technische universität
dortmund

Computational Intelligence

Winter Term 2021/22

Prof. Dr. Günter Rudolph

Lehrstuhl für Algorithm Engineering (LS 11)

Fakultät für Informatik

TU Dortmund

- **Organization (Lectures / Tutorials)**
- **Disambiguation: *Computational Intelligence***

Who are you?

either

studying "***Automation and Robotics***" (Master of Science)

or

studying "***Informatics***" (Bachelor of Science)

or

studying "***Data Science***" (Master of Science)

or

… let me know!

Who am I ?

Günter Rudolph
Fakultät für Informatik, LS 11

Guenter.Rudolph@tu-dortmund.de ← best way to contact me
OH-14, Room 2.32 ← if you want to see me
(after pandemic)

office hours:
Tuesday, 10:30–11:30am
and by appointment

Hybrid setting due to current state of Corona pandemic

Lecture:
- in lecture hall
  - with medical mask,
  - 3G-rule: admission only if vaccinated, recovered or tested
- remote / online
  - via Zoom,
  - streaming from lecture hall

slides of lecture published on web page weekly

Tutorial:
- in classroom (→ registration required)
  - with medical mask,
  - 3G-rule: admission only if vaccinated, recovered or tested
- remote / online
  - via Zoom (purely digital: no streaming from classroom)

Organizational Issues

Lectures		Wednesday from 13-Oct-2021	10:15-11:45	OH 14 / E23,	weekly
Tutorials	either	Wednesday	12:15-13:45	OH 12 / 3.031	≈ bi-weekly
	or	Friday	12:15-13:45	OH 12 / 3.031	≈ bi-weekly
	or	Thursday from 20-Oct-2021	12:15-13:45	online (Zoom)	≈bi-weekly
Tutor		Marius Bommert, MSc, LS 11 Florian Wellner, LS11			

Information (web pages & moodle)

`http://ls11-www.cs.tu-dortmund.de/people/rudolph/teaching/lectures/CI/WS2021-22/lecture.jsp`

Slides see moodle

Literature see web page

Exams

Effective since winter term 2014/15: written exam (not oral)

- Informatik, Bachelor: Module → written exam (90 min)
- Automation & Robotics, Master: Module → written exam (90 min)
- Data Science / Statistics, Master: Module → written exam (90 min)
- whoever else … → written exam (90 min)

