

Hva er maskinlæring og hvordan utvikler en maskinlæringsmodeller?

«Bruk av maskinlæring i offentlig forvaltning – muligheter og problemer»

15. september 2021

Anders Løland

PETER A. LAWRENCE

The Making of a Fly

THE GENETICS OF ANIMAL DESIGN



Blackwell
Scientific
Publications

amazon

\$106,23

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The Making of a Fly

THE GENETICS OF ANIMAL DESIGN



Blackwell
Scientific
Publications

Selger 1 =
0,9983 x Selger 2

Selger 2 =
1,270589 x Selger 1

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Blackwell
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Publications

amazon

\$23 698 655,93

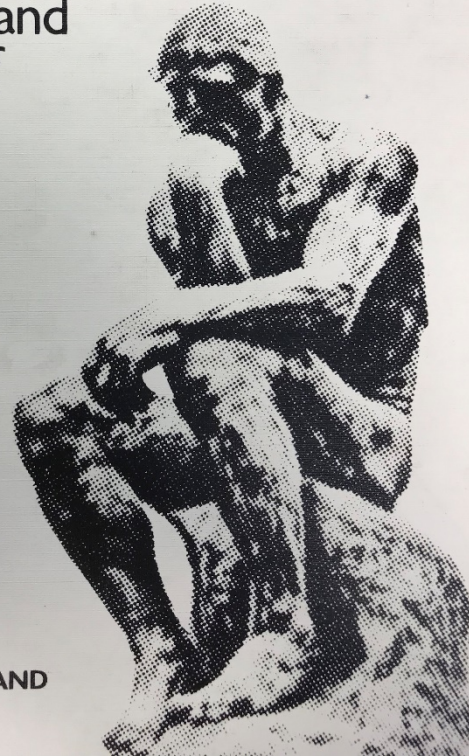
<https://www.wired.com/2011/04/amazon-flies-24-million/>

Artificial Intelligence (AI) is in the headlines these days. Industry seems now determined to exploit AI-techniques for a broad range of applications. Scientists from nearly all disciplines are attracted by the idea of approaching their own specific problems by AI-methodologies. Ordinary people are stunned by the inconceivable capabilities of AI-systems and feel uneasy about the prospects of this technology.

ARTIFICIAL INTELLIGENCE

methodology, systems,
applications

W. Bibel and
B. Petkoff
editors



NORTH-HOLLAND

1984

kunstig intelligens
≈ maskinlæring

hva er egentlig
maskinlæring?

Machine learning (ML) is the scientific study of **algorithms and statistical models** that computer systems use to progressively improve their performance on a specific task.

Machine learning algorithms build a mathematical model of sample data, known as "**training data**", in order **to make predictions** or decisions **without being explicitly programmed** to perform the task.

