



zühlke
empowering ideas

What industry can learn from healthcare when developing AI solutions?

Introduction

MONEYBOX

Amazon Created a Hiring Tool Using A.I. It Immediately Started Discriminating Against Women.

BY JORDAN WEISSMANN OCT 10, 2018 • 4:52 PM



Amazon sign, with dude. David Ryder/Getty Images

Artificial intelligence / Machine learning

Hundreds of AI tools have been built to catch covid. None of them helped.

Some have been used in hospitals, despite not being properly tested. But the pandemic could help make medical AI better.

by **Will Douglas Heaven**

July 30, 2021



GETTY IMAGES

Tech policy / AI Ethics

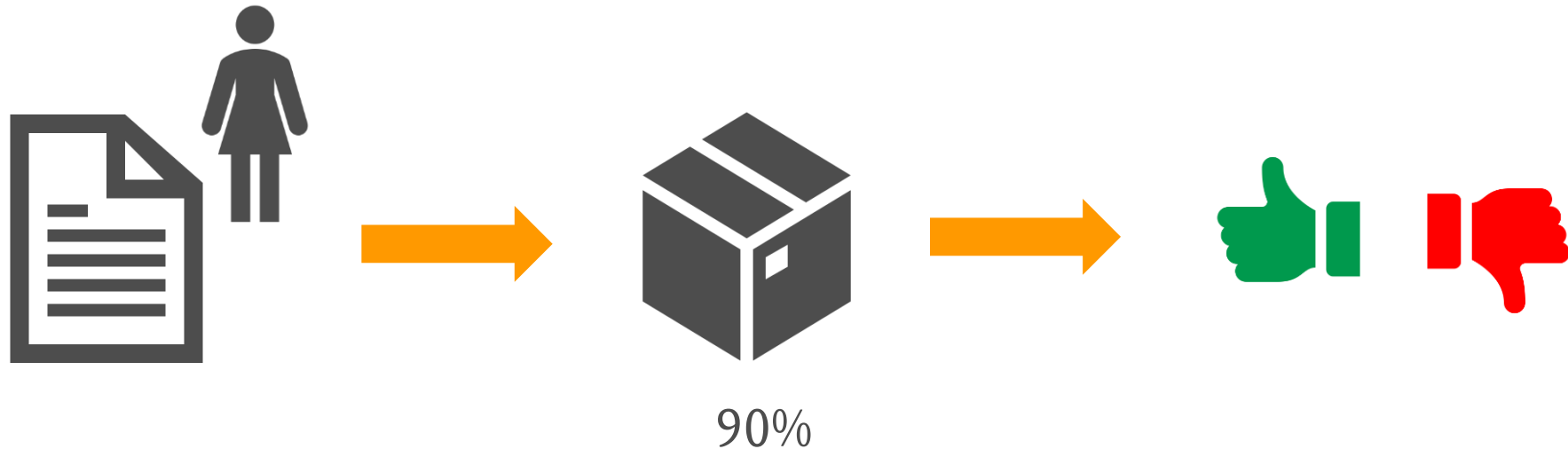
AI is sending people to jail —and getting it wrong

Using historical data to train risk assessment tools could mean that machines are copying the mistakes of the past.

by **Karen Hao**

January 21, 2019

Machine learning



Blind application of machine learning is a thing of the past and unacceptable in medical applications

Medical process

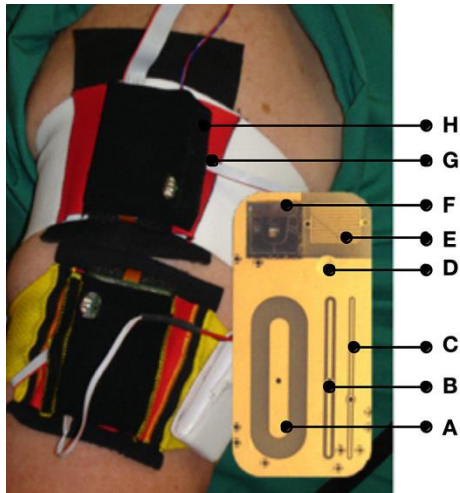
Intended use



Risk management

What are the consequences of failure?

