

Datamodelling in de tuinbouw: kansen en uitdagingen

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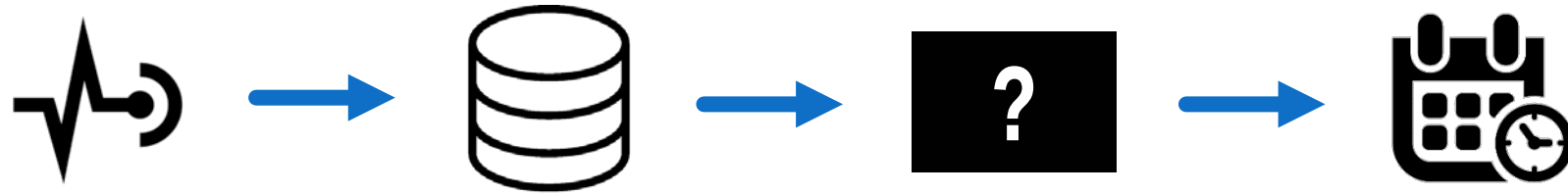
 Universiteit
Antwerpen


VLAAMS CENTRUM VOOR BEWARING
VAN TUINBOUWPRODUCTEN



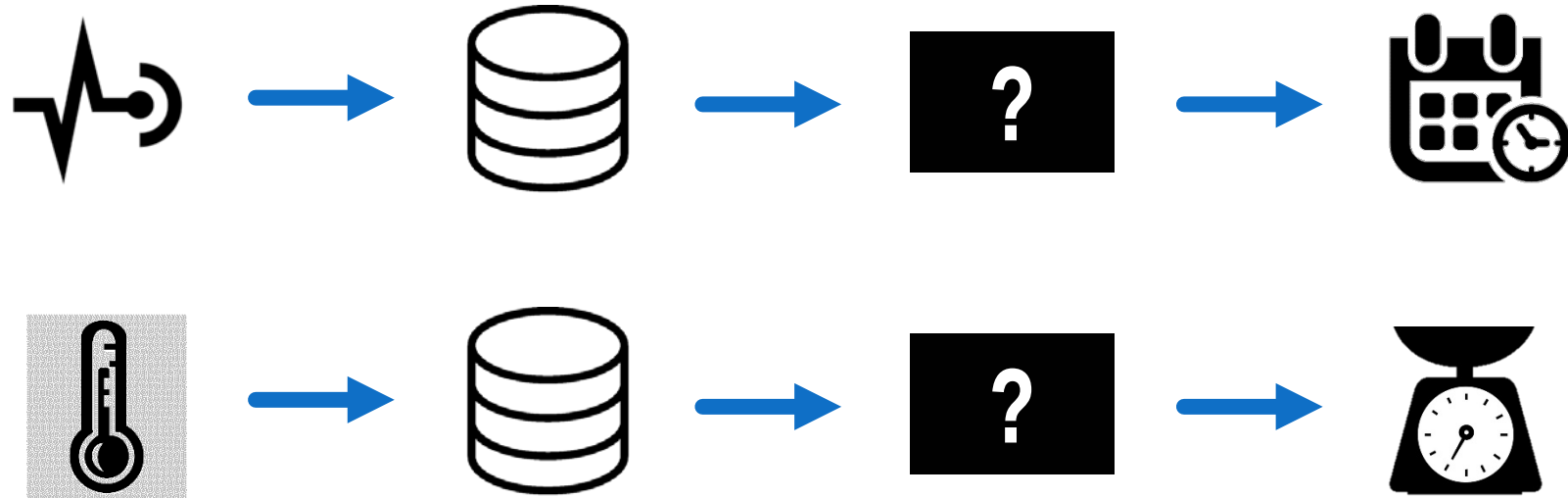
Opportunities

- ▶ Smart analysis van data:



