FROM BIG DATA TO SMALL ROBOTS

CURRENT TRENDS OF AI AND OUR PLACE AS HUMAN USERS

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BUSINESS INSIDER

TECH | FINANCE | POLITICS | STRATEGY | LIFE | ALL

BI PRIME | INTELLIGENCE

59 impressive things artificial intelligence can do today

Ed Newton-Rex, Medium Mar. 7, 2017, 9:48 AM

2050.

Streeter Lecka/Getty Images

That's the year in which artificial intelligence will be able to perform **any intellectual task a human can perform**, according to one survey of experts at a recent AI conference. Anything and everything any person has ever done in all of history—all of it doable, by 2050, by intelligent machines.

But what can AI do today? How close are we to that all-powerful machine intelligence? I wanted to know, but couldn't find a list of AI's achievements to date. So I decided to write one.

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What AI can do: Everyday human stuff

👓 Recognize objects in images

🗺️ Navigate a map of the London Underground

👂 Transcribe speech better than professional transcribers

🌎 Translate between languages

😮 Speak

❓ Pick out the bit of a paragraph that answers your question

😡 Recognize emotions in images of faces

🐵 Recognise emotions in speech

Science & medicine

💊 Discover new uses for existing drugs

🚑 Spot cancer in tissue slides better than human epidemiologists

💉 Predict hypoglycemic events in diabetics three hours in advance

👁️ Identify diabetic retinopathy (a leading cause of blindness) from retinal photos

🔬 Analyze the genetic code of DNA to detect genomic conditions

🦹 Detect a range of conditions from images

⚛️ Solve the quantum state of many particles at once

Travel

🚘 Drive

🚁 Fly a drone

🅿️ Predict parking difficulty by area

Agriculture

🌱 Detect crop disease

🚜 Spray pesticide with pinpoint accuracy

🌾 Predict crop yields

🥒 Sort cucumbers

Security

💰 Spot burglars in your home

🐵 Write its own encryption language

🚓 Predict social unrest 5 days before it happens

🦹 Unscramble pixelated images

😈 Detect malware

✅ Verify your identity

💳 Anticipate fraudulent payment attacks before they happen

svt.se Program Nyheter Sport Barn SVT Play Öppet arkiv Väder TV-tablå Sök på svt.se

ONSDAG 9 DECEMBER

svt Nyheter

Nyheter

Nyheter Regionalt Sport Kultur Opinion Väder

Inrikes Utrikes Ekonomi Vetenskap Oddasat Uutiset Nyhetstecken SVT Forum Text-tv Video