mandatory for registration to written exam: **must pass tutorial!**

Knowledge about

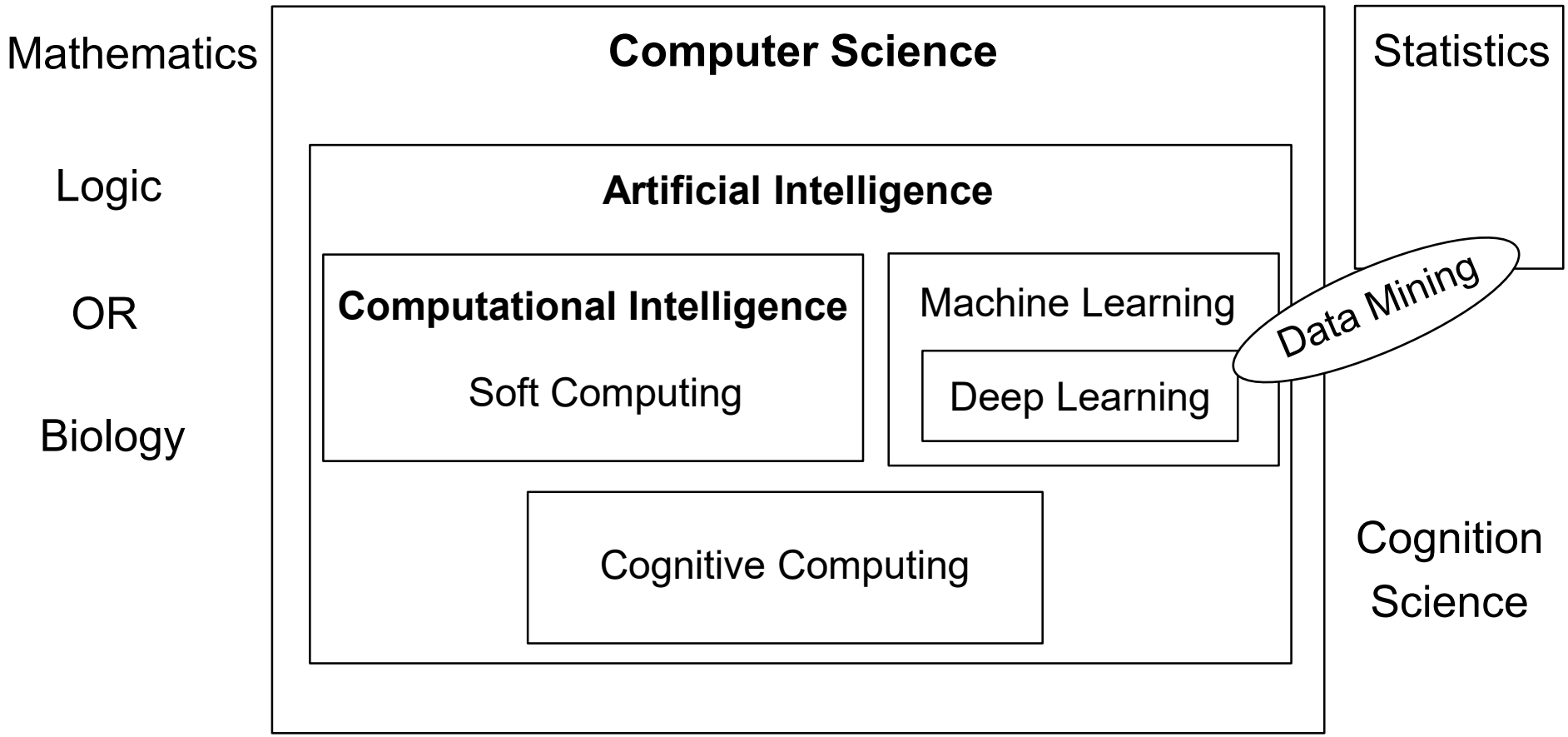
- mathematics,
- programming,
- logic

is helpful.

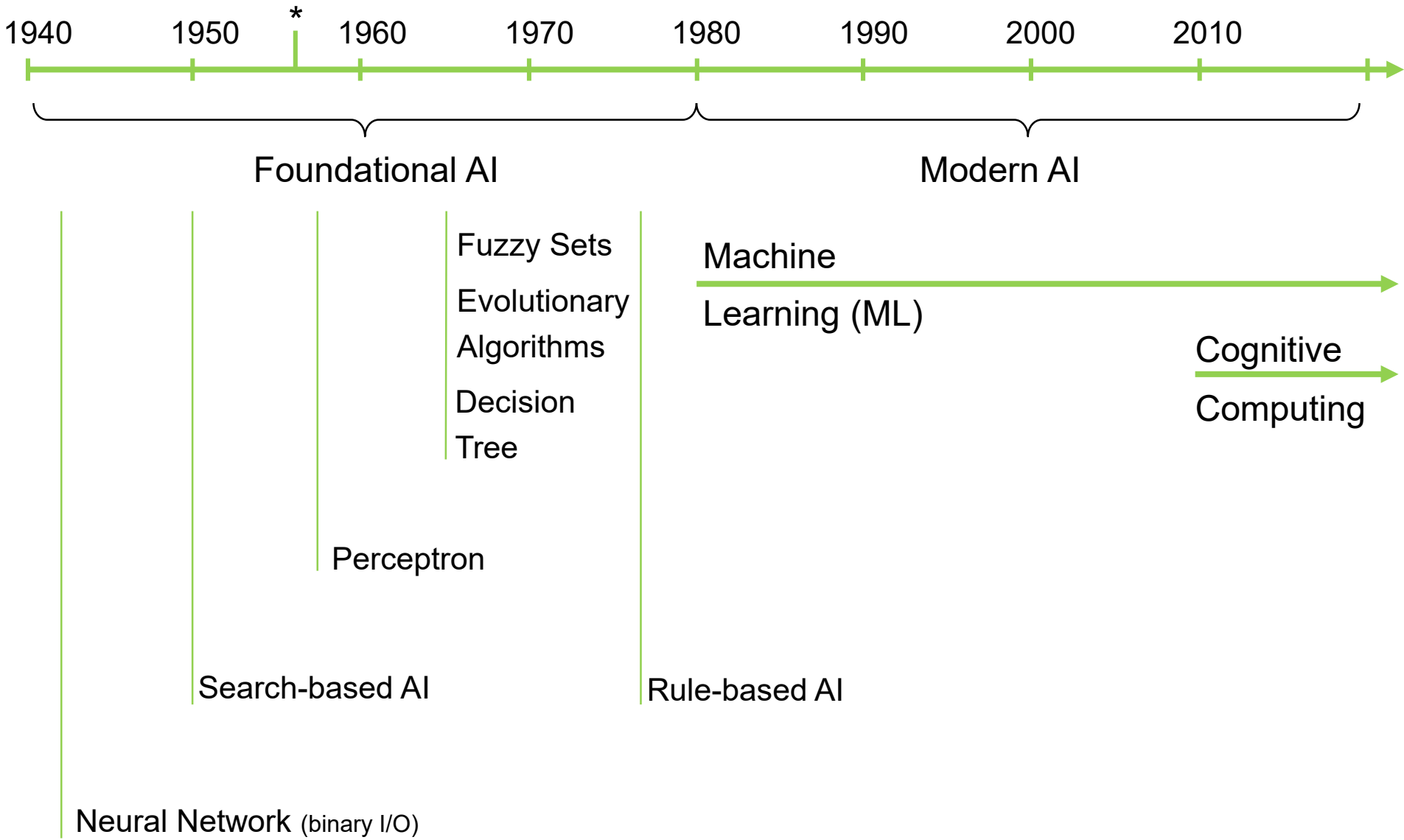
But what if something is unknown to me?