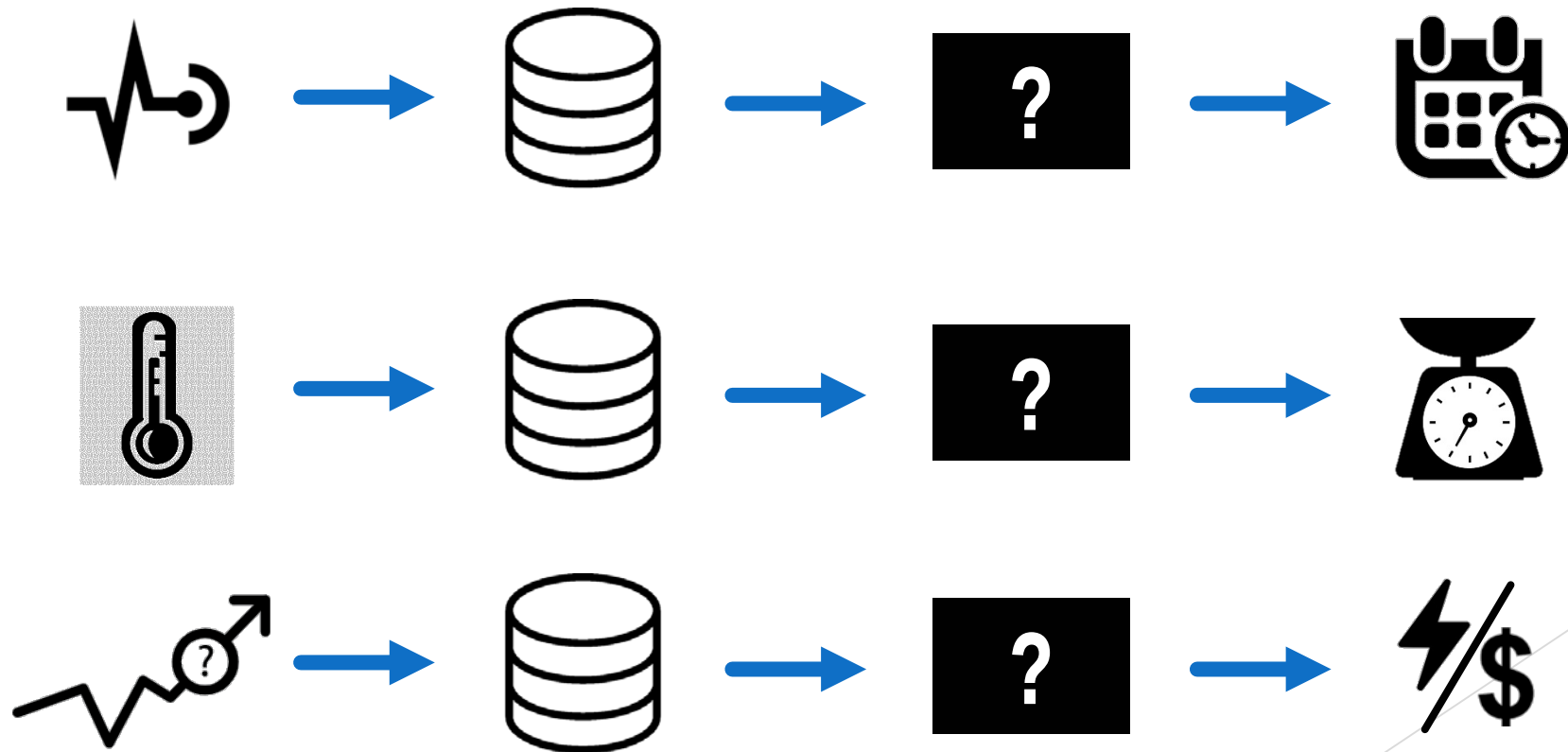
Opportunities

- ▶ Smart analysis van data:



