

Künstliche Dummheit, Natürliche Intelligenz und Donald Trump

Prof. Dr. Wolfgang Mauerer <wolfgang.mauerer@oth-regensburg.de>

*Labor für Digitalisierung // Theoretische Informatik
Fakultät Informatik und Mathematik*

12. April 2019

GPG/PGP-ID 98356E1E, Fingerprint: 5920 9407 AB5C 8B28 3C7B 4F02 F16F 2523 9835 6E1E.

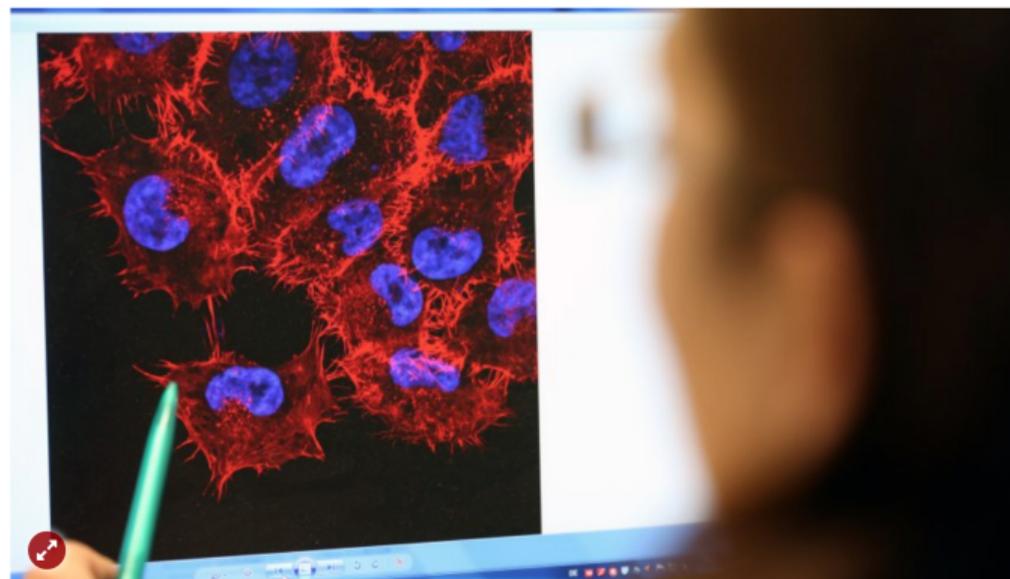
Künstliche Intelligenz und maschinelles Lernen I



Künstliche Intelligenz

Computer erkennt Hautkrebs besser als Ärzte

Ungefährliches Muttermal oder schwarzer Hautkrebs? Der Unterschied ist oft schwer zu erkennen. Nachdem er mit 100.000 Bildern trainiert hatte, gelang es einem Computer besser als Hautärzten.



Siri, Alexa, Assistant oder Cortana – wer sind die klügsten Sprachassistenten im Land?

f Facebook

Twitter

Pocket

Flipboard

E-Mail



Google Home Mini. (Bild: Google)