– Wikipedia

maskinlæring handler (ofte) om

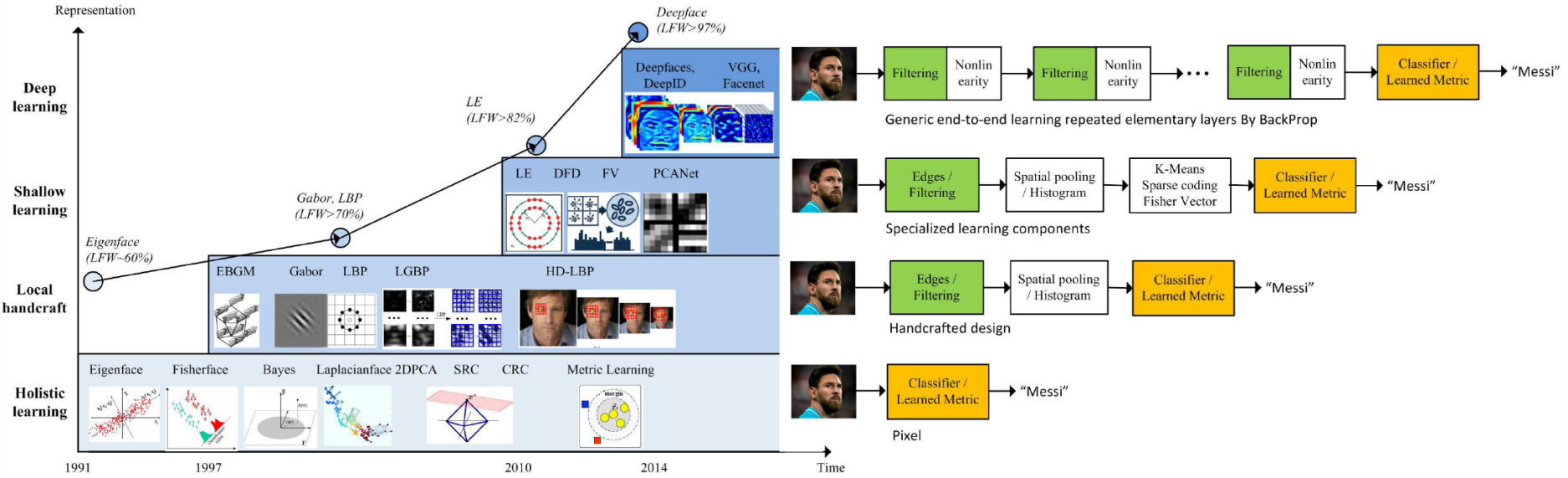
prediksjon

(eller klassifisering)



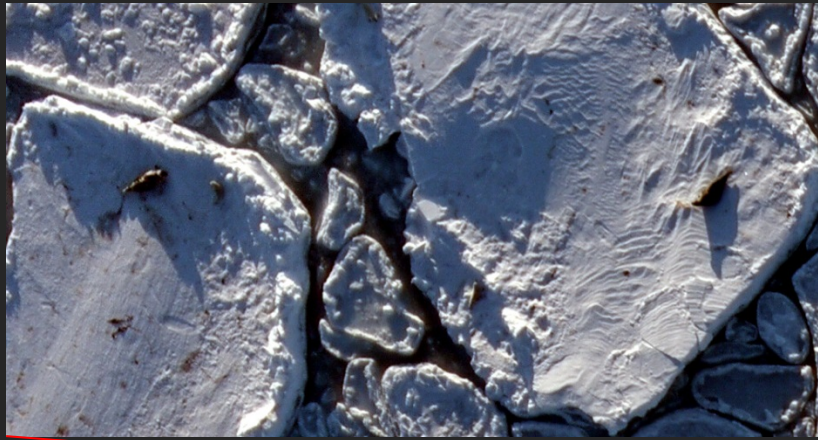
Кирилл Венедиктов
[CC BY-SA 3.0 GFDL]

