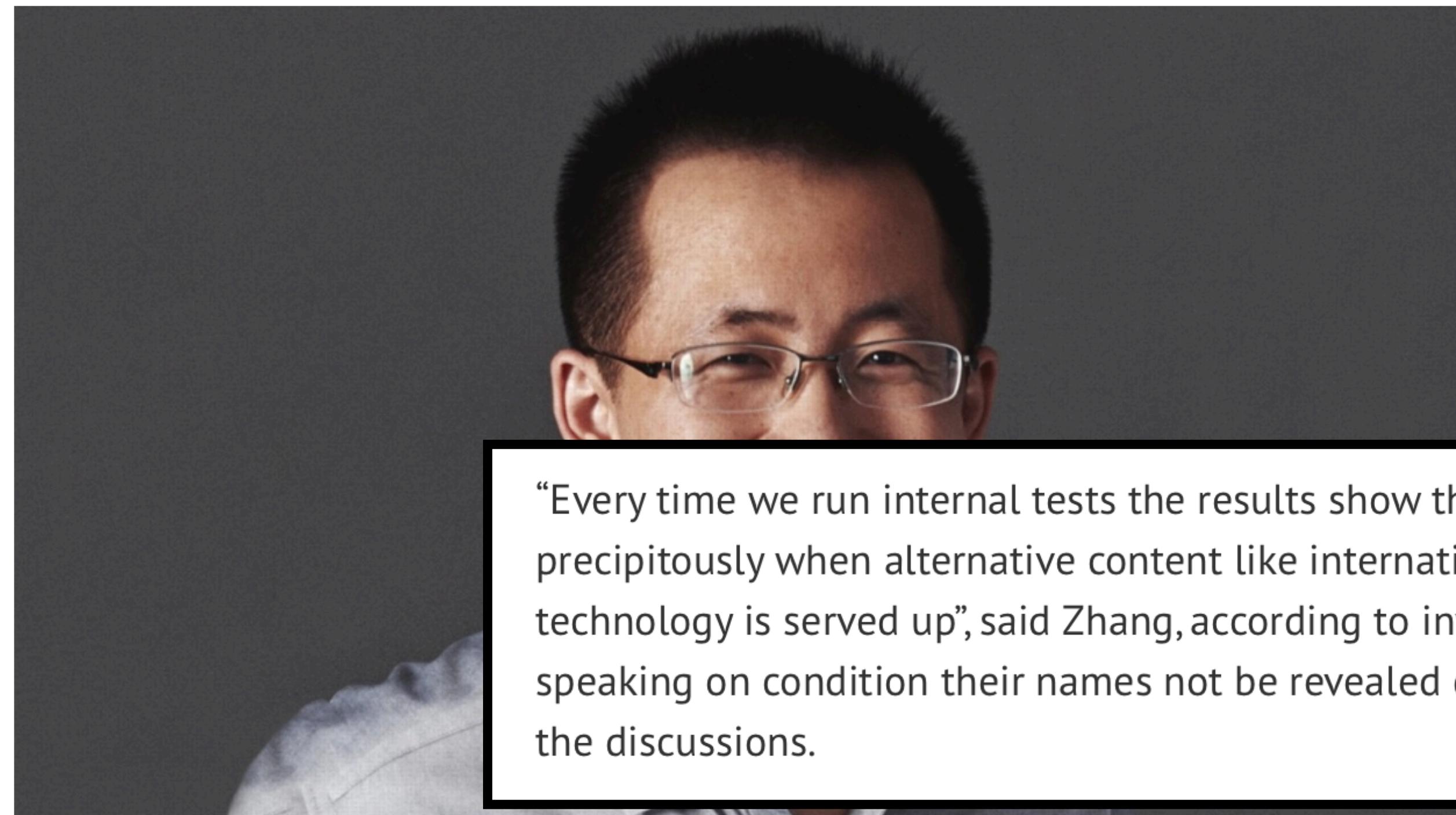
CASE STUDY

Toutiao News App

China's king of titillating content Jinri Toutiao issues apology for providing what the people want

PUBLISHED : Thursday, 12 April, 2018, 7:02am

UPDATED : Friday, 14 September, 2018, 7:13pm



“Every time we run internal tests the results show that viewership drops off precipitously when alternative content like international current affairs, science and technology is served up”, said Zhang, according to investors present at the meeting, speaking on condition their names not be revealed due to the confidential nature of the discussions.

CASE STUDY

Toutiao News App

“Value Function”

CASE STUDY

Toutiao News App

China's king of titillating content Jinri Toutiao issues apology for providing what the people want

PUBLISHED : Thursday, 12 April, 2018, 7:02am

UPDATED : Friday, 14 September, 2018, 7:13pm



“We let our users down by over emphasising growth and scale over quality and responsibility,” Zhang said in an open letter reminiscent of the “self criticism” of “wrongdoers” during the era of Chinese leader Mao Zedong.

Zhang said Toutiao would “correct the flaws” in its algorithms and machine vetting, expand its vetting team from 6,000 to 10,000 people, and permanently ban creators whose content was “against community values”.