21.12.2018, 20:23 Uhr

In seinem Smartspeaker-IQ-Test hat Loup Ventures die



Jörn Brien

News-Redakteur



Verwandte Themen

Alexa

Amazon Echo

Siri



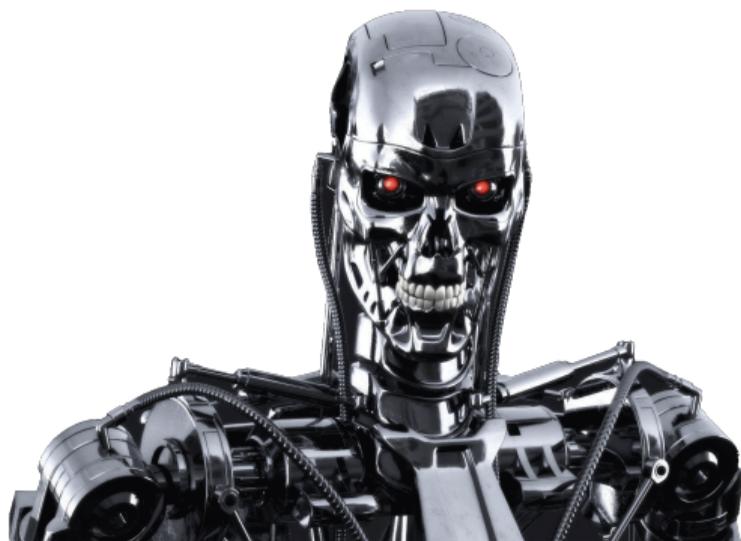
Filialschnäppchen
sichern



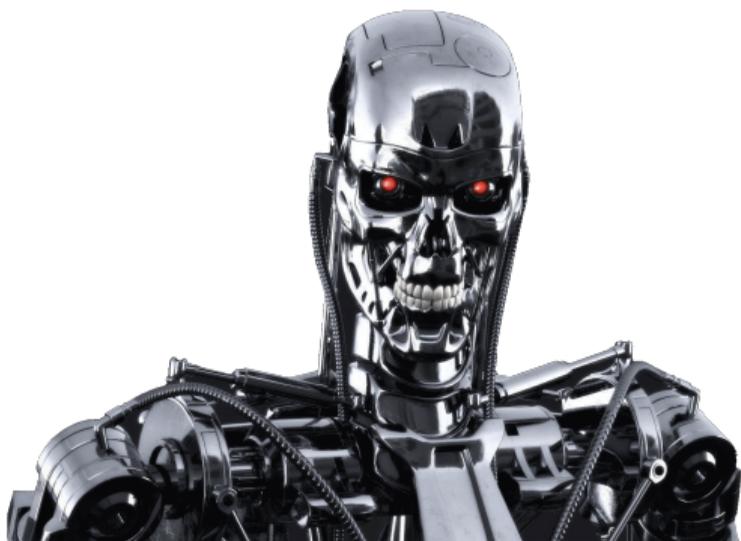


Künstliche Intelligenz und maschinelles Lernen III

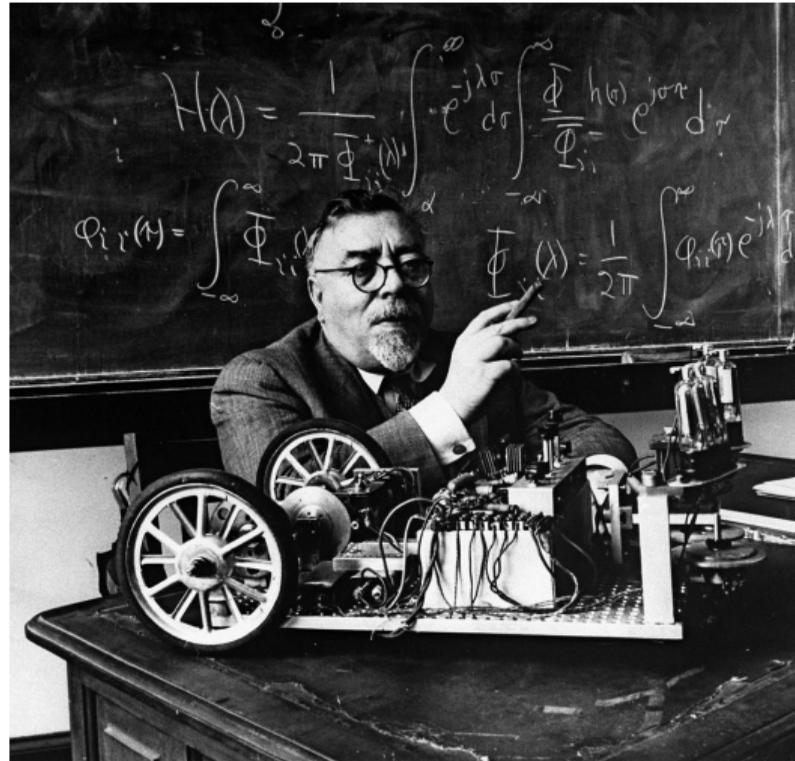


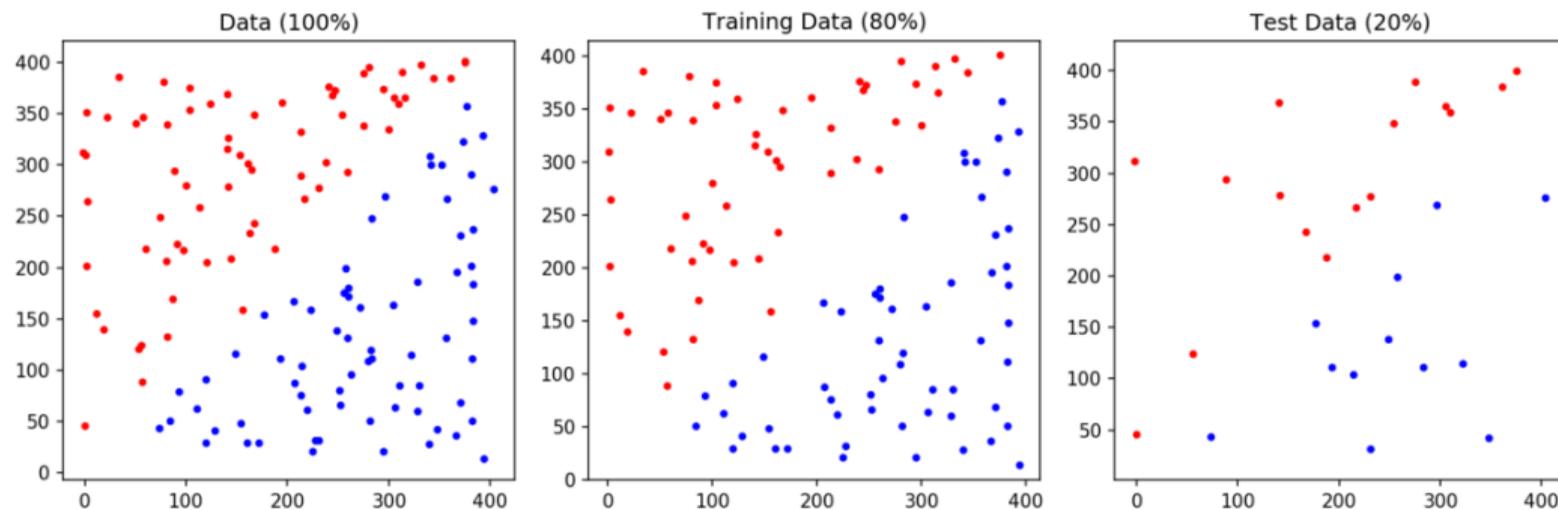


Bildquellen: pngimg.com, www.kinder-klassiker.de

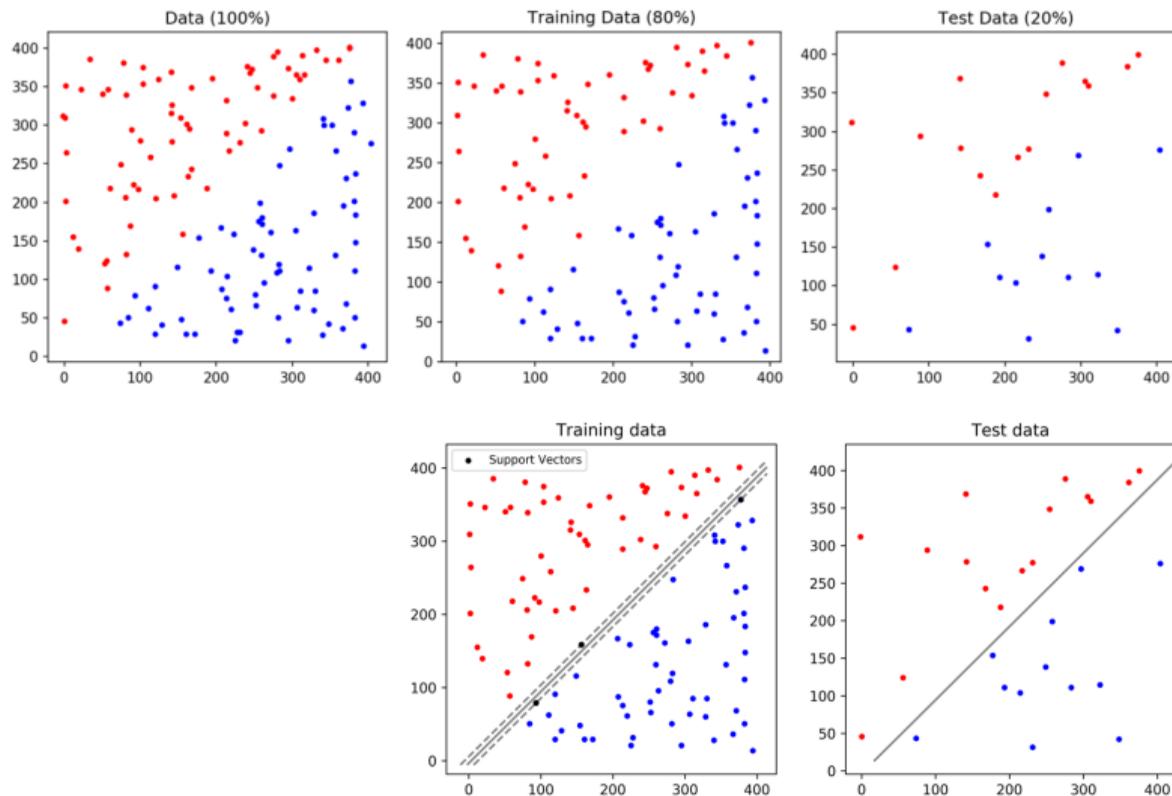


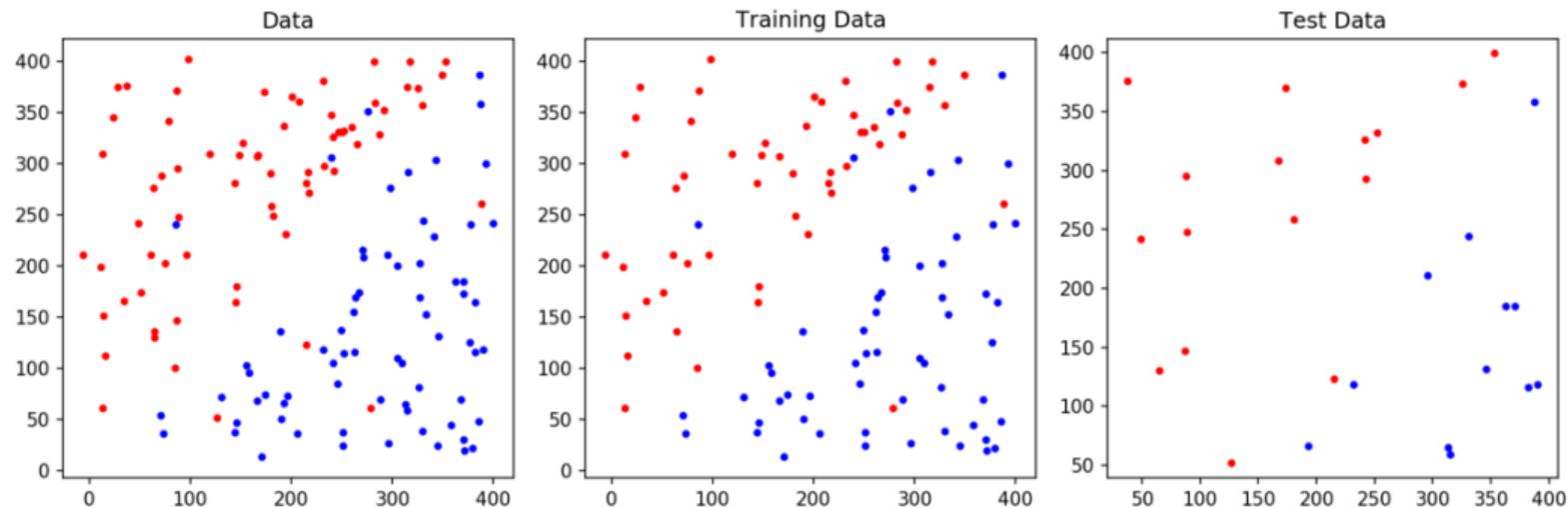
Bildquellen: pngimg.com, www.kinder-klassiker.de