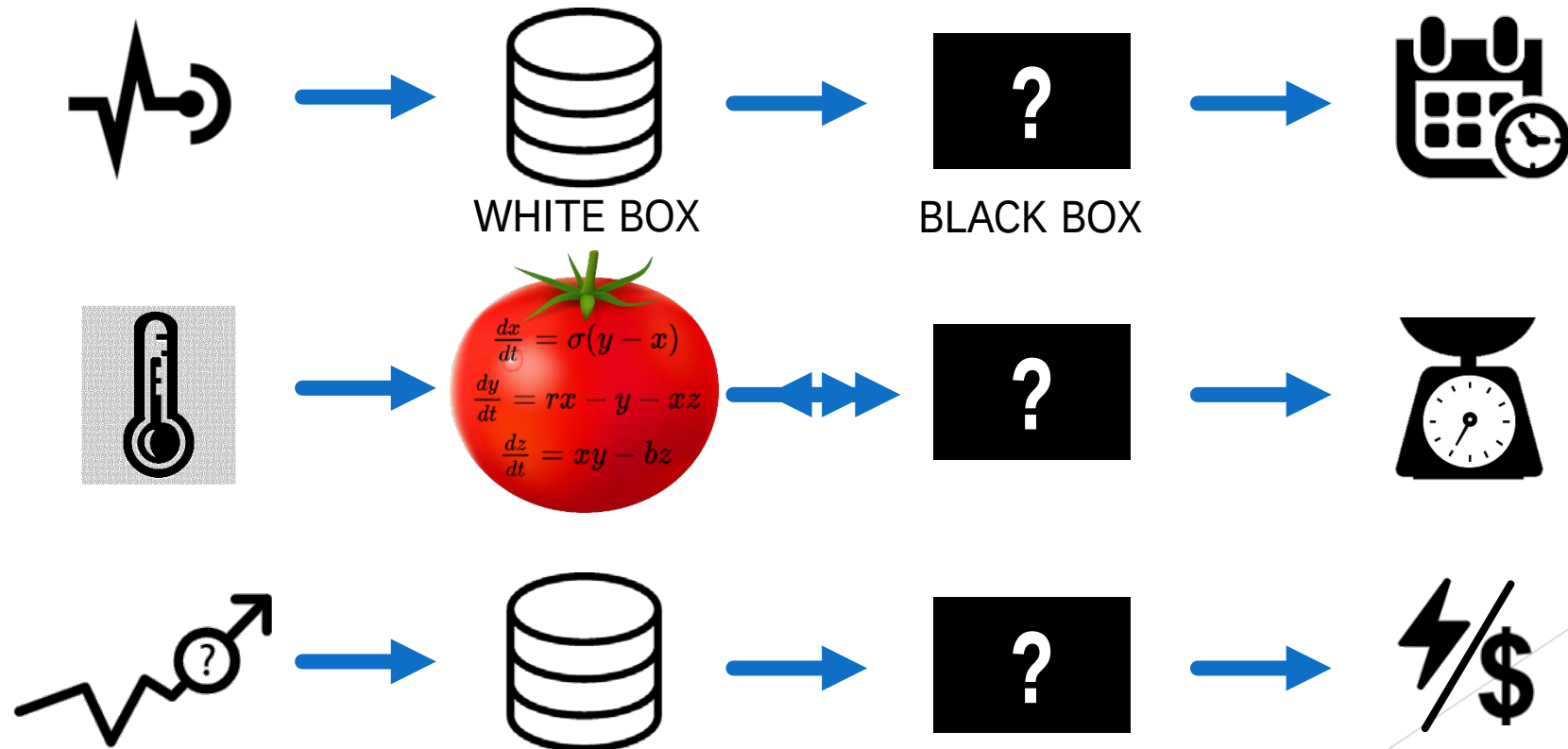
Opportunities

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Opportunities

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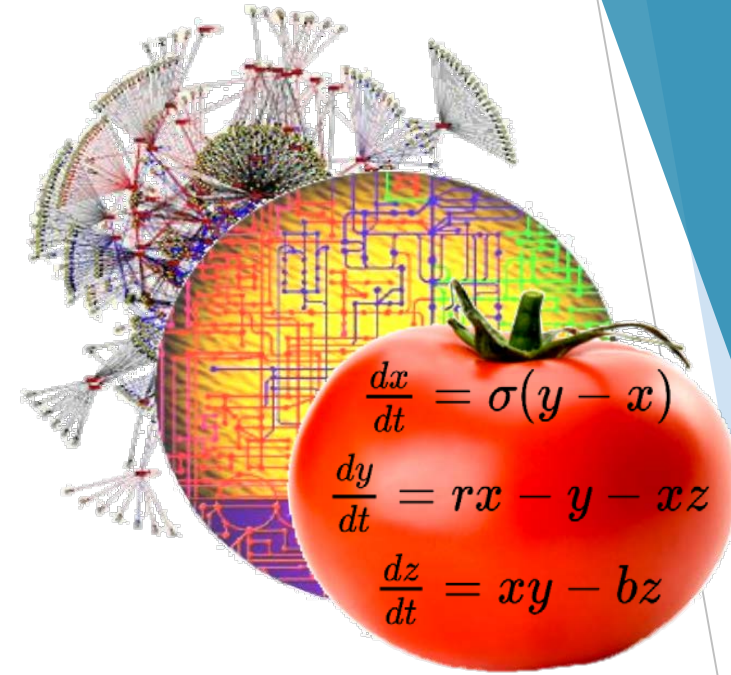
Modellen en simulaties

Wat is een model?

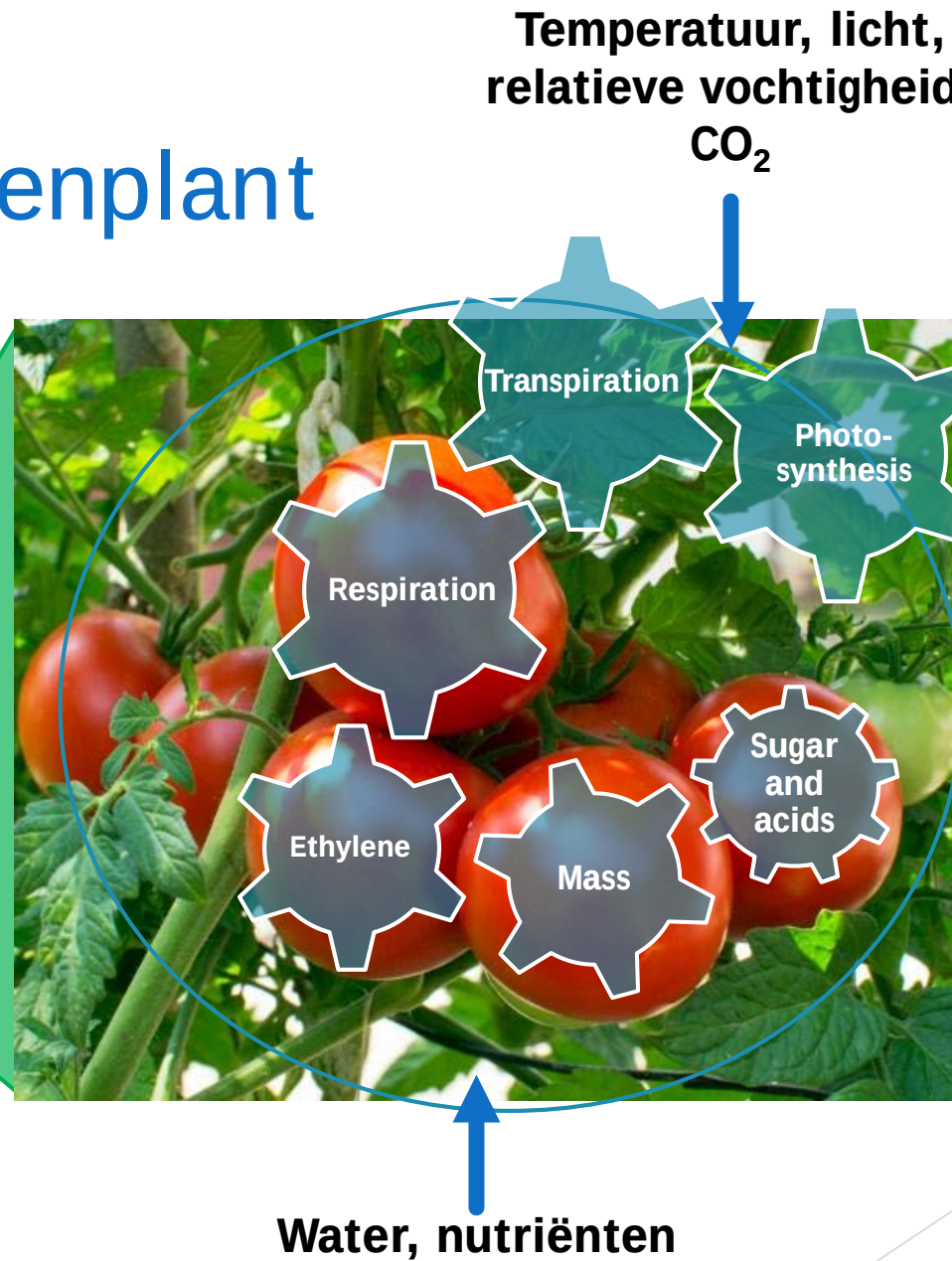
- ▶ Combineert fysiologische, fysische en statistische kennis in wiskundige vergelijkingen
- ▶ Gebruik van computer algoritmes om vergelijkingen op te lossen