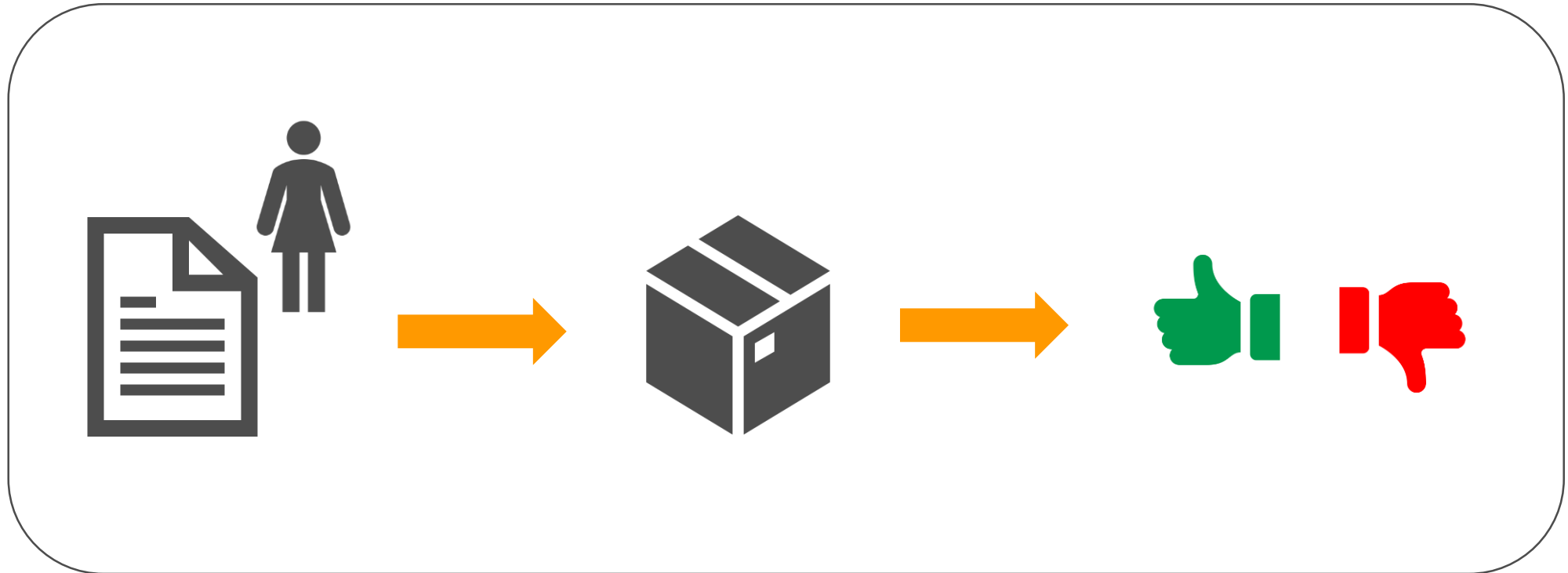
Glucose monitoring from multi-sensor device



Wearable for fertility tracking



Risk management



Should cover the entire process

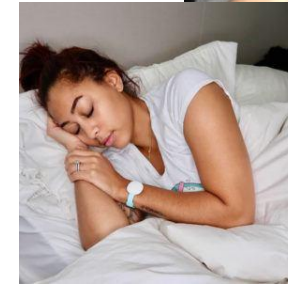
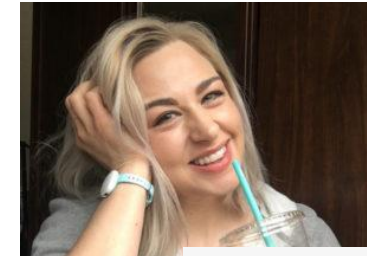
Know your data



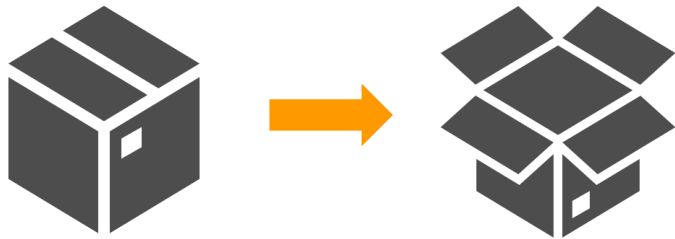
Develop on high quality, labelled data

Understand all possible confounders and how they influence the results

Bias: Is your data representative of your future users?