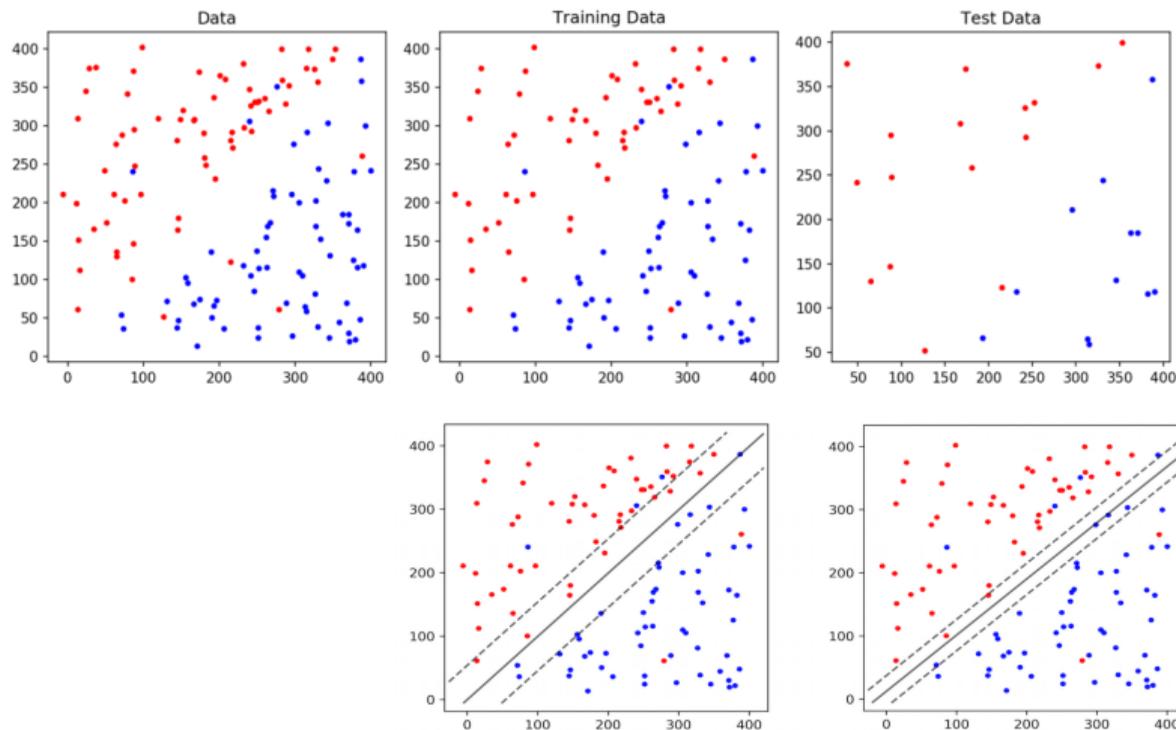


Bildquelle: www.learnopencv.com

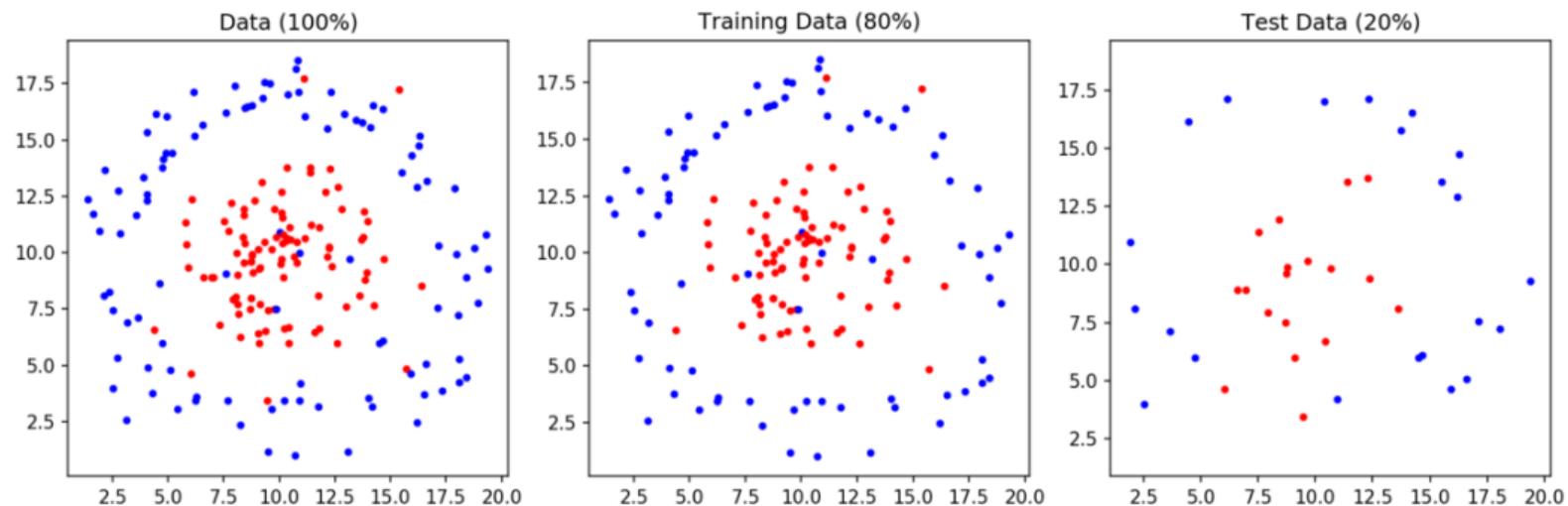




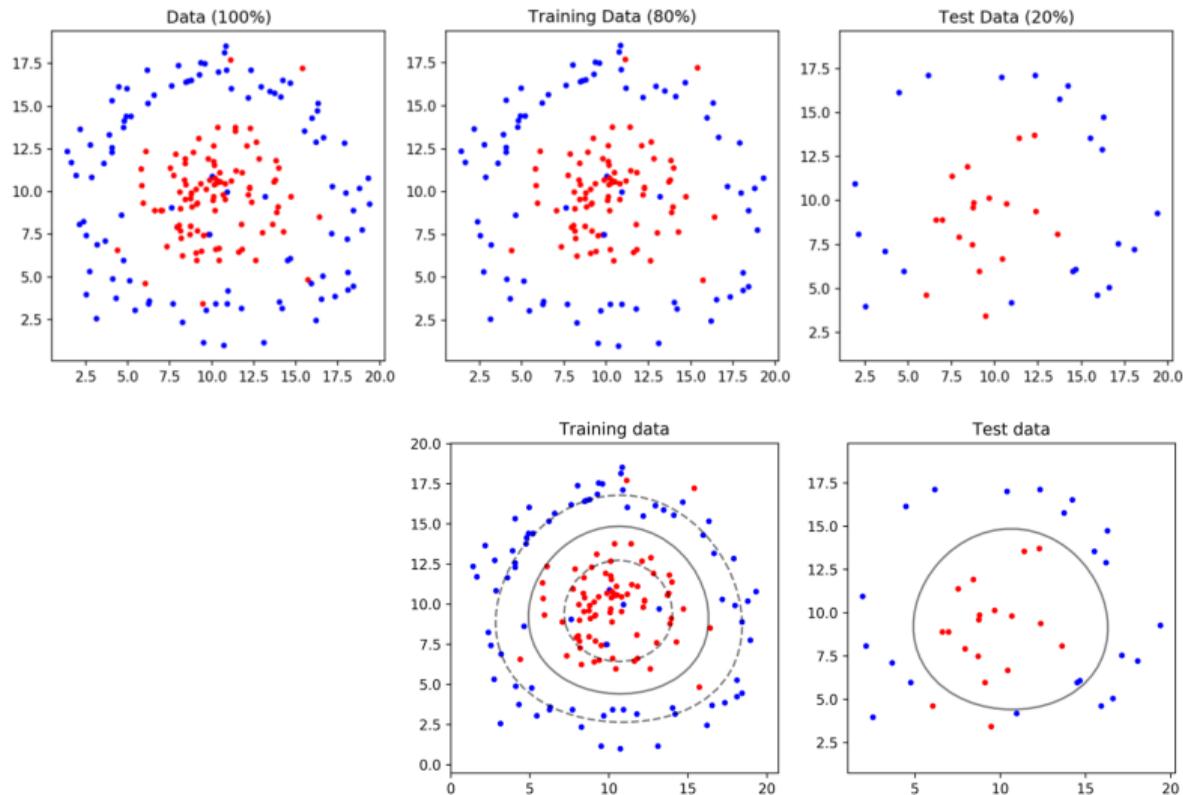
Bildquelle: www.learnopencv.com

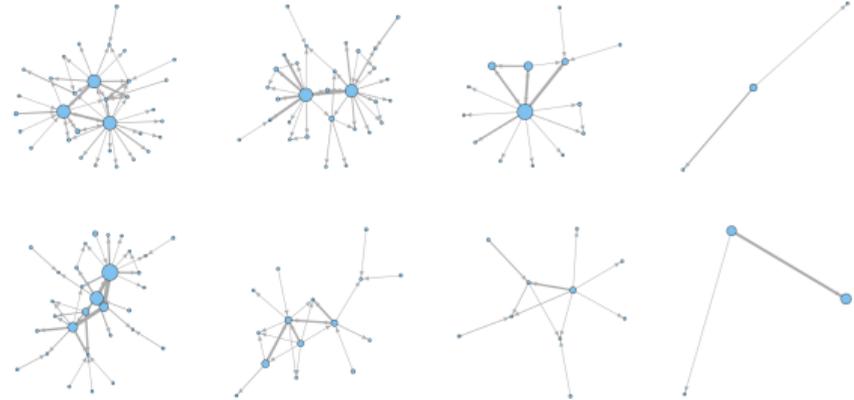
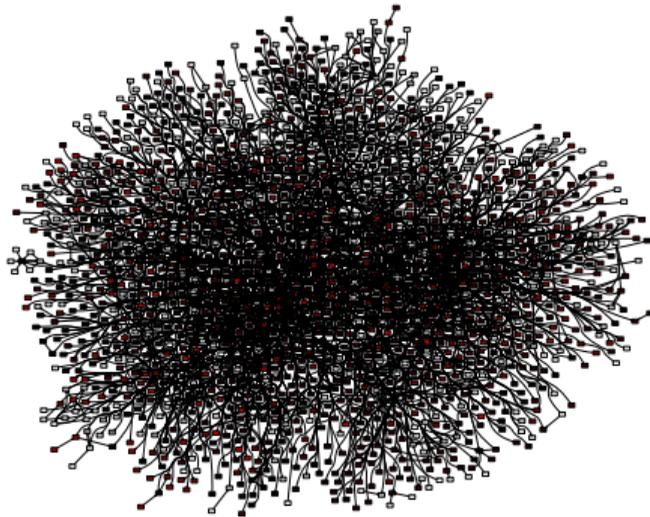


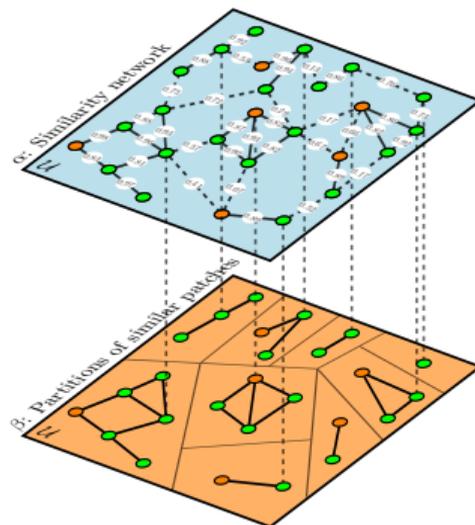
Bildquelle: www.learnopencv.com



Bildquelle: www.learnopencv.com







Überwacht (supervised)



Bildquelle: www.kindererziehung.com

Überwacht (supervised)



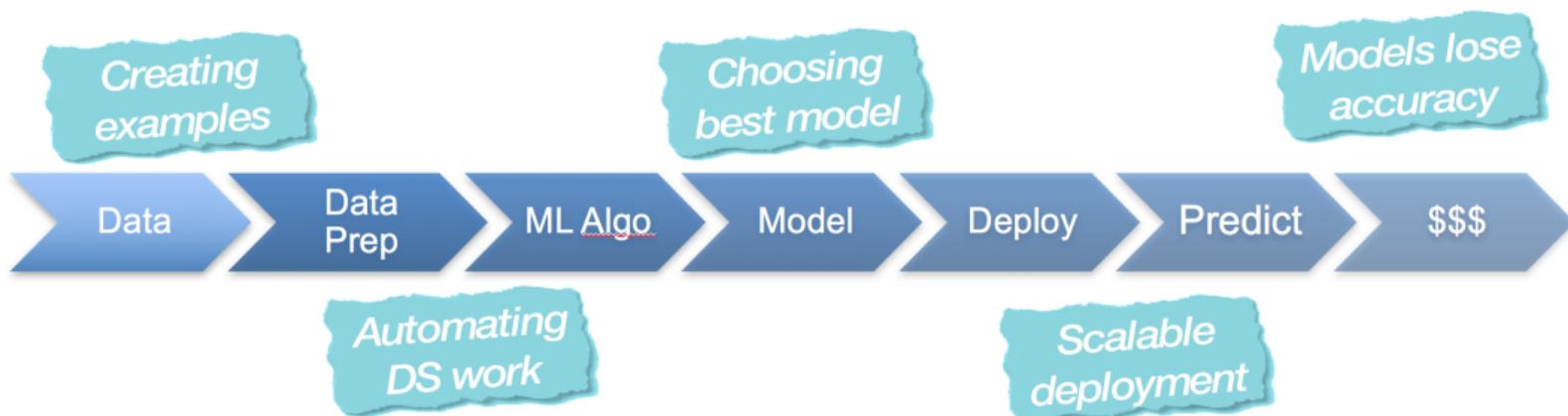
Bildquelle: www.kindererziehung.com

Unüberwacht (unsupervised)



• The Machine Learning Workflow

- Not that simple



Bildquelle: <https://www.ibm.com/developerworks>

- **The Machine Learning Workflow**

- Perception now



Bildquelle: <https://www.ibm.com/developerworks>



The image shows a screenshot of a Twitter post by Donald J. Trump. The background is a photograph of a large crowd at a political rally, with many people holding signs that say "FINISH THE WALL" and "BUILD THE WALL". A circular profile picture of Donald Trump is overlaid on the left side of the tweet. The tweet text reads: "Sorry losers and haters, but my I.Q. is one of the highest -and you all know it! Please don't feel so stupid or insecure,it's not your fault". The tweet is dated 18:37 - 8. Mai 2013 and has 134,482 retweets and 158,220 likes. Below the tweet, there is a reply from user "po borqueman" who says: "@MrDoodyHead @realDonaldTrump please refrain from such intellectual conversation with Trump. Might go over his head".