Wat is een simulatie?

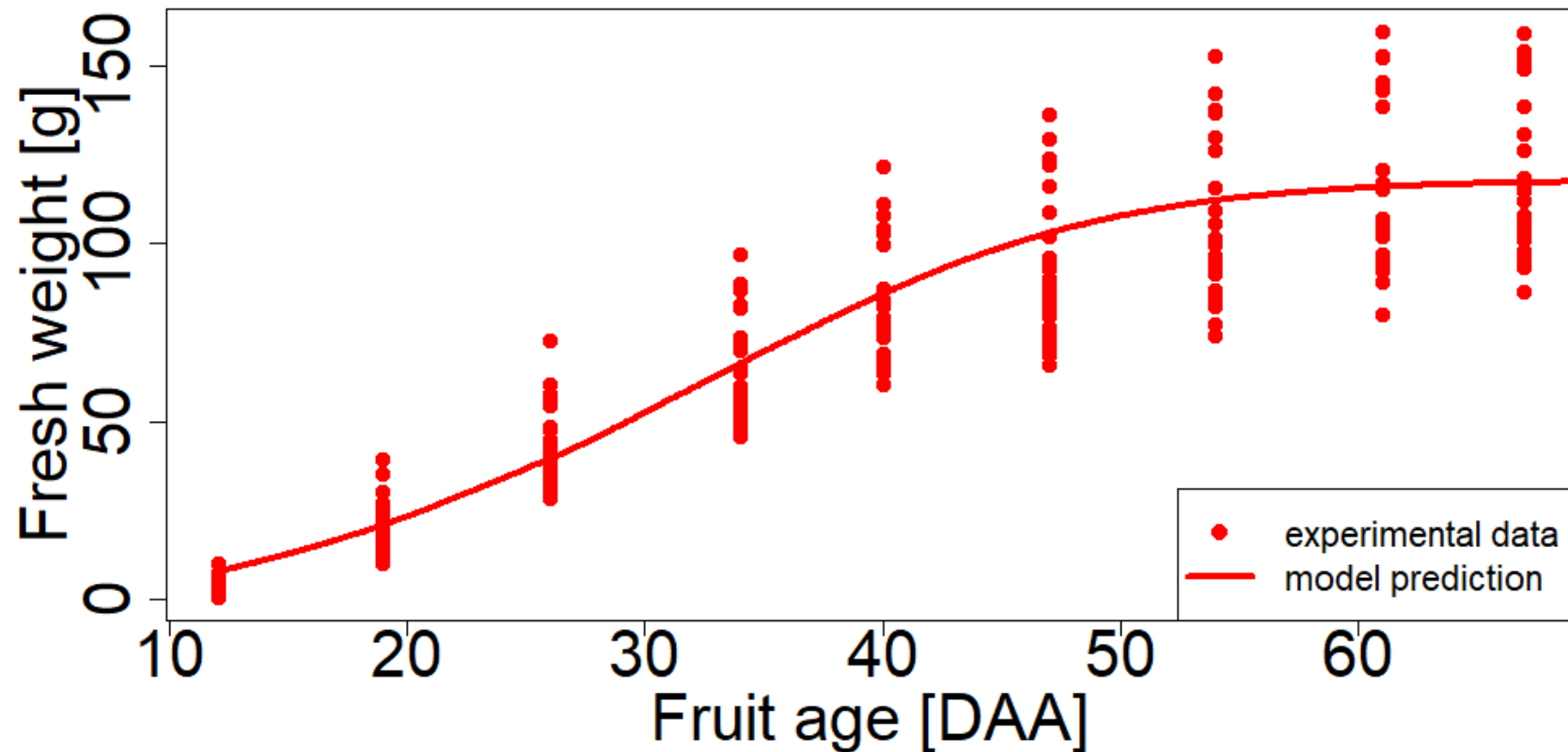
- ▶ Het model gebruikt data van een sensor
- ▶ Voorspellingen maken:
 - ▶ Teelt optimalisatie en controle
 - ▶ Besluitvorming en risico-analyze