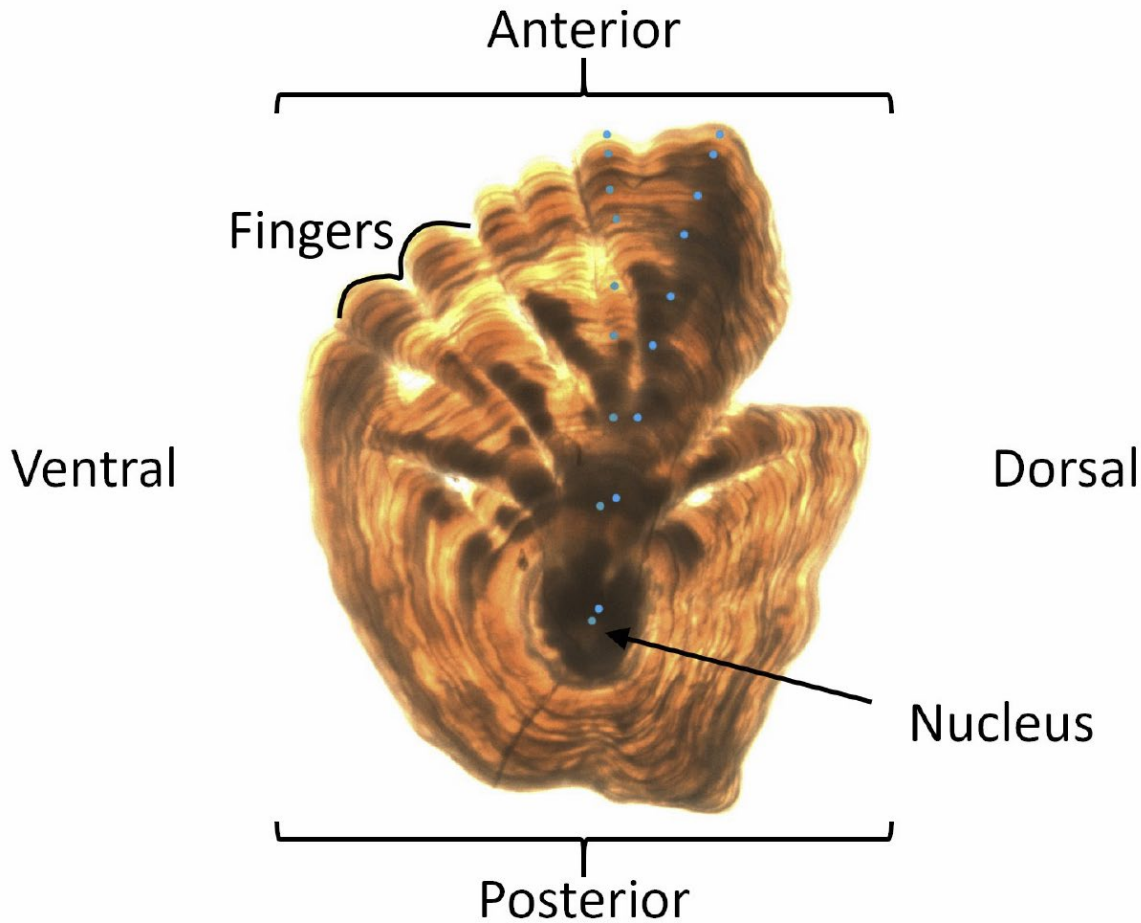
99,8 %



Li, S., & Deng, W. (2018). Deep facial expression recognition: A survey. *arXiv preprint arXiv:1804.08348.*







Ordonez et al., 2020.
**Explaining decisions
of deep neural
networks used for
fish age prediction.**
PloS one, 15(6)

Fig 1. Right Greenland halibut otolith image. The main structural parts of the otolith are indicated together with annotated manual year zone readings in turquoise dots. Both alternatives predict an age of 8 years. Photo was provided by Kristin Windsland, Norwegian Institute of Marine Research.

maskinlæring er snedig, men

lat



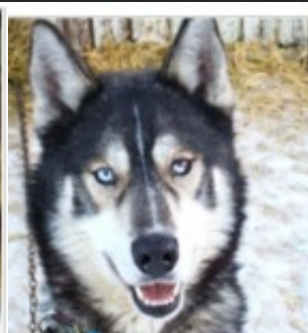
Predicted: **wolf**
True: **wolf**



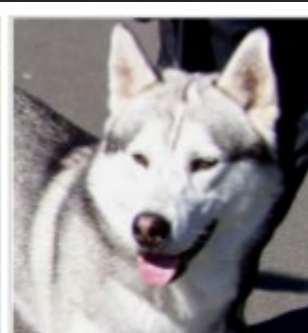
Predicted: **husky**
True: **husky**



Predicted: **wolf**
True: **wolf**



Predicted: **wolf**
True: **husky**

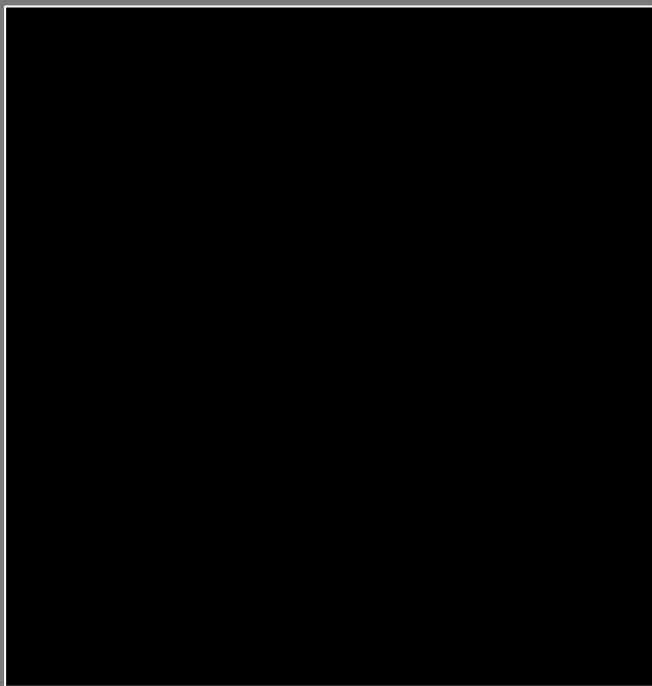


Predicted: **husky**
True: **husky**

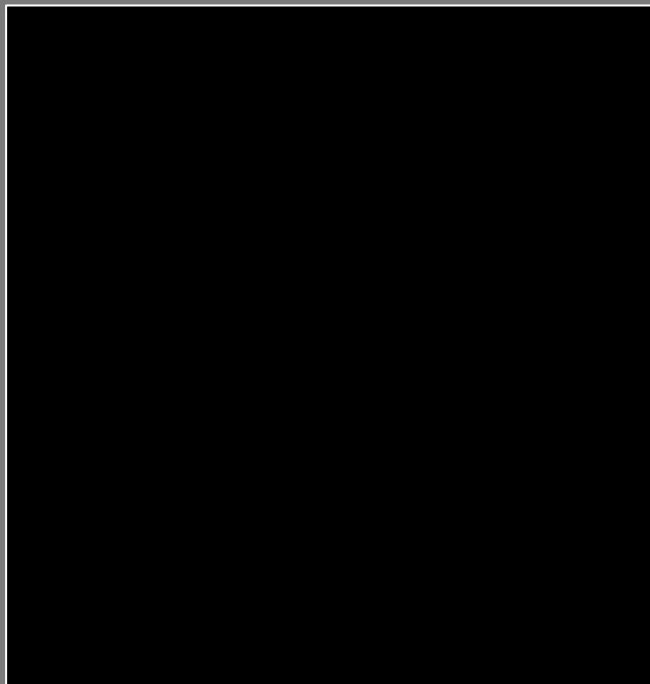


Predicted: **wolf**
True: **wolf**

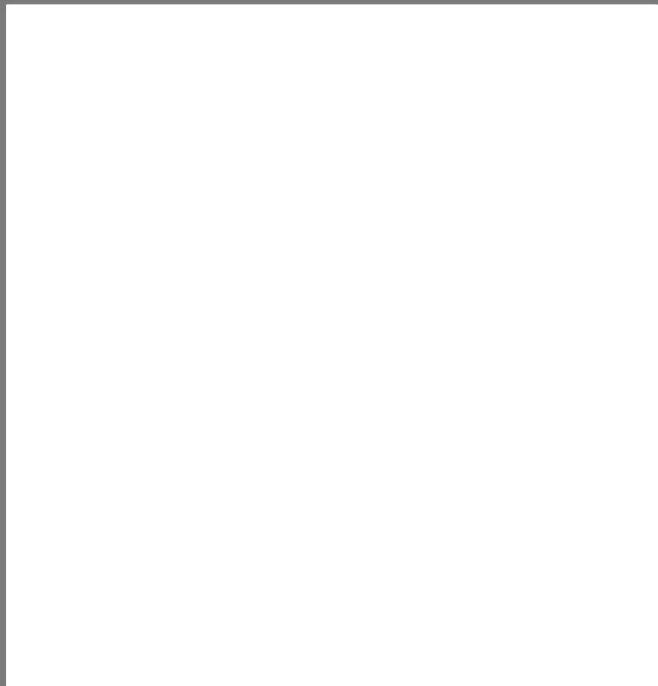
"Why Should I Trust You?" Marco Ribeiro, University of Washington



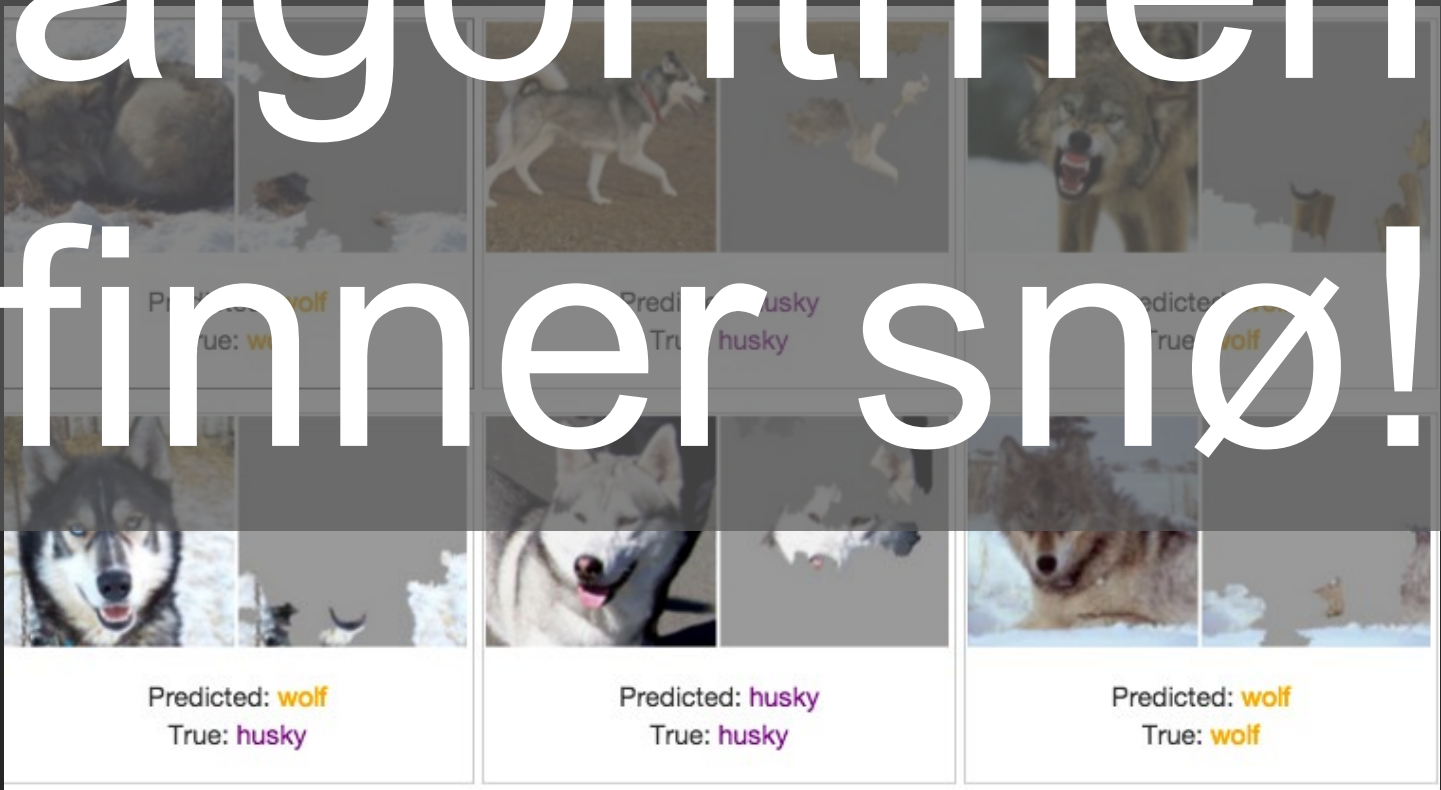
inndata +



= prediksjon



algoritmen finder snø!