Make your AI explainable

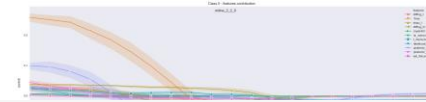


Use interpretable models or find other ways to understand what is happening

Fairness & transparency

Actionable insights

Feature importance



Patients with this score have 33.3% risk of developing POD
See details below.

Age
The risk of POD increases with age. 86 years

BMI
 25 kg/m²

ASA status
ASA physical classification system: <https://www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system> 2

History of delirium
Have the patient previously suffered from delirium (Yes / No)

Cognitive impairment
The cognitive assessment of the patient can be done by MMSE, MoCA or another reliable score.

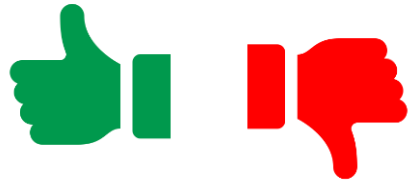
Medications
Number of medications taken by the patient before the operation. 5

Preoperative CRP
CRP measured in the blood before the operation, measured in mg/ml 6 mg/dl

Surgery Severity Classification ⓘ
A scoring system based on the ESA (European Society of Anaesthesiology) risk classification for non-cardiac surgery which assigns a low (I), intermediate (II) or high risk (I... 2

Laparotomy/thoracotomy
Is the surgery a laparotomy/thoracotomy? The type of surgery influence the risk of POD and open surgery has a particularly high risk.

Validation



Validate on real life data in real life setting

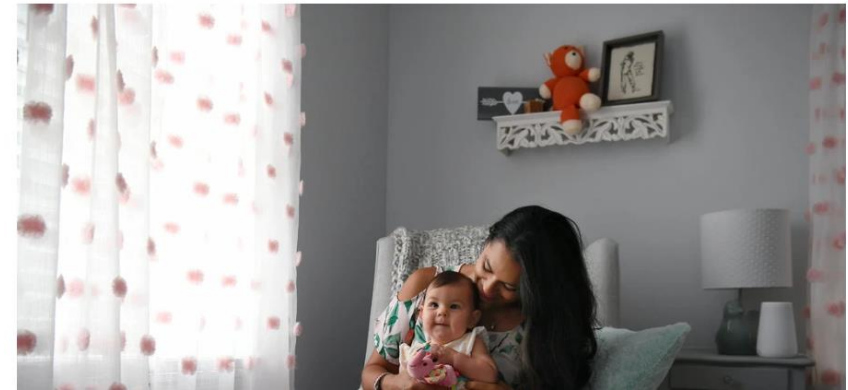
Data sets need to be:

- sufficiently large (statistically significant)
- representative

Chose a relevant metric

The New York Times

Women Struggling to Get Pregnant Turn to Fertility Apps



The Ava bracelet collects data on nine parameters, including skin temperature, resting pulse rate, breathing, sleep movement, and stress levels, while the woman sleeps. Once the bracelet is synced to the person's phone in the morning, Ava's proprietary algorithm achieves an 89 percent accuracy rate at detecting 5.3 fertile days each cycle, according to the company.

Upcoming EU regulations for AI

In April 2021, EU published their intentions to regulate AI

Risk-based and will resemble the medical device regulations (MDR)

Will take a few years but it makes sense to think about it early

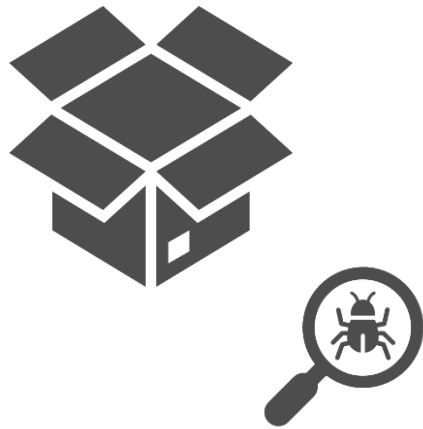
The European Union's draft AI regulations classify AI systems into three risk categories.



McKinsey
& Company

Source: <https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/what-the-draft-european-union-ai-regulations-mean-for-business>

Cornerstones for medical AI



Intended use

Risk management

Validation





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Thank you!