- covered in the lecture
- pointers to literature

... and don‘t hesitate to ask!


Mathematics
Logic
OR
Biology
Computer Science
Artificial Intelligence
Computational Intelligence
Soft Computing
Machine Learning
Deep Learning
Data Mining
Cognitive Computing
Statistics
Cognition Science

Timeline of Artificial Intelligence (AI)



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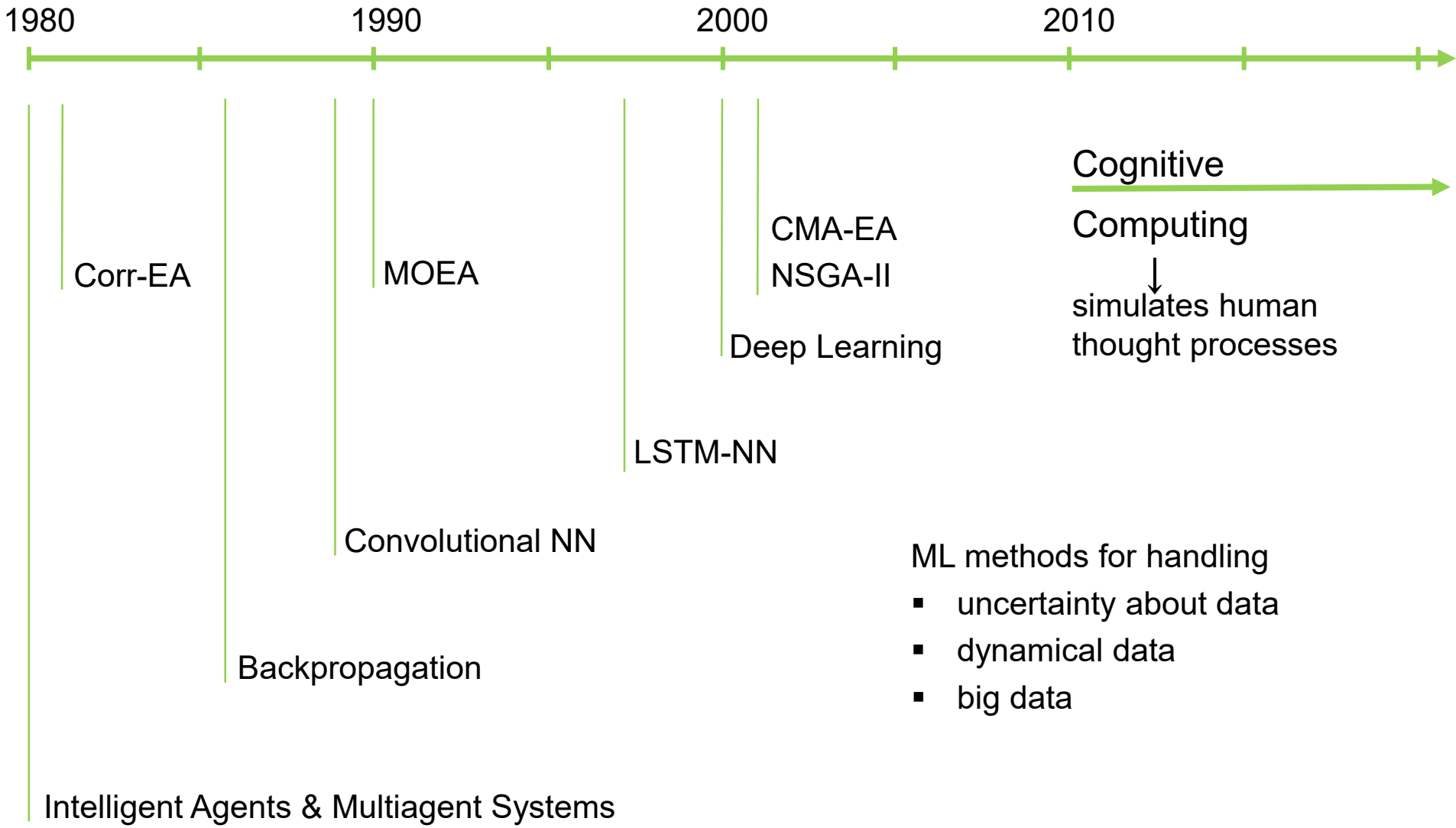

ML methods for handling

- uncertainty about data
- dynamical data
- big data

What is CI ?

$\Rightarrow$ umbrella term for computational methods inspired by nature

- artifical neural networks
- evolutionary algorithms
- fuzzy systems

} historical backbone

- swarm intelligence
- artificial immune systems
- growth processes in trees

} newer developments

- ...

- term „computational intelligence“ made popular by John Bezdek (FL, USA)
- originally intended as a demarcation line
  $\Rightarrow$ establish border between artificial and computational intelligence
- nowadays: blurring border $\rightarrow$ current widespread perception: CI $\subset$ AI

our goals:

1. know what CI methods are good for!
2. know when refrain from CI methods!
3. know why they work at all!
4. know how to apply and adjust CI methods to your problem!