CASE STUDY

Predictive Policing

PARTNER CONTENT CYNTHIA RUDIN, MIT SLOAN

PREDICTIVE POLICING: USING MACHINE LEARNING TO DETECT PATTERNS OF CRIME

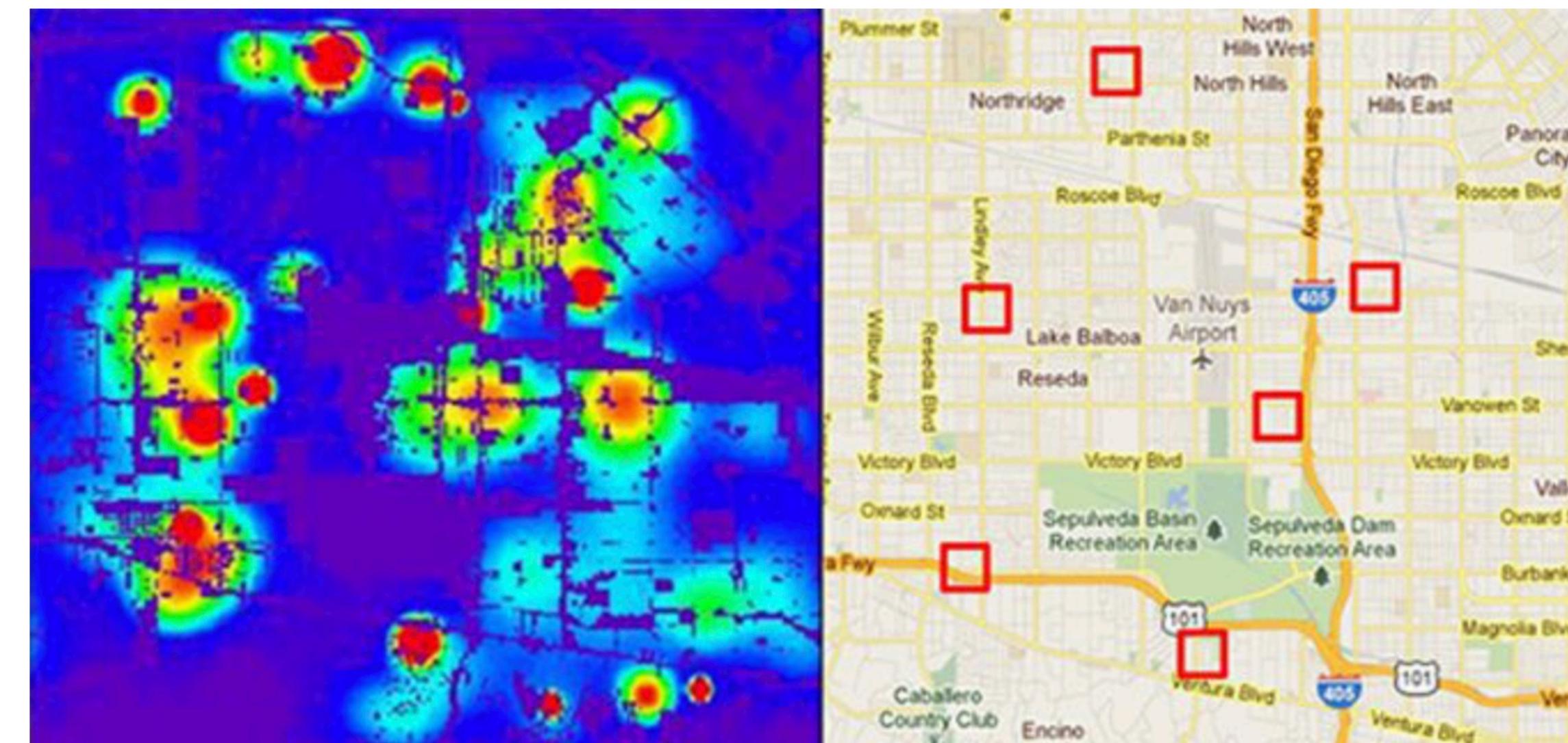


CASE STUDY

Predictive Policing

Artificial Intelligence Is Now Used to Predict Crime. But Is It Biased?

The software is supposed to make policing more fair and accountable. But critics say it still has a way to go.



Predictive policing is built around algorithms that identify potential crime hotspots.. (PredPol)

CASE STUDY

Predictive Policing

Feedback Loops

CASE STUDY

The Harry Potter Problem

Sunday Funday

Young & Free
Live your life... this is Young & Free.
1,011,774 FOLLOWERS

Hits Idag
De bästa låtarna och största hitsen just nu. Cover: Drake
545,612 FOLLOWERS

Soul Coffee
Some nice, soothing RnB/Soul tunes to go with your nice, soothing coffee.
408,020 FOLLOWERS

Get Your Hits Together
De senaste hitsen du behöver ha koll på. Cover: Drake
166,703 FOLLOWERS

Happy Hits!
Hits to boost your mood and fill you with happiness!
2,562,803 FOLLOWERS

RapCaviar
Listen to Drake's new Scorpion album.
9,816,066 FOLLOWERS

< >

Sunday Funday

100
Hiphop när den är 100. Cover: Drake
139,065 FOLLOWERS

Beast Mode
Get your beast mode on!
3,955,230 FOLLOWERS

Today's Top Hits
Drake releases Scorpion and rules over the hottest 50.
20,481,128 FOLLOWERS

Rhythm & Baws
Det bästa inom svensk och internationell R&B. Cover: Drake
27,896 FOLLOWERS

Songs to Sing in the Car
Sing along and enjoy the drive...
2,967,173 FOLLOWERS

This Is Drake
Hear the new album 'Scorpion' plus more essential Drake.
2,026,723 FOLLOWERS

< >

CASE STUDY

The Harry Potter Problem

“Cold Start”

CASE STUDY

The Harry Potter Problem