Digitale tomatenplant



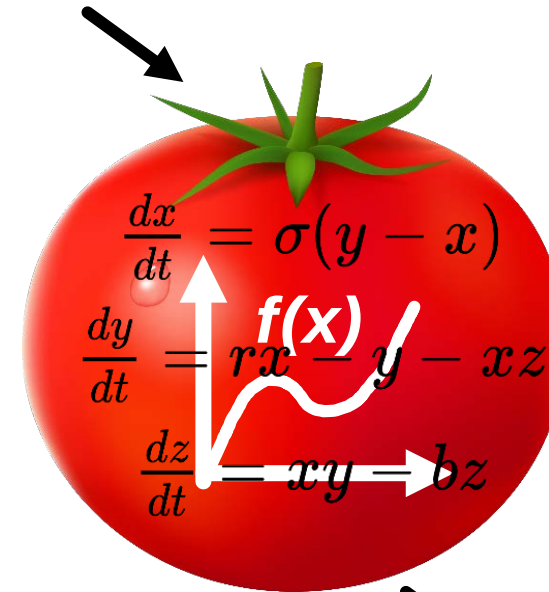
Modelering van tomaat (vrucht)



Vruchtmodel GROW!

- ▶ Mechanistisch model
- ▶ Tomaat vrucht
- ▶ Voorspelling van vruchtontwikkeling
 - ▶ Opbrengst
 - ▶ Groeitijd
- ▶ Gebaseerd op echte meetdata
 - ▶ PCH & HAS
 - ▶ Seizoen 2018 & 2019

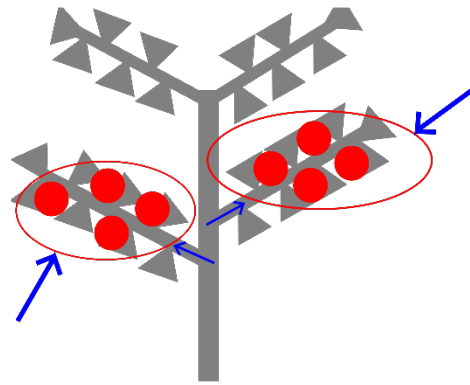
Temperatuur
Relatieve vochtigheid



Vers gewicht
Droog gewicht
Volume
...

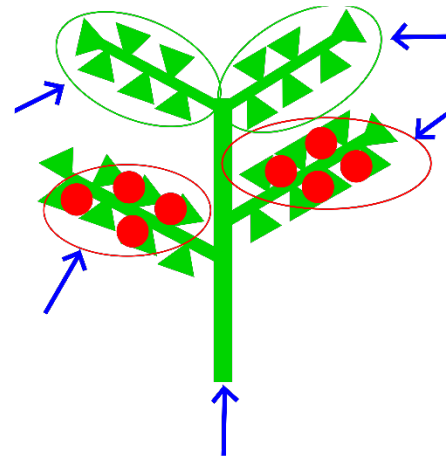
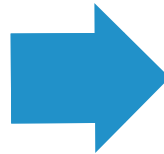
Verdere ontwikkeling