15 procent av pojkarna i USA får adhd-diagnos

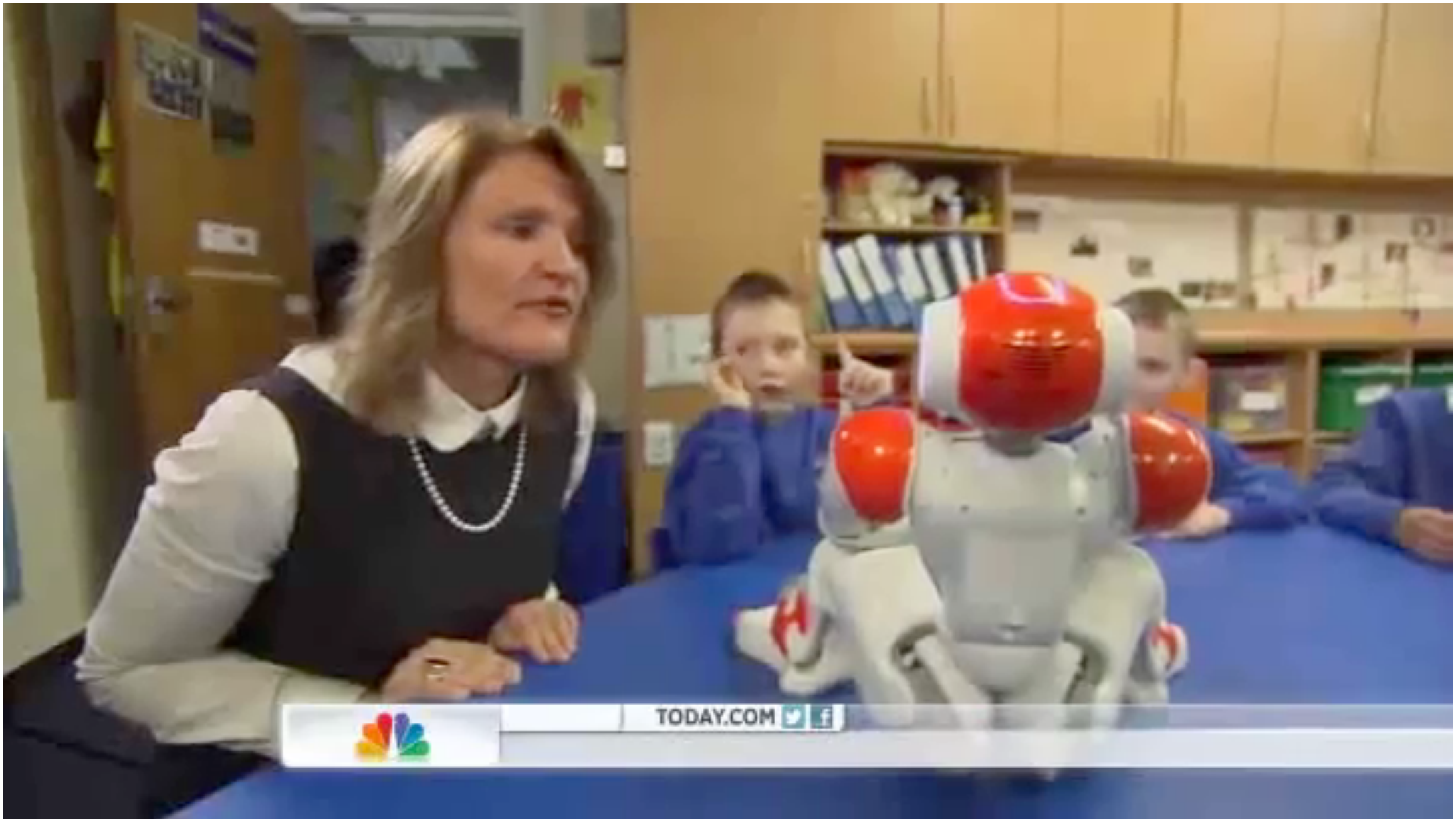
7 april

SENASTE NYTT

- ”Skyhöga som vanligt” 2 min
  Sport
- Vinterstudion sänder från Åre 7 min
  Sport
- Svenska damer hoppas på ny VC-lycka 13 min
  Sport
- Ikeas vinst: 32,4 miljarder kronor 1 tim
  Ekonomi
- Danska medier: I dag tar Hareide över 46 min
  Sport
- Stenson knäopererad 42 min
  Sport
- Man till sjukhus efter rån på Gotland 1 tim
  Öst
- Lyckat försök med psykologhjälp på nätet 1 tim

UNIVERSITY OF SKÖVDE


DREAM


TODAY.COM

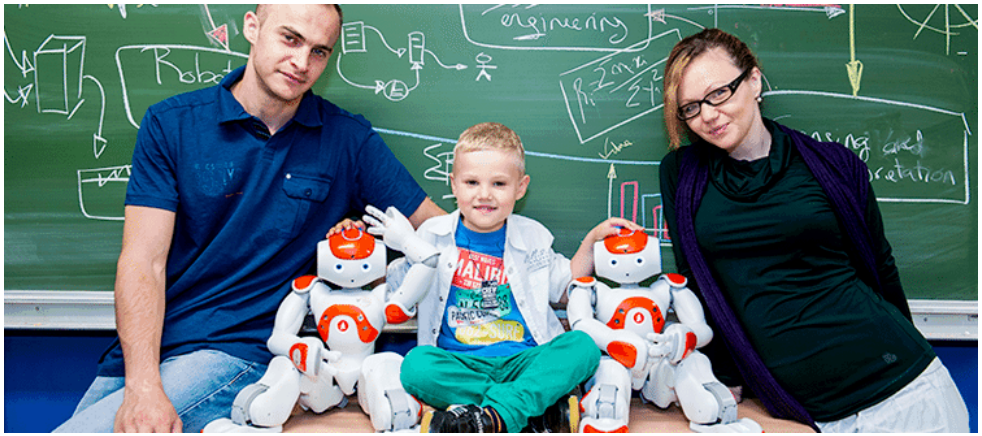
Research questions

1. **Is this a good method for treating children with autism?**
2. **Technical aspects**
    1. Sense signals from the child
    2. Detect what the child is doing
    3. Make the robot react in a suitable way
    4. Define subjective notions of “attention” and “imitation” so that the robot can understand?