Donald J. Trump 
@realDonaldTrump

18:37 - 8. Mai 2013

134.482 Retweets 158.220 „Gefällt mir“-Angaben

15 Tsd. 134 Tsd. 158 Tsd.

Dieser Tweet ist nicht verfügbar

po borqueman @Donchrisote · 8. Mai 2013
@MrDoodyHead @realDonaldTrump please refrain from such intellectual conversation with Trump. Might go over his head

17 84 2,6 Tsd.

Bildquelle: twitter.com/realdonaldtrump/status/332308211321425920?lang=de





Jadda Dadda Dadda Jadda Dadda Jadda Dadda
Jadda Dadda Jadda Dadda Dadda Jadda Dadda



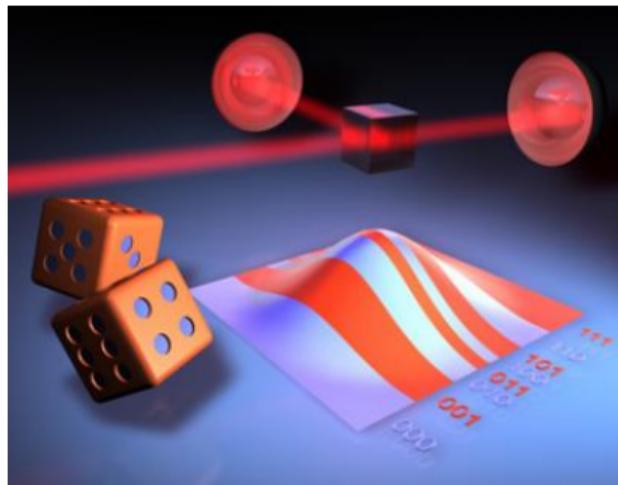
Jadda Dadda Dadda Jadda Dadda Jadda Dadda
Jadda Dadda Jadda Dadda Dadda Jadda Dadda

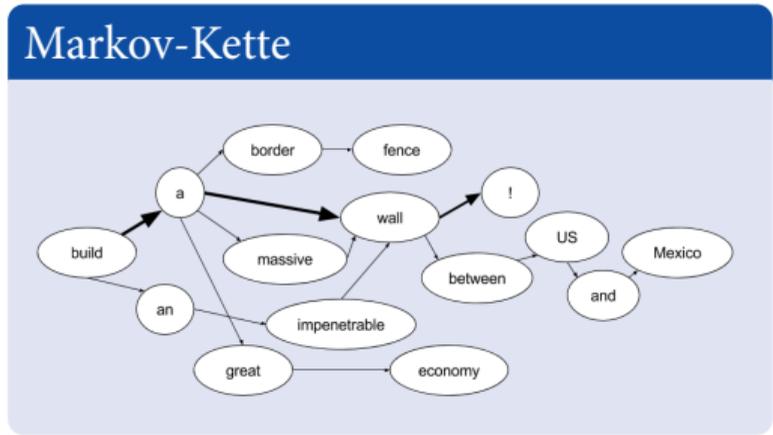
- ▶ Jadda \Rightarrow 100% Dadda
- ▶ Dadda \Rightarrow 70% Jadda / 30% Dadda



Jadda Dadda Dadda Jadda Dadda Jadda Dadda
Jadda Dadda Jadda Dadda Dadda Jadda Dadda

- ▶ Jadda \Rightarrow 100% Dadda
- ▶ Dadda \Rightarrow 70% Jadda / 30% Dadda





Bildquellen: filiph.github.io/markov, de.wikipedia.org/wiki/Diskette#/media/File:5.25%22-Diskette.jpg



Markov-Kette

Donald J. Trump 

@realDonaldTrump

 Follow 

Via @CBNNews by @TheBrodyFile: "Iowa Evangelical Leader Says Donald Trump Storms the American dream!"

<http://somelink.com/>

9:30 - 11 Apr 2019

  13K  37K

Bildquellen: filiph.github.io/markov, de.wikipedia.org/wiki/Diskette#/media/File:5.25%22-Diskette.jpg



Markov-Kette

Donald J. Trump 

@realDonaldTrump

 Follow 

There has been over 8% unemployment for a lot of money!

9:30 - 11 Apr 2019

  13K  37K

Bildquellen: filiph.github.io/markov, de.wikipedia.org/wiki/Diskette#/media/File:5.25%22-Diskette.jpg