► Plantengroei model



Vrucht model

- Plant input
- Omgeving input

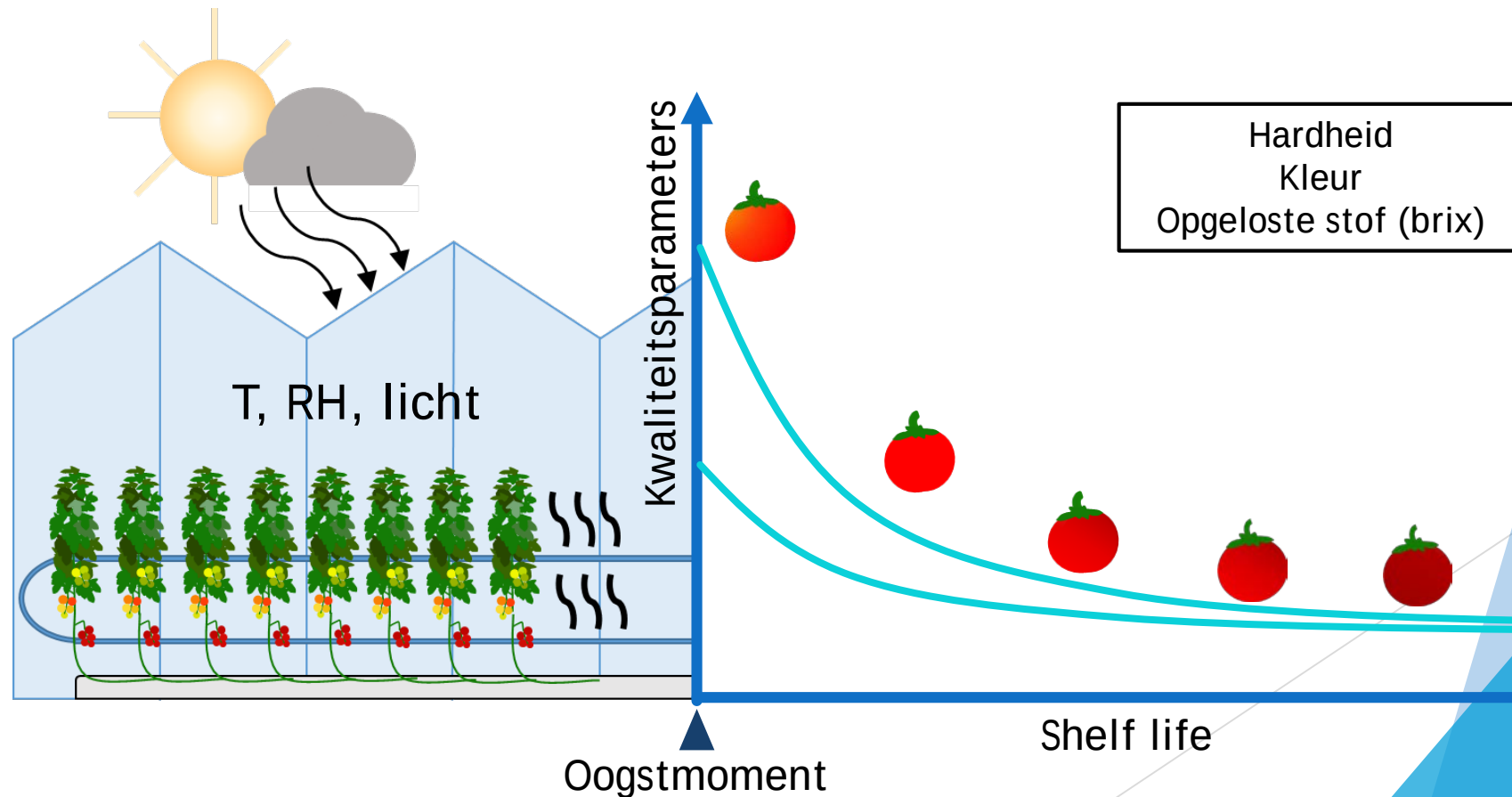


Ganse plant

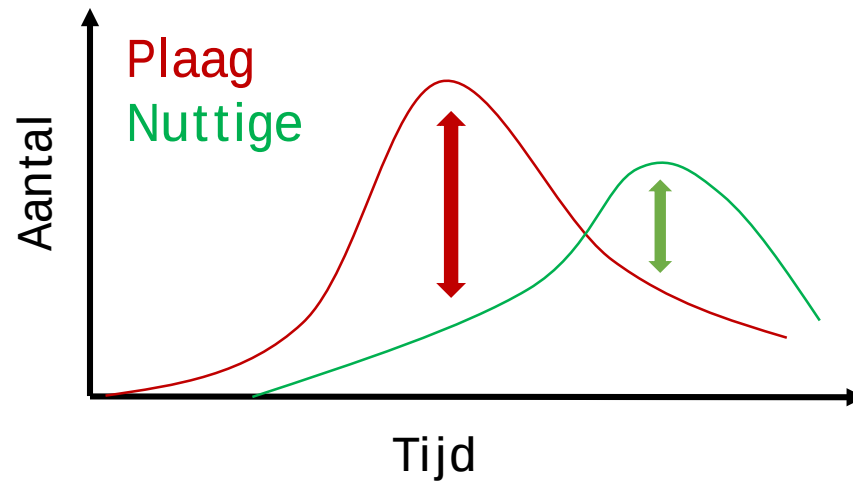
- Opdelen in functionele organen
- Omgeving input

Verdere ontwikkelingen in GROW!

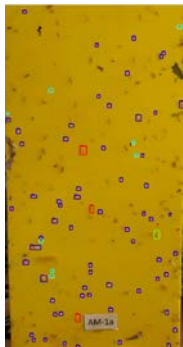
► Kwaliteit



► Voorspellen van plagen & bestrijden



Monitoring



Wiskundig Model

$$\frac{dN}{dt} = r * N * \left(1 - \frac{N}{K}\right) - \frac{a * N * P}{1 + a * h * N}$$