Predicted: wolf
True: husky

Predicted: husky
True: husky

Predicted: wolf
True: wolf

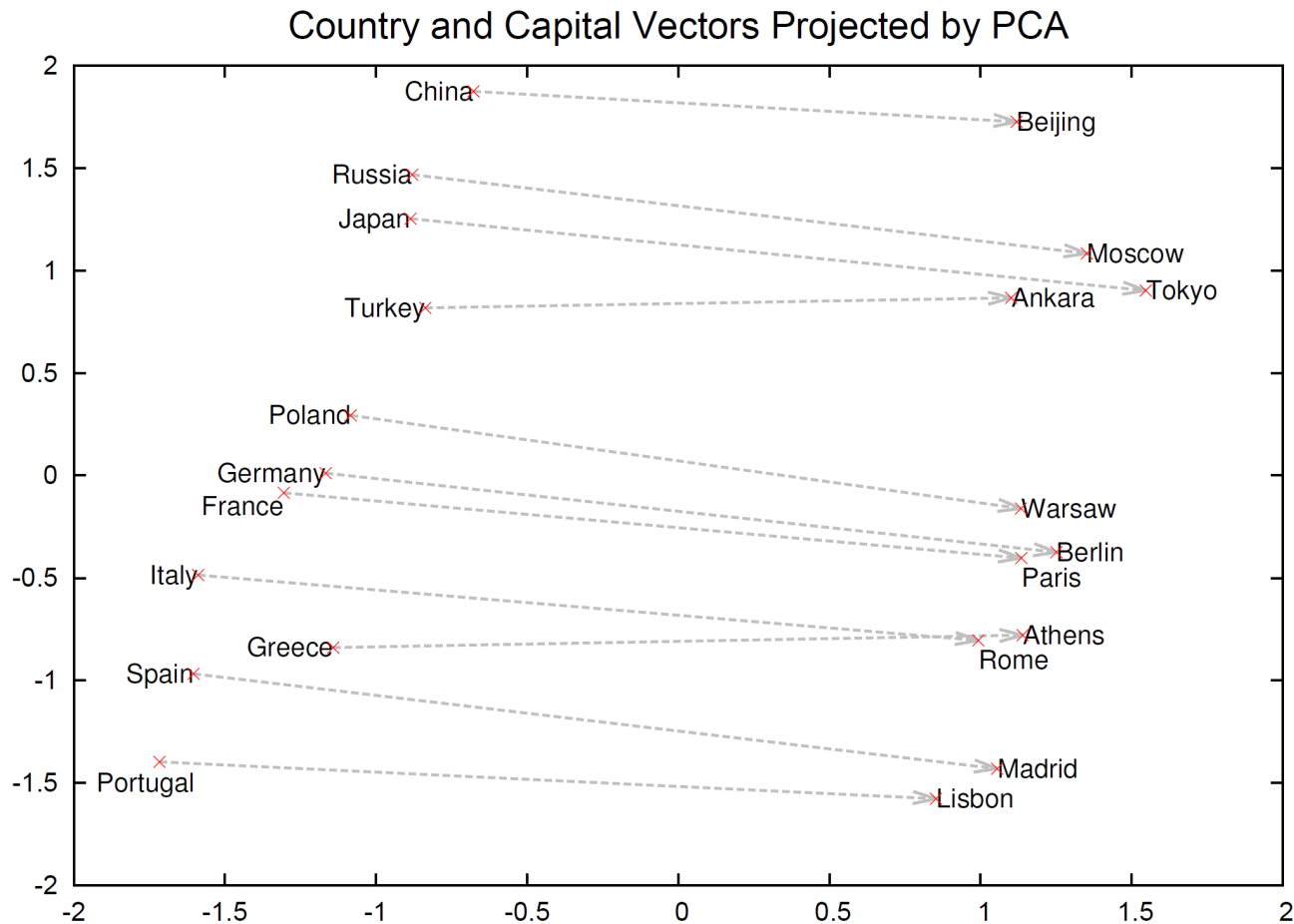
«The Deep Learning Tsunami»

At the June 2015 opening of the Facebook AI Research Lab in Paris, its director Yann LeCun said:

*“The next big step for **Deep Learning** is natural language understanding, which **aims to give machines the power to understand not just individual words but entire sentences and paragraphs.**”*

Manning, C.D., 2015. Computational linguistics and deep learning. Computational Linguistics, 41(4), pp.701-707.

2013: word2vec



King - Man + Woman
er nærmest
Queen

en ganske ny språkmodell: GPT-3

175 milliarder parametre

Brown, T.B., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., Neelakantan, A., Shyam, P., Sastry, G., Askell, A. and Agarwal, S., 2020. Language models are few-shot learners. arXiv preprint arXiv:2005.14165.

CLEANUP:

Machine Learning for the Anonymisation of Unstructured Personal Data



UiO : **Department of Informatics**
University of Oslo



NTNU

Norwegian University of
Science and Technology



**UNIVERSITAT
ROVIRA i VIRGILI**



**Norsk
Regnesentral**
NORWEGIAN COMPUTING CENTER



UiO : **Faculty of Law**
University of Oslo



ARKIVVERKET



LOVDATA

Gjensidige



DNB

Så: hvordan utvikler en maskinlæringsmodeller?

1. En klar idé om hva som skal gå inn (data) og ut (resultat)
2. Fortrinnsvis merkede data
3. En god definisjon av hva vi vil oppnå (et avvik vi vil minimere)
4. (hyppig) testing av modellen på nye data

hva kan gå galt
med maskinlæring?