Cao et al. (2019) *IEEE Robotics & Automation*

In sum

- AI is used to interpret and assess children's behaviour, and to control the robot
- The system is designed with detailed input from clinicians as a tool for therapists
- This is possibly only close collaboration between therapists and engineers



DEEP LEARNING FOR DRUG DESIGN

Generation of new compounds that have attractive properties

Efficacious

Safe

Minimal side effects

On molecular level

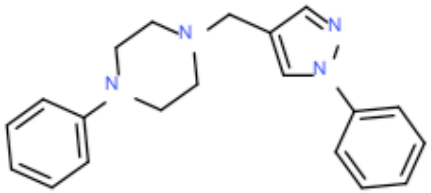
Polar surface area (PSA)

molecular weight (MW)

Lipophilicity (clogP)

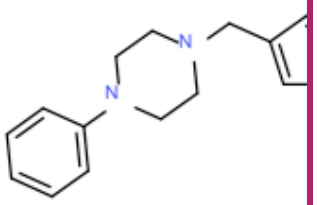
Sthål et al. (2019) *J. Chem. Inf. Model.*

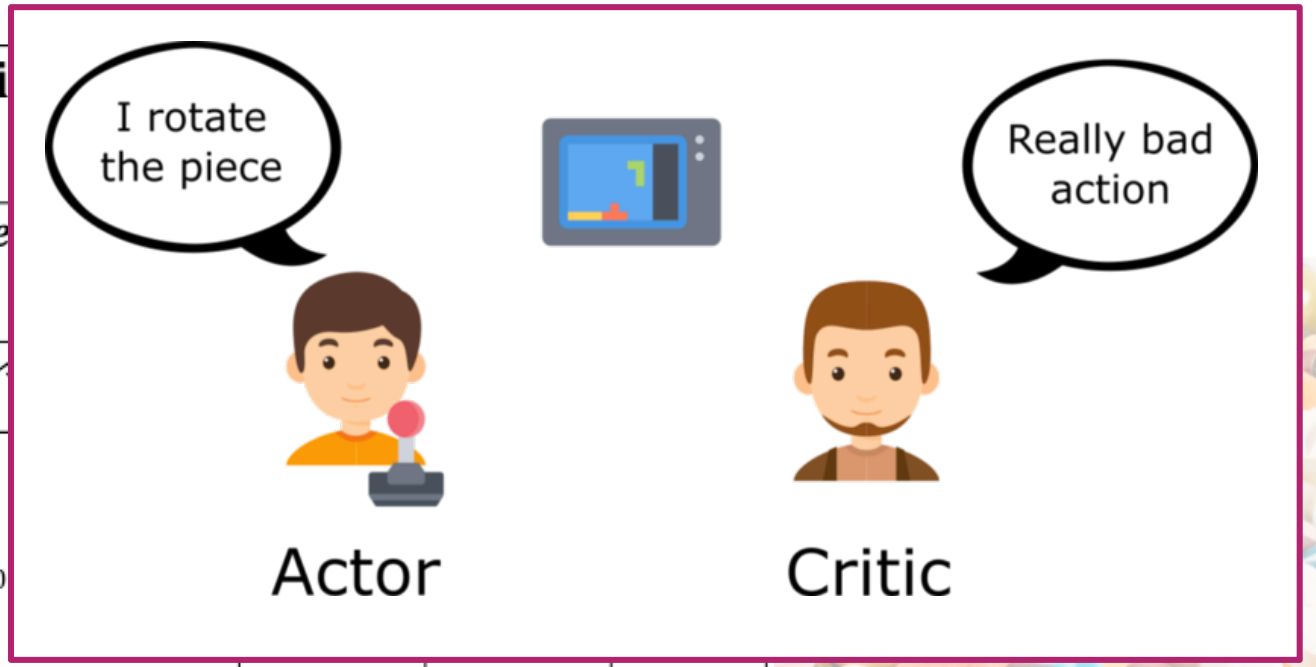
DEEP LEARNING FOR DRUG DESIGN

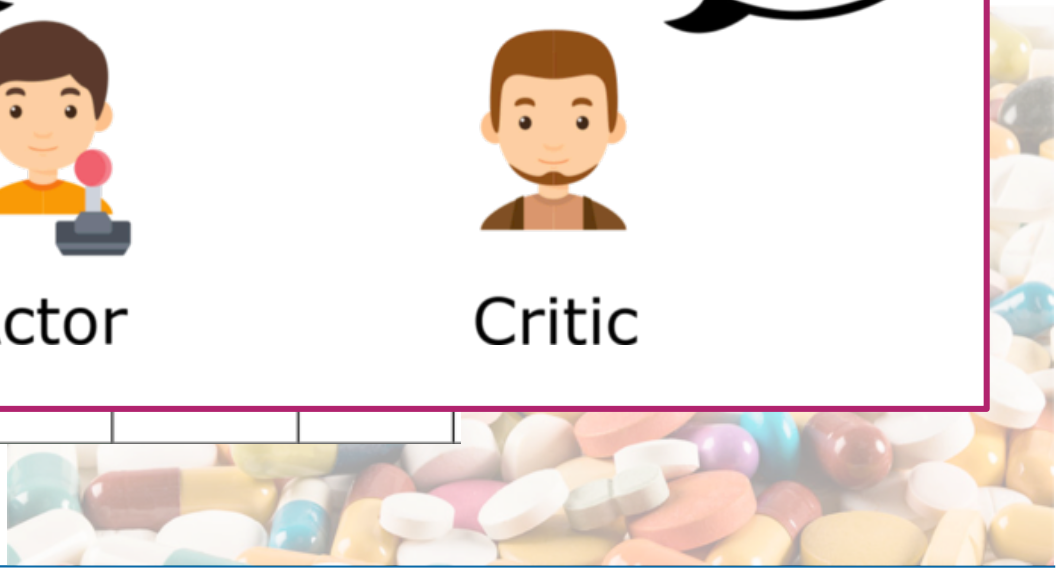
	Initial Lead Compound			
No	***Structure***	***MW***	***clogP***	***PSA***
1	 CHEMBL210405	318.2	3.2	24

Sthål et al. (2019) *J. Chem. Inf. Model.*

DEEP LEARNING FOR DRUG DESIGN

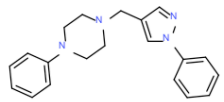
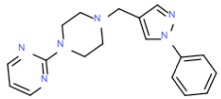
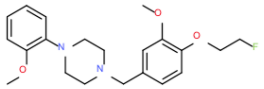
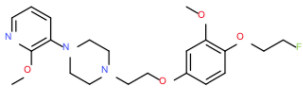
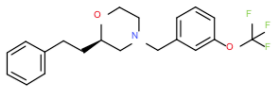
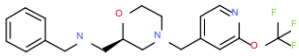
	Initi
No	*Structure*
1	 CHEMBL21040

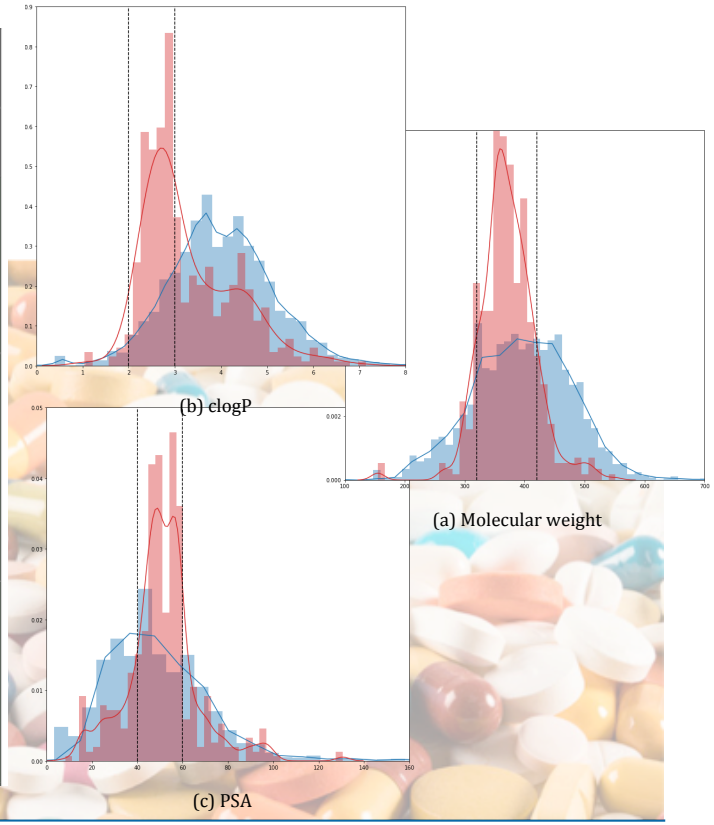




Sthål et al. (2019) *J. Chem. Inf. Model.*

DEEP LEARNING FOR DRUG DESIGN