$$\frac{dP}{dt} = e * \frac{a * N * P}{1 + a * h * N} - m * P$$

Plaat



Witte vlieg

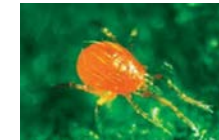


Spint

Nuttige

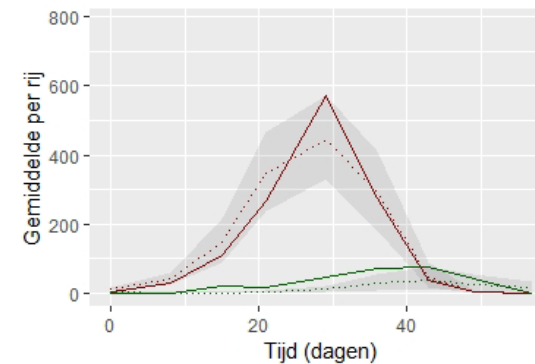


Macrolophus



Phytoseiulus

Voorspelling

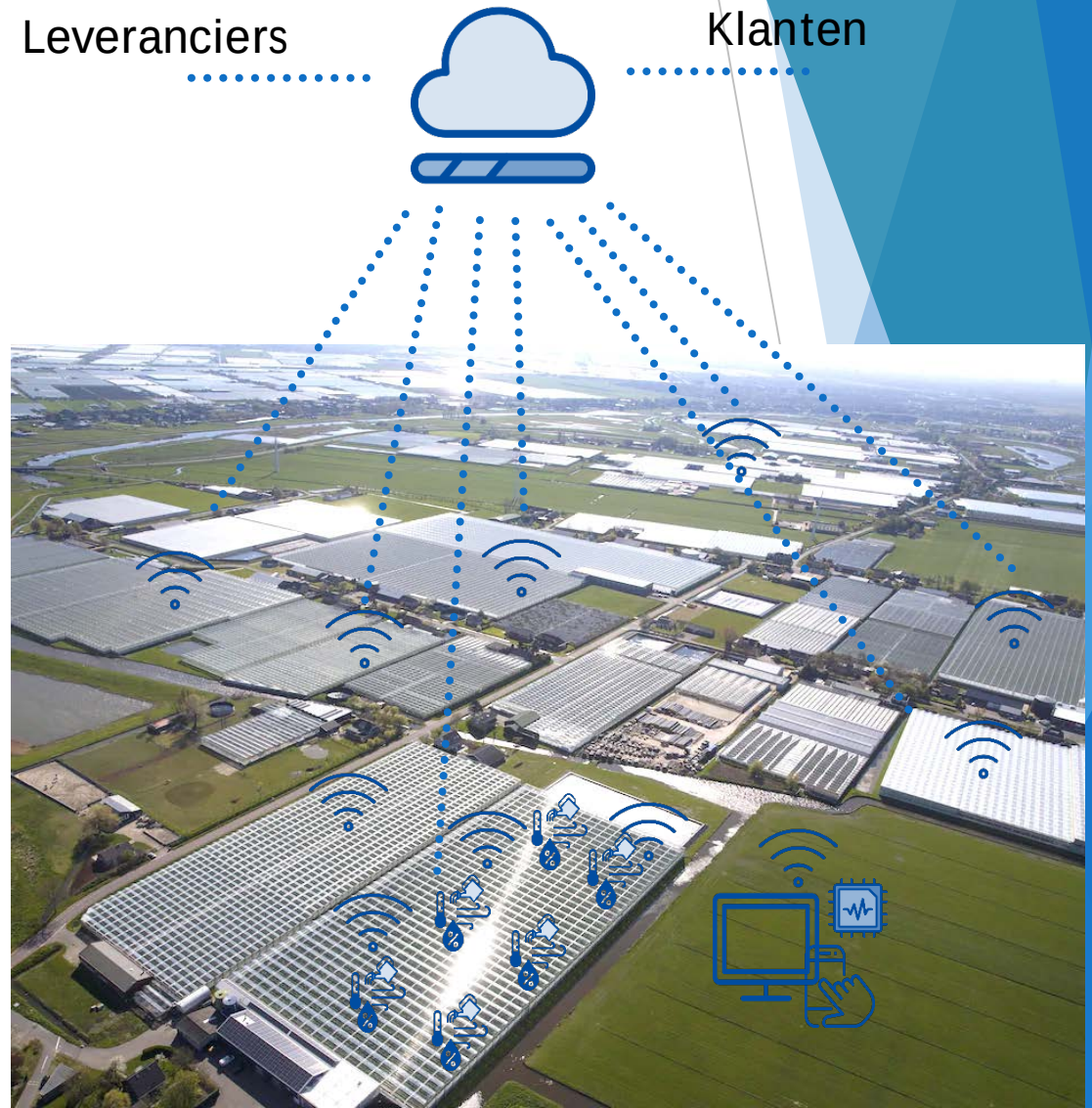


Nieuwe ontwikkelingen

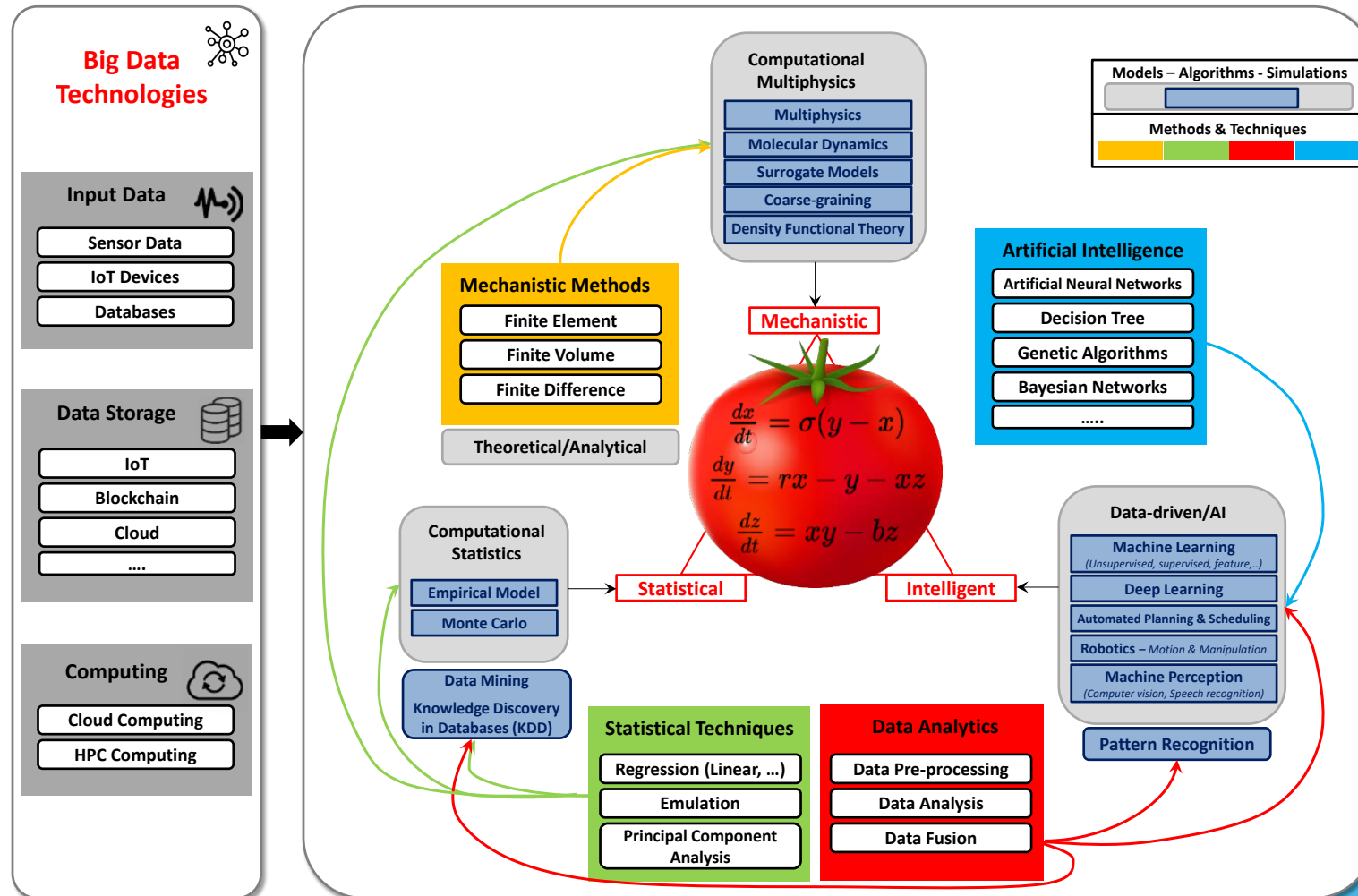


Nieuwe ontwikkelingen

- ▶ Goedkope draadloze sensortechnologie
- ▶ Toegenomen connectiviteit (IoT)
- ▶ Data analyse en apps
- ▶ Big data & cloud services



Big Data & Digital Twins

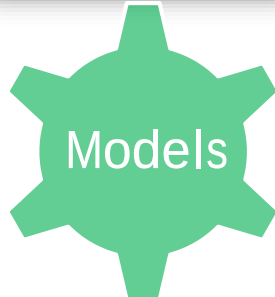


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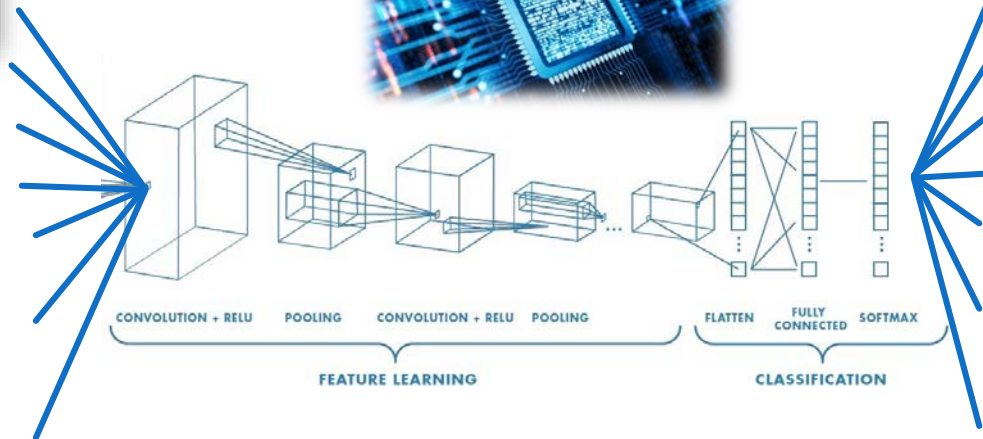
Big data, modelling & AI in de serre

Sensors, models

Cloud data



**Deep learning
& AI**



Decision support

Control

Robotics



Thank you

Dr. Ir. Pieter Verboven
Jakub Salagovic



Dr. Ir. Bert Verlinden
Dr. Dorien Vanhees

