Universität Hamburg

Department
Informatik
Arbeitsbereich
Bildverarbeitung (BV)

Commentary:

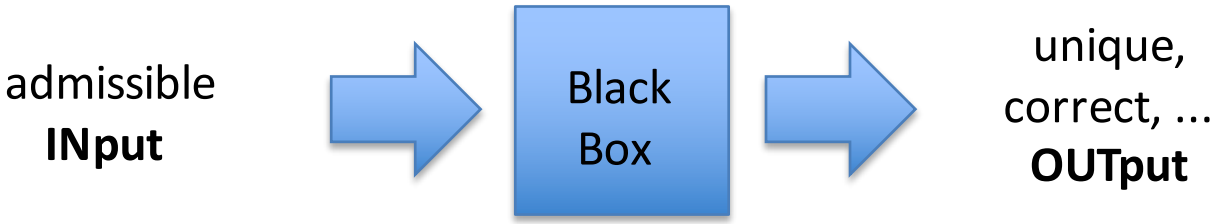
From (and On) Infor_Mat_ics

H. Siegfried Stiehl, Prof. Dr.-Ing.
(„Seniorprofessor“)

Workshop „Digitisation & Law“ • Hamburg • Dec 2-3, 2019

Informatics (in a Nutshell)

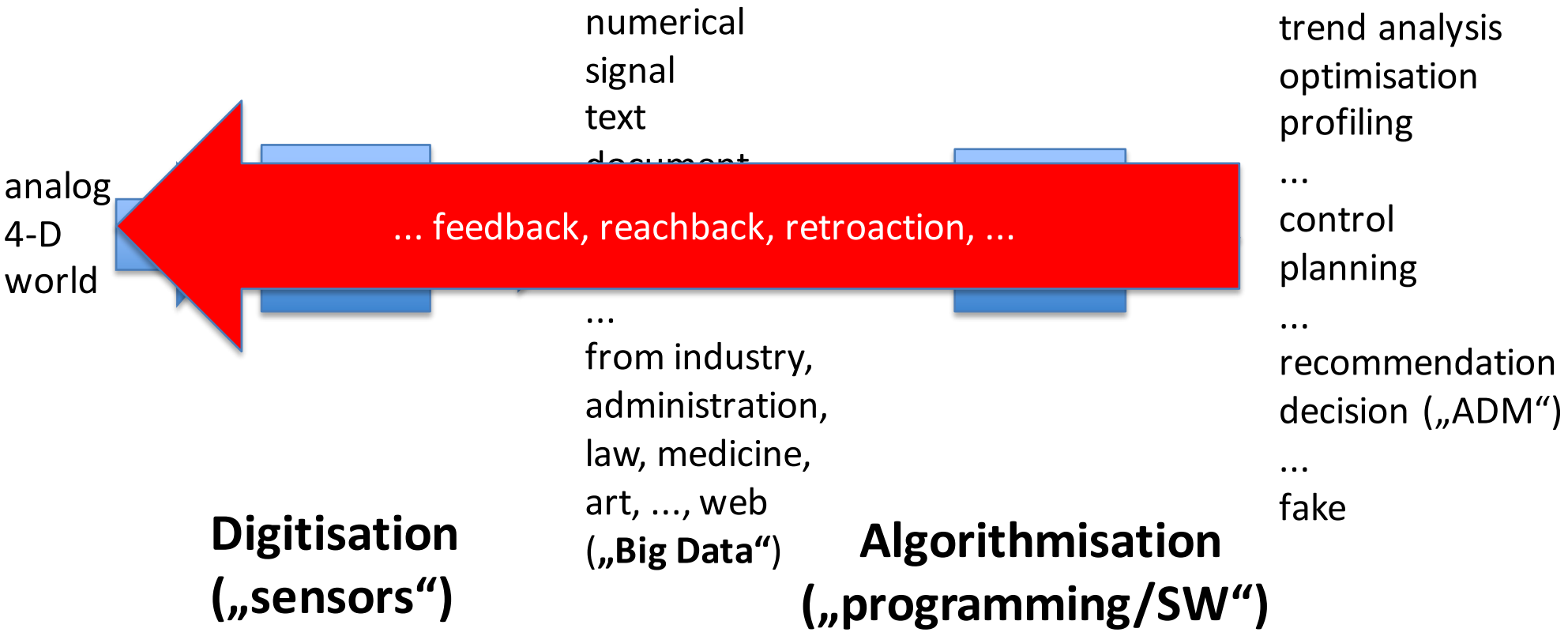
„... the study of the structure, the behaviour, *and* the interactions of natural *and* engineered ***computational systems*** ...“
(U Edinburgh, https://www.ed.ac.uk/informatics/about/what-is-informatics)



(complex) computational system

key topic: *algorithm* à la Turing, e.g. a finite number of elementary, well-defined steps of computation - yielding a unique and correct OUTput for admissible INput **<-> computational *theory* (math)**

More Essentials (in Brevity)



„**Big Data *Analytics***“: data exploration via **A**(rtificial) **I**(ntelligence) or **M**(achine) **L**(earning) or **D**eep **L**earning