Markov-Kette

Donald J. Trump 

@realDonaldTrump

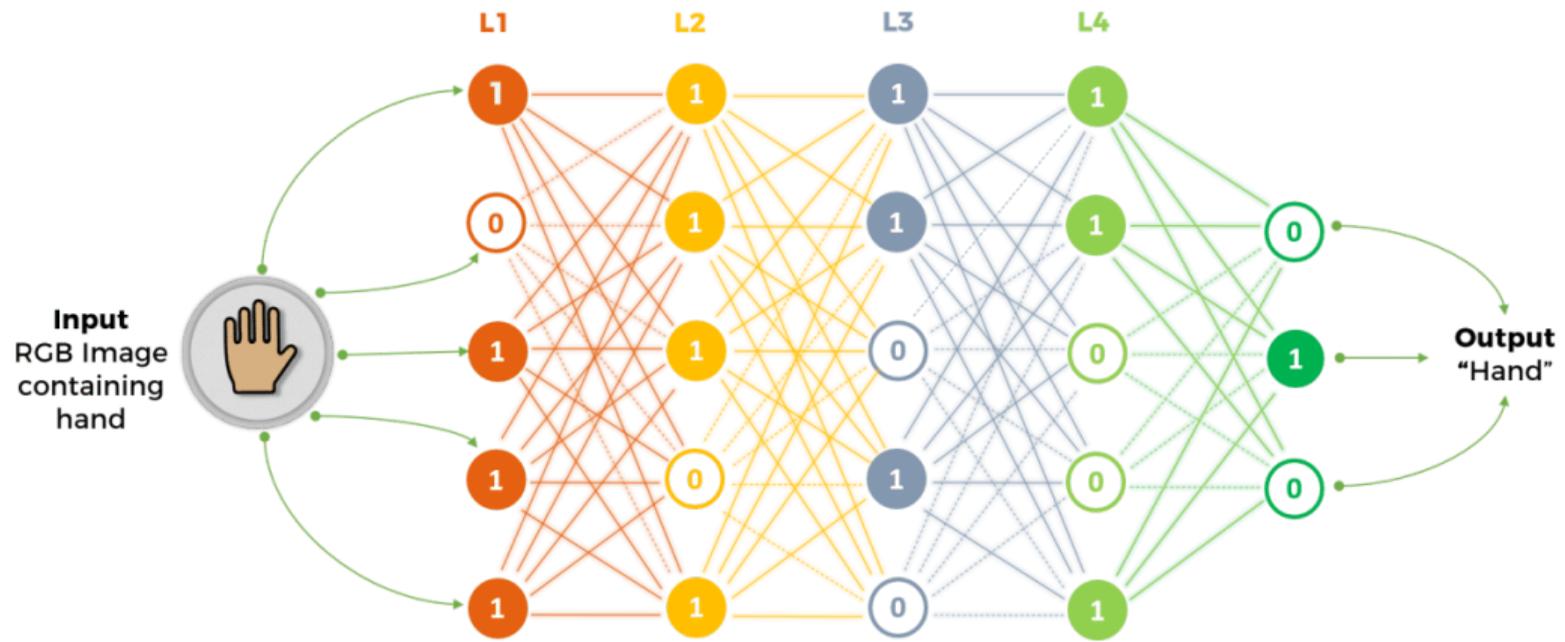
 Follow 

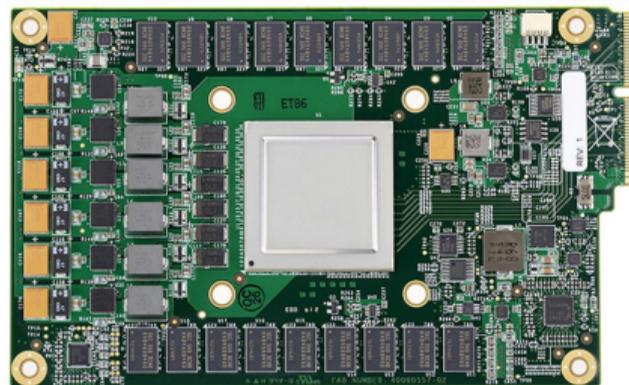
There has been over 8% unemployment for a lot of money!

9:30 - 11 Apr 2019

  13K  37K

Bildquellen: filiph.github.io/markov, de.wikipedia.org/wiki/Diskette#/media/File:5.25%22-Diskette.jpg





SHARE



SHARE
804



TWEET



COMMENT



EMAIL

WIRED STAFF SCIENCE 06.26.12 11:15 AM

GOOGLE'S ARTIFICIAL BRAIN LEARNS TO FIND CAT VIDEOS



By Liat Clark, Wired UK

MOST POPULAR



SCIENCE
The First Black Hole Picture
Has Finally Been Revealed
SOPHIA CHEN



CULTURE
How Professional Gambler
James Holzhauer Broke
'Jeopardy!'
BRIAN BARRETT



SPONSOR CONTENT
Fighting Climate Change
With Nanomaterials
ESD



BACKCHANNEL
A Brief History of Porn on
the Internet
DAVID KUSHNER

WIRED.STATE SCIENCE 09.09.12 11:15 AM

SHARE

SHARE 854

TWEET

COMMENT

EMAIL

GOOGLE'S ARTIFICIAL BRAIN LEARNS TO FIND CAT VIDEOS



By Liat Clark, Wired UK

MOST POPULAR

SCIENCE
The First Black Hole Picture
Has Finally Been Revealed
SOPHIA CHEN

CULTURE
How Professional Gambler
James Holzhauer Broke
'Jeopardy!'
BRIAN BARRETT

SPONSOR CONTENT
Fighting Climate Change
With Nanomaterials
CSO

BACKCHANNEL
A Brief History of Porn on
the Internet
DAVID RUSHNER

Musterschüler?

Wired State SCIENCE 09.06.12 11:15 AM

SHARE

SHARE 854

TWEET

COMMENT

EMAIL

GOOGLE'S ARTIFICIAL BRAIN LEARNS TO FIND CAT VIDEOS



By Liat Clark, Wired UK

MOST POPULAR

SCIENCE
The First Black Hole Picture
Has Finally Been Revealed
SOPHIA CHEN

CULTURE
How Professional Gambler
James Holzhauer Broke
'Jeopardy!'
BRIAN BARRETT

SPONSOR CONTENT
Fighting Climate Change
With Nanomaterials
CSO

BACKCHANNEL
A Brief History of Porn on
the Internet
DAVID RUSHNER

Musterschüler?

- ▶ Google: 1000 Computer (a 16 Kerne), 3 Tage a 24h

Wired State SCIENCE 09.06.12 11:15 AM

SHARE

SHARE 854

TWEET

COMMENT

EMAIL

GOOGLE'S ARTIFICIAL BRAIN LEARNS TO FIND CAT VIDEOS



By Liat Clark, Wired UK

MOST POPULAR

SCIENCE
The First Black Hole Picture
Has Finally Been Revealed
SOPHIA CHEN

CULTURE
How Professional Gambler
James Holzhauer Broke
'Jeopardy!'
BRIAN BARRETT

SPONSOR CONTENT
Fighting Climate Change
With Nanomaterials
CSO

BACKCHANNEL
A Brief History of Porn on
the Internet
DAVID RUSHNER

Musterschüler?

- ▶ Google: 1000 Computer (a 16 Kerne), 3 Tage a 24h
- ▶ Schultag: 6h, 200 Tage/Jahr => 1200h

Wired State SCIENCE 09.06.12 11:15 AM

SHARE

SHARE 854

TWEET

COMMENT

EMAIL

GOOGLE'S ARTIFICIAL BRAIN LEARNS TO FIND CAT VIDEOS



By Liat Clark, Wired UK

MOST POPULAR

SCIENCE
The First Black Hole Picture
Has Finally Been Revealed
SOPHIA CHEN

CULTURE
How Professional Gambler
James Holtzauer Broke
'Jeopardy!'
BRIAN BARRETT

SPONSOR CONTENT
Fighting Climate Change
With Nanomaterials
CSO

BACKCHANNEL
A Brief History of Porn on
the Internet
DAVID RUSHNER

Musterschüler?

- ▶ Google: 1000 Computer (a 16 Kerne), 3 Tage a 24h
- ▶ Schultag: 6h, 200 Tage/Jahr => 1200h
- ▶ 60 (Schul-)Jahre vor dem Fernseher!

Big Data

Smart Data! Fast Data! Huge Data!



Bildquellen: <https://twitter.com/ThePoke/status/823828441262919681/photo/1>, foersterkinder.de

Big Data

Smart Data! Fast Data! Huge Data!

Müll rein, Müll raus



Bildquellen: <https://twitter.com/ThePoke/status/823828441262919681/photo/1>, foersterkinder.de

Big Data

Smart Data! Fast Data! Huge Data!

Müll rein, Müll raus



Nadeln & Heuhaufen



Bildquellen: <https://twitter.com/ThePoke/status/823828441262919681/photo/1>, foersterkinder.de

ARD Home Nachrichten Sport Börse Ratgeber Wissen Kultur Kinder Die ARD Fernsehen Radio ARD Mediathek ARD®

tagesschau.de Suche in tagesschau.de

Startseite Videos & Audios Inland Ausland Wirtschaft Wahlen Wetter Ihre Meinung Mehr

Startseite Inland Nach Testphase: Gesichter zu mehr als 80 Prozent erkannt



Fazit nach Testphase
Gesichter zu mehr als 80 Prozent erkannt

Stand: 11.10.2018 20:11 Uhr

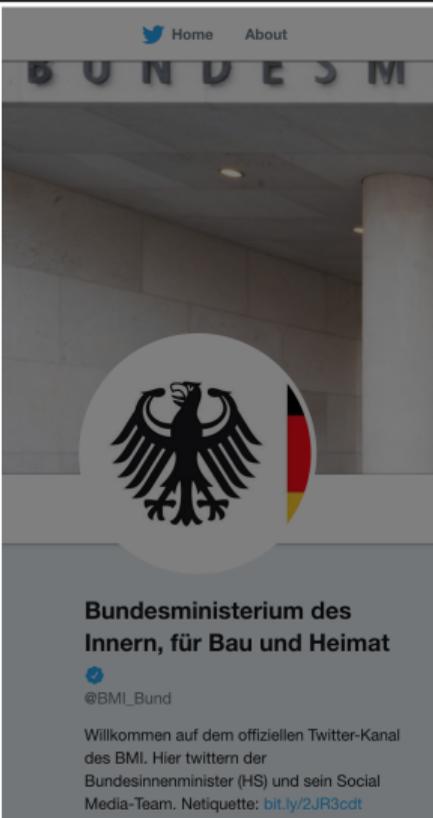
[f](#) [t](#) [e](#) [p](#)

Ein Experiment zur automatischen Gesichtserkennung am Berliner Bahnhof Südkreuz hat eine Trefferquote von mehr als 80 Prozent erreicht. Das von Datenschützern kritisierte Projekt soll nun fortgesetzt werden.