for eksempel

LONDON, SATURDAY 5 MARCH 1988

BRITISH MEDICAL JOURNAL

rasisme

A blot on the profession

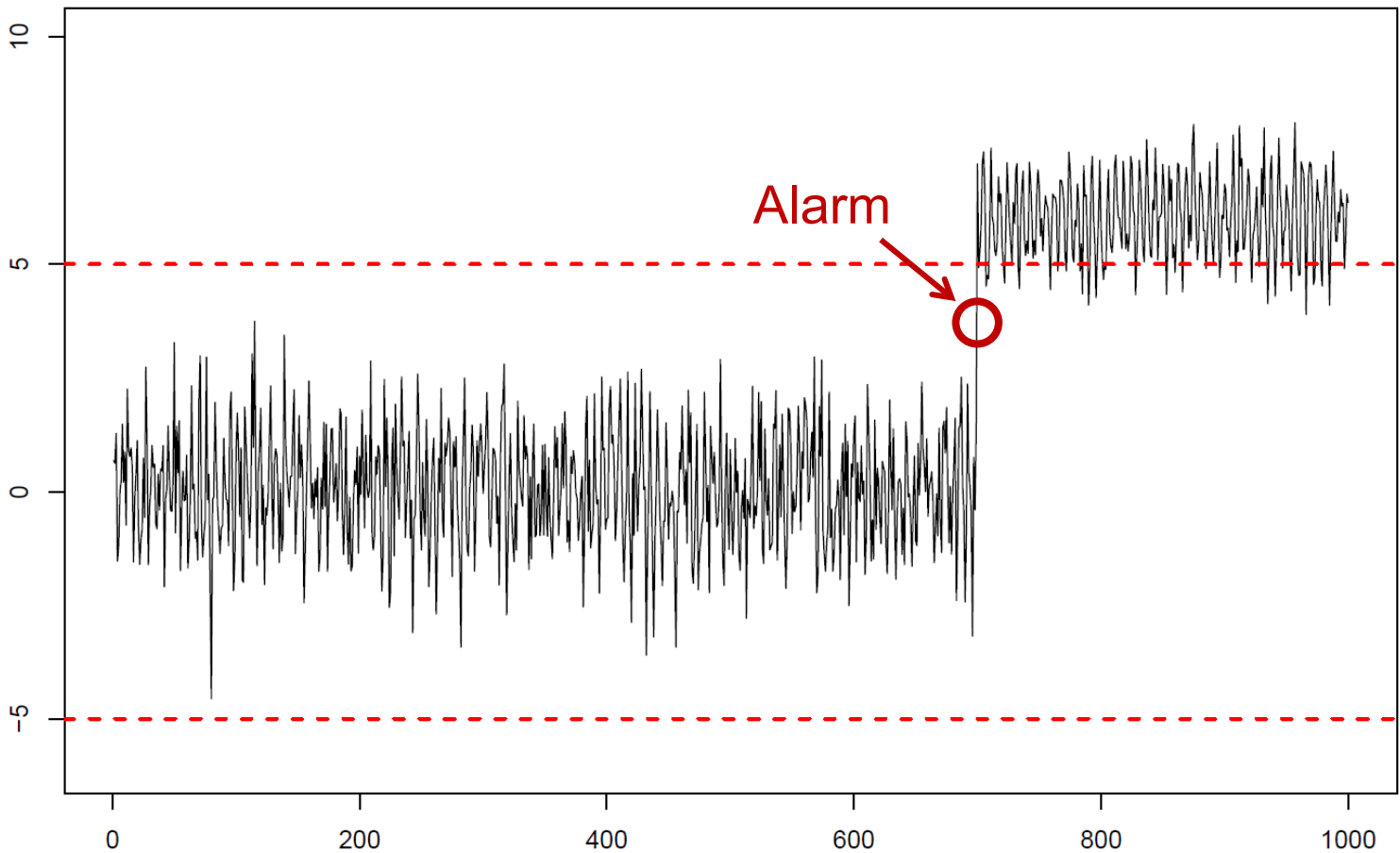
Discrimination in medicine against women and members of ethnic minorities has long been suspected,^{1,2} but it has now been proved. St George's Hospital Medical School has been found guilty by the Commission for Racial Equality of practising racial and sexual discrimination in its admissions policy.⁴ The commission does not have a power to issue discrimination notices in the school, which is empowered to do by the Race Relations Act, but a number of applicants each year among 2000 may have been refused an interview purely because of their sex or racial origin. This is a sad finding not only for St George's Hospital Medical School but for the whole profession. It is now important not only that discrimination is swept out of St George's and the profession

reassuring as it raises the question of what is happening in the other schools.