„**4-D world**“: e.g. human beings with spatio-temporal behaviour

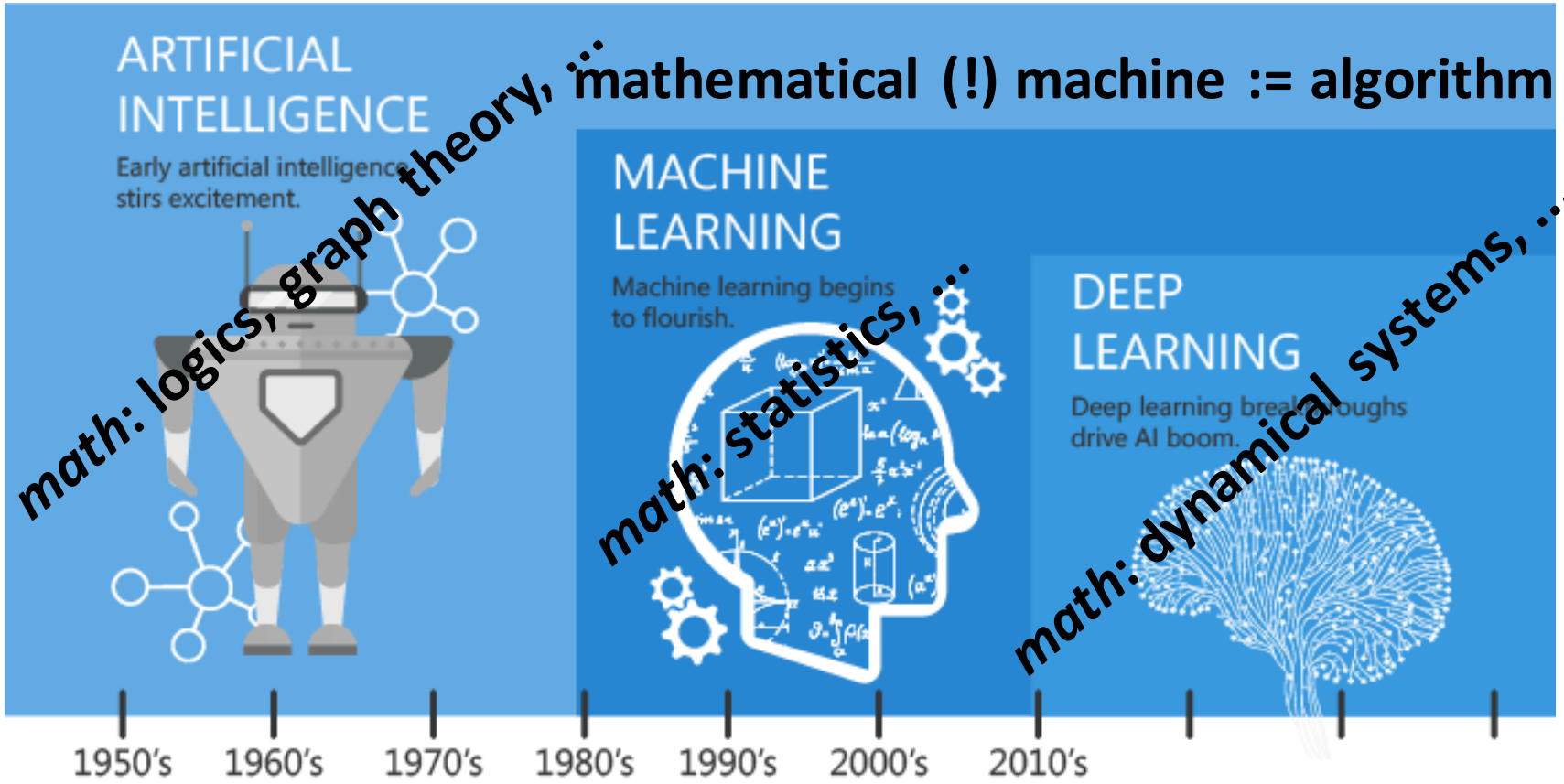
Big Data: Definition (5 Vs)

- **Volume**
- **Velocity**
- **Variety**
- ***Veracity***
- **Value**

- ***Veracity*** is **THE** critical issue in AI/ML/DL (or: one of ...)
- Law of Informatics: **„Garbage IN – Garbage OUT!“**
- IN *requirements*: exact, statistically significant, valid, ...
- BB *requirements*: fair, accountable, transparent, explainable,..
- OUT *requirements*: correct, reliable, trustworthy, just, ...