Das Bundesinnenministerium wertet das Pilotprojekt zum Test aus.

AUDIO
Bundesinnenministerium wertet Projekt zur Gesichtserkennung aus, Julia Barth, ARD Berlin, 12.10.18 06:47 Uhr | audio

AUS DEM ARCHIV
Facebook stoppt Gesichtserkennung in



Home About

BUNDES M



**Bundesministerium des
Innern, für Bau und Heimat**

@BMI_Bund

Willkommen auf dem offiziellen Twitter-Kanal
des BMI. Hier twittern der
Bundesinnenminister (HS) und sein Social
Media-Team. Netiquette: bit.ly/2JR3cdt



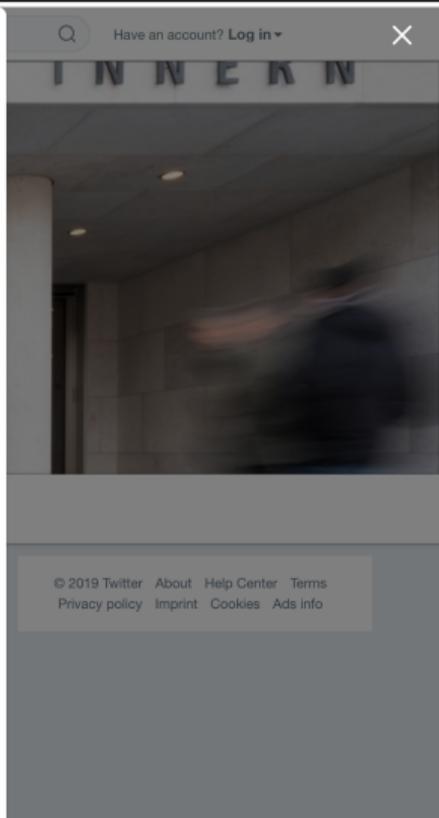
Bundesministerium des Innern, ... @BMI_Bund

Nach vielversprechendem ersten
Zwischenergebnis der Gesichtserkennung
am #Südkreuz hat Minister #deMaizière
erklärt: "Bei 70 Prozent und mehr haben wir
eine positive Erkennung der gesuchten
Testpersonen - das ist ein sehr guter Wert."



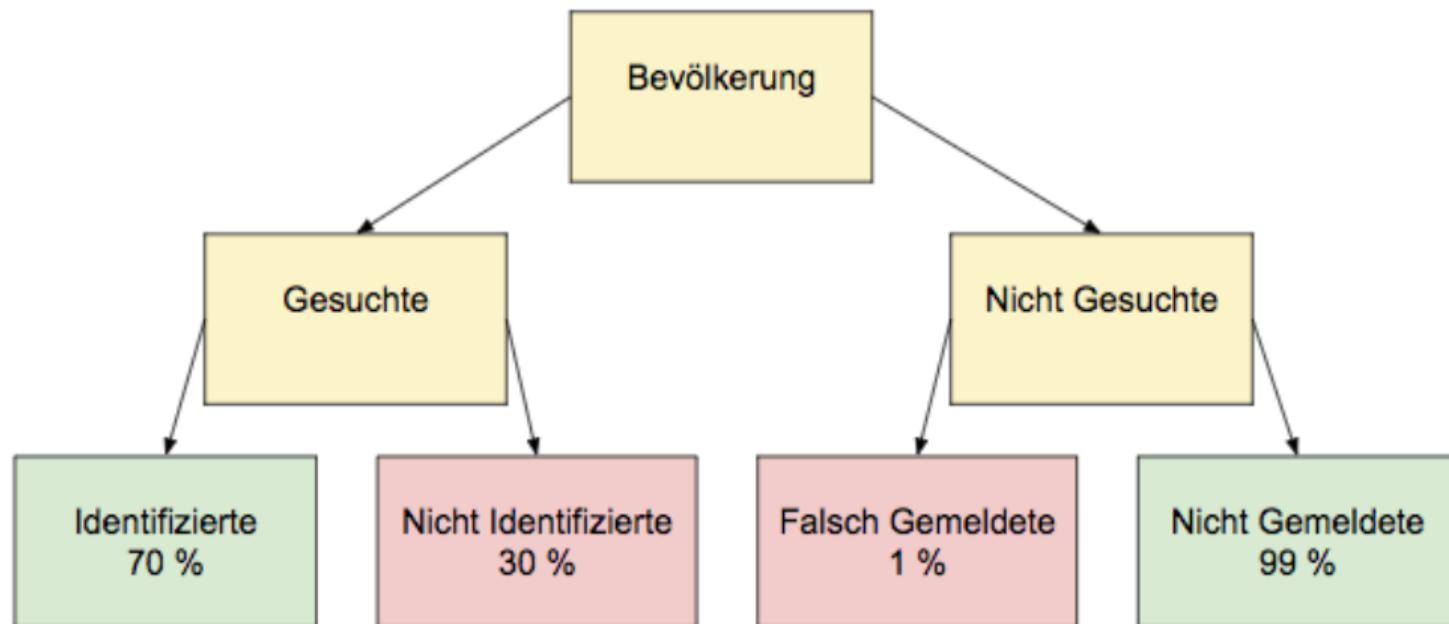
3:44 AM - 15 Dec 2017

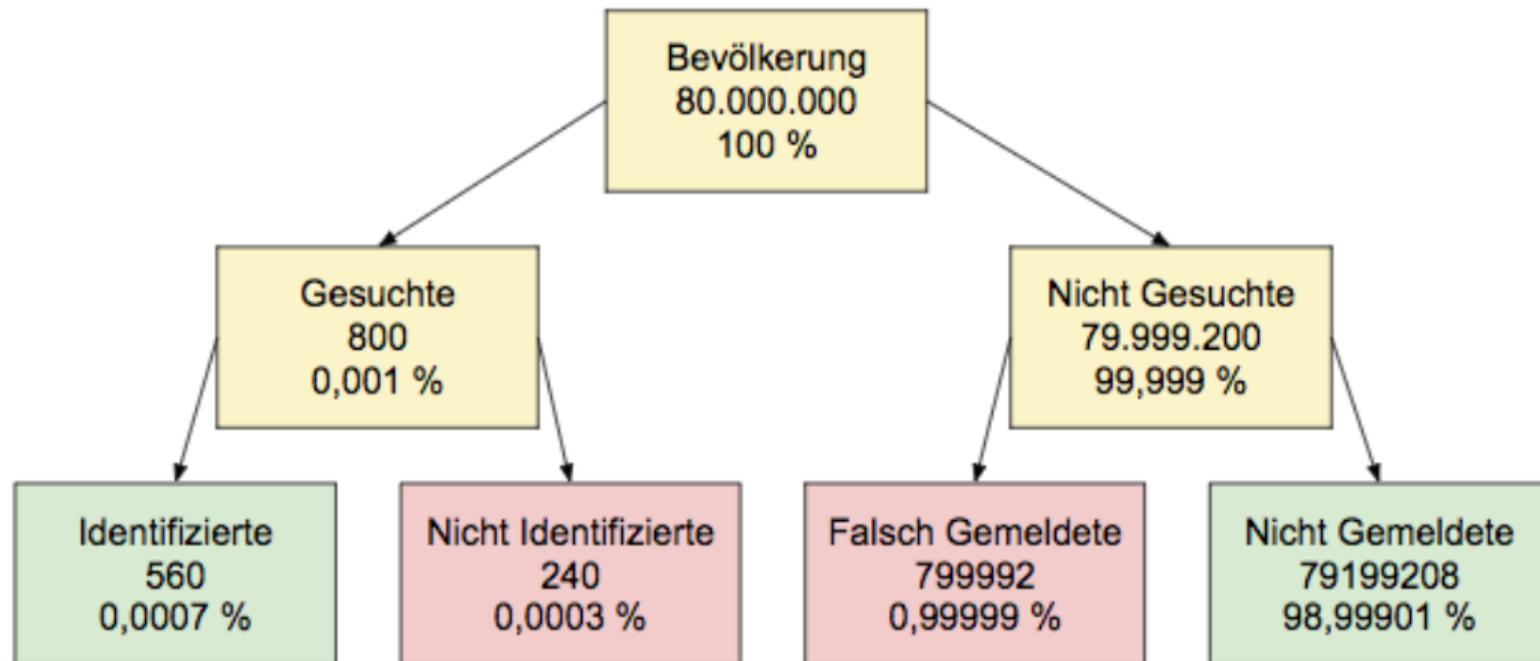
13 Retweets 26 Likes



Have an account? Log in

© 2019 Twitter About Help Center Terms
Privacy policy Imprint Cookies Ads info





Ein Tag in Berlin

- ▶ 100.000 Passanten

Ein Tag in Berlin

- ▶ 100.000 Passanten
- ▶ Prävalenz: 0,01%
 - ▶ 10 Terroristen
 - ▶ 99.990 unbescholtene Staatsbürger

Ein Tag in Berlin

- ▶ 100.000 Passanten
- ▶ Prävalenz: 0,01%
 - ▶ 10 Terroristen
 - ▶ 99.990 potentielle Terroristen

Ein Tag in Berlin

- ▶ 100.000 Passanten
- ▶ Prävalenz: 0,01%
 - ▶ 10 Terroristen
 - ▶ 99.990 potentielle Terroristen
- ▶ Sensitivität: 90%
 - ▶ 9 Terroristen erkannt
 - ▶ 1 Terrorist unentdeckt

Ein Tag in Berlin

- ▶ 100.000 Passanten
- ▶ Prävalenz: 0,01%
 - ▶ 10 Terroristen
 - ▶ 99.990 potentielle Terroristen
- ▶ Sensitivität: 90%
 - ▶ 9 Terroristen erkannt
 - ▶ 1 Terrorist unentdeckt
- ▶ Spezifität: 99,7%
 - ▶ 99.690 Staatsbürger korrekt negativ
 - ▶ 300 falsch verdächtige

Ein Tag in Berlin

- ▶ 100.000 Passanten
- ▶ Prävalenz: 0,01%
 - ▶ 10 Terroristen
 - ▶ 99.990 potentielle Terroristen
- ▶ Sensitivität: 90%
 - ▶ 9 Terroristen erkannt
 - ▶ 1 Terrorist unentdeckt
- ▶ Spezifität: 99,7%
 - ▶ 99.690 Staatsbürger korrekt negativ
 - ▶ 300 falsch verdächtige

A/RES/217, UN-Doc. 217/A-(III), Art. 11, Abs. 3

Jeder Mensch, der einer strafbaren Handlung beschuldigt wird, ist solange als unschuldig anzusehen, bis seine Schuld in einem öffentlichen Verfahren, in dem alle für seine Verteidigung nötigen Voraussetzungen gewährleistet waren, gemäß dem Gesetz nachgewiesen ist.



x

“panda”

57.7% confidence

+ .007 ×



$\text{sign}(\nabla_x J(\theta, x, y))$

“nematode”

8.2% confidence

=



$x +$

$\epsilon \text{sign}(\nabla_x J(\theta, x, y))$

“gibbon”

99.3 % confidence

I. J. Goodfellow, J. Shlens, Ch. Szegedy: Explaining and harnessing adversarial examples, ICLR 2015

Eykholt, Evtimov et al.: Robust Physical-World Attacks on Deep Learning Visual Classification, CVRP 2018



I. J. Goodfellow, J. Shlens, Ch. Szegedy: Explaining and harnessing adversarial examples, ICLR 2015

Eykholt, Evtimov et al.: Robust Physical-World Attacks on Deep Learning Visual Classification, CVRP 2018







A. M. Turing 1936

258

A. M. TURING

[Nov. 12,

and

$$\mathfrak{U}_\eta \& F^{(M)} \rightarrow \left[\left\{ G(u^{(n)}, u^{(m)}) \vee G(u^{(m)}, u^{(n)}) \right. \right. \\ \left. \left. \& H(u^{(n)}, u^{(n)}) \right\} \rightarrow \left(-H(u^{(n)}, u^{(m)}) \right) \right].$$

Hence

$$\mathfrak{U}_\eta \& F^{(M)} \rightarrow \left(-H(u^{(n)}, u^{(m)}) \right).$$

The conditions of our second definition of a computable function are therefore satisfied. Consequently η is a computable function.

Proof of a modified form of (iii).

Suppose that we are given a machine \mathfrak{U} , which, starting with a tape bearing on it $\epsilon\epsilon$ followed by a sequence of any number of letters “F” on F-squares and in the m -configuration b , will compute a sequence γ_n depending on the number n of letters “F”. If $\phi_n(m)$ is the m -th figure of γ_n , then the sequence β whose n -th figure is $\phi_n(n)$ is computable.

We suppose that the table for \mathfrak{U} has been written out in such a way that in each line only one operation appears in the operations column. We also suppose that Ξ , Θ , $\bar{0}$, and $\bar{1}$ do not occur in the table, and we replace ϵ throughout by Θ , 0 by $\bar{0}$, and 1 by $\bar{1}$. Further substitutions are then made. Any line of form

$$\mathfrak{U} \quad \alpha \quad P\bar{0} \quad \mathfrak{B}$$

ARTICLES

<https://doi.org/10.1038/s42256-018-0002-3>

nature
machine intelligence

Corrected: Author Correction

Learnability can be undecidable

Shai Ben-David¹, Pavel Hrubeš², Shay Moran³, Amir Shpilka⁴ and Amir Yehudayoff ^{5*}

The mathematical foundations of machine learning play a key role in the development of the field. They improve our understanding and provide tools for designing new learning paradigms. The advantages of mathematics, however, sometimes come with a cost. Gödel and Cohen showed, in a nutshell, that not everything is provable. Here we show that machine learning shares this fate. We describe simple scenarios where learnability cannot be proved nor refuted using the standard axioms of mathematics. Our proof is based on the fact the continuum hypothesis cannot be proved nor refuted. We show that, in some cases, a solution to the ‘estimating the maximum’ problem is equivalent to the continuum hypothesis. The main idea is to prove an equivalence between learnability and compression.

Einführung ins Universum

$$i\hbar\partial_t |\Psi(t)\rangle = \left(\frac{\hbar^2}{2m}\Delta + \hat{V} \right) |\Psi(t)\rangle$$

$$\partial_\mu F^{\mu\nu} = \frac{4\pi}{c} j^\nu$$

$$\epsilon^{\alpha\beta\gamma\delta} \partial_\alpha F_{\gamma\delta} = 0$$

$$\frac{8\pi G}{c^4} T_{\mu\nu} = R_{\mu\nu} - \frac{1}{2} R g_{\mu\nu} + \Lambda g_{\mu\nu}$$

$$? = ?$$

$$?? = ??$$

G-Mafia

G-Mafia

Google Microsoft Apple Facebook Intel Amazon