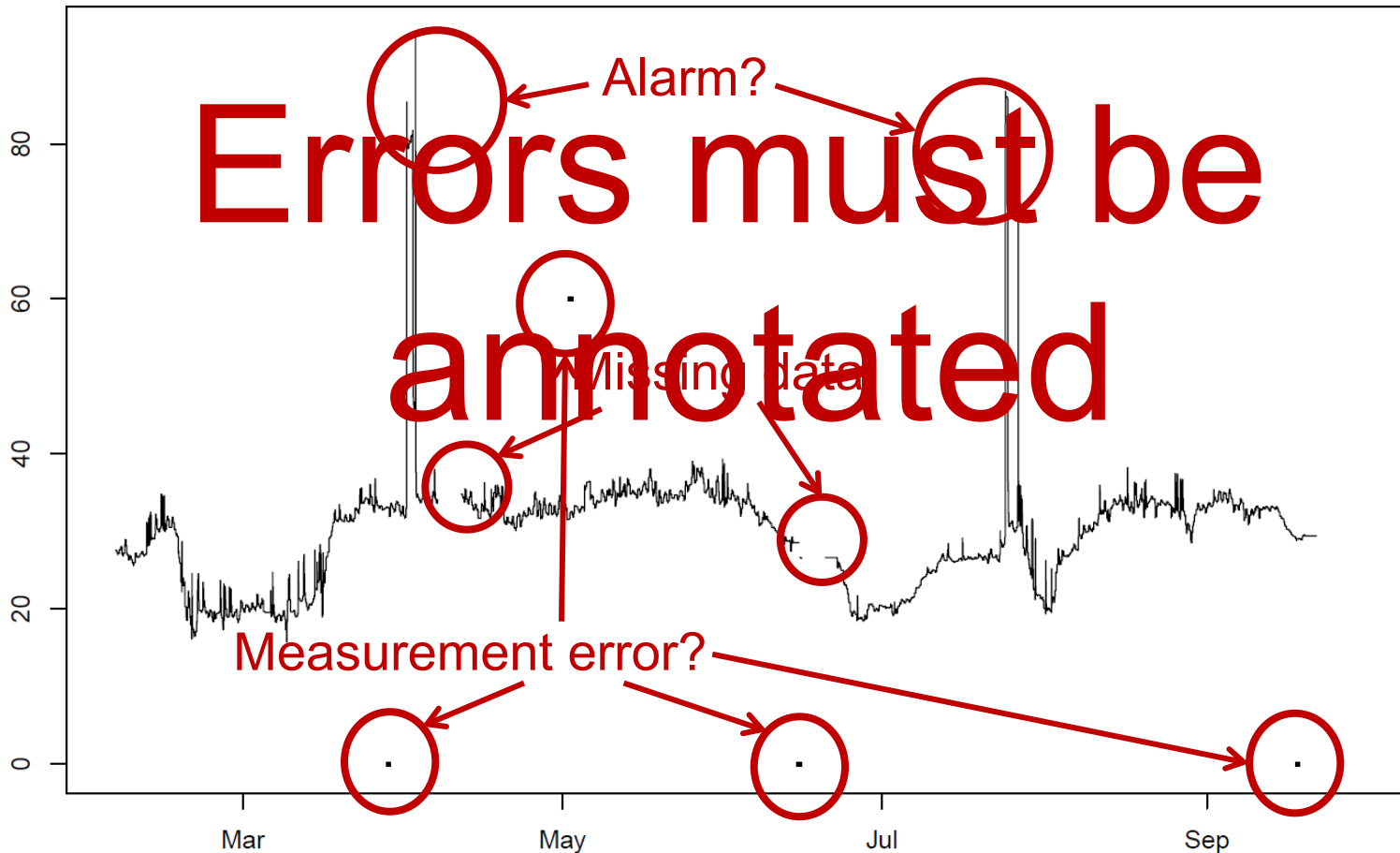
The commission has made recommendations not just about this particular episode but also about how other schools can avoid similar difficulties. It is emphasised that where a computer program is used as part of the selection process all members of staff taking part have responsibility to find out what it contains. A major criticism of the staff at St George's was that many had no idea of the content of the program and those who did failed to report the bias. All staff participating in selection should be trained so that they are aware of the risk of discrimination and try to eliminate it. No one person should have sole responsibility for any stage of the

1982-1986

Simulated sensor data



Engine temperature (°C)



Real world sensor data

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– Wikipedia