On AI vs. ML vs. DL

(*weak*) **AI**: computational *simulation* of intelligent behaviour



[Source: https://hackernoon.com/difference-between-artificial-intelligence-machine-learning-and-deep-learning-1pcv3zeg]

Machine Learning (for Noobs)

- **machine = algorithmic learning**
  - *supervised* from past data (with known meaning/semantics)
  - *unsupervised* for finding similarity, typicality, etc. in data
  - caveat: (statistical) irregularity or invalidity of data
- **„hype“**: deep learning for text/speech/image data
  - data as „vectors“ -> classification (for e.g. object detection)
  - caveat: data quality & complexity mastering (time/memory)
- **„non-hype“**: logical calculus
  - data as „ontology“ plus rules of reasoning
    (cf. semantic nets and Web 2.0)
  - caveat: modelling of domain & complexity mastering

Quick Conclusion

- **THE „AI“ as a silver bullet doesn‘t exist (... yet)!**
  - variety of theories/models and methods
  - theoretical limits not always/fully understood
  - high demands w.r.t. quality of input data
  - partially disputable feasibility (e.g. real-time processing, reliability, security, etc.)
  - need for controllability in critical real-world applications
- Ergo: **Engineering Approach**
  - clear-cut goal setting and requirements for task
  - justifiable choice of models/methods/tools
  - certifiable quality of input (e.g. training data)
  - standardized testing and quality assurance („TÜV“)
  - effective/efficient application with added-value
  - ***plus***: social acceptance in democratic societies

Quote - in German only ☹

„**Textdeutungen** auf Knopfdruck können Computer **bislang nicht** liefern. ... Dem Computer sind Sinn und Bedeutung gleichgültig.

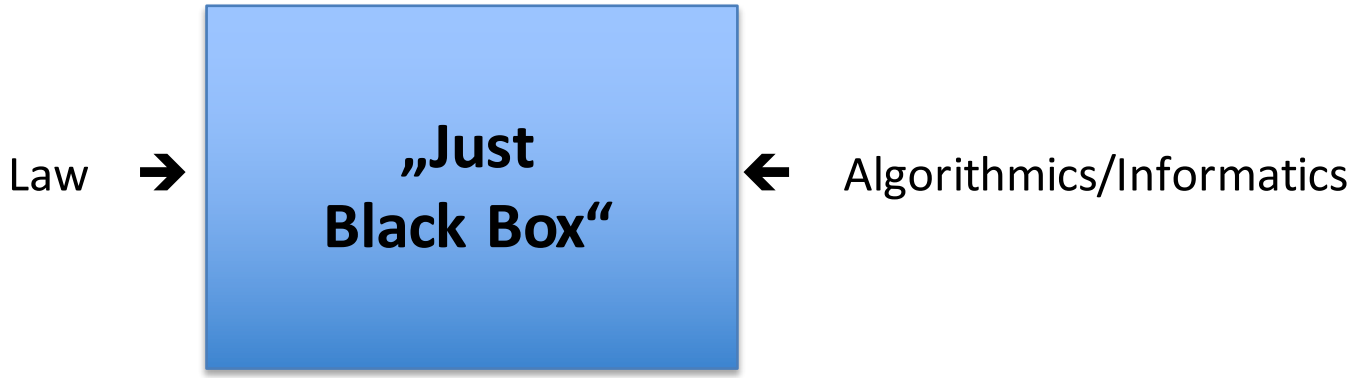
Sinnerfüllte und historisch informierte Textdeutungen lassen sich **ebenso wenig** maschinell erzeugen wie zwischenmenschliche Erfahrungen und ausgewogene Urteile.
Algorithmen für Einordungsvermögen, ästhetischen Sinn und textsensible Deutungen sind **nicht** in Aussicht. ...

Den Maschinen sollten wir die Chance geben, uns dabei zu unterstützen – mehr jedoch nicht.“

(*Prof. Dr. Sandra Richter*, seit Januar 2019 Direktorin des Deutschen Literaturarchivs Marbach; in: *SZ, 20. April 2019, S. 6*)

***Upshot*:** one of many pleas for Assistive/Augmented Intelligence

Famous Last Words: „Digitisation/AI for Good!“



- **THMs I:** Don‘t trust disruption chatterboxes and don‘t believe AI evangelists!
- ... Join in and collaborate with {infor|mathe}matics!
- ... Self-critically reflect what may, could or should be algorithmised – and why!
- ... Adopt the CSNY approach (1970): „Teach your children – here: students - well!“

- **THMs II:** Theoretical grounding and scientific experimentation - no bricolage!
- ... Keep-the-human-in-the-loop-**and**-in-control!
- ... Law surely is more than algorithmics – if(f) the lawyer is a human being!


thank you
danke
рахмат
謝謝
ngiyabonga
teşekkür ederim
Баярлалаа
спасибо
faafetai lava
mersi
barka
welalin
tack
dank je
misaotra
matondo
paldies
grazzi
gracias
tapadh leat
хвала
asante
manana
vinaka
blagodaram
kiitos
dankie
dhanyavad
bedankt
hvala
maururu
köszönöm
enkosi
dziękuję
chnorakaloutioun
gratias ago
gràcies
sulpáy
djiere dieuf
mochchakkeram
mamnun
дякую
go raibh maith agat
obrigado
sobodi
dēkuji
mèsi
sukriya
kop khun krap
ありがとう
grazie
arigatô
takk
dakujem
trugarez
najis tuke
terima kasih
tanemirt
rahmet
diolch
dhanyavadagalu
shukriya
мерси
kam sah hamnida
감사합니다
xièxie
ευχαριστώ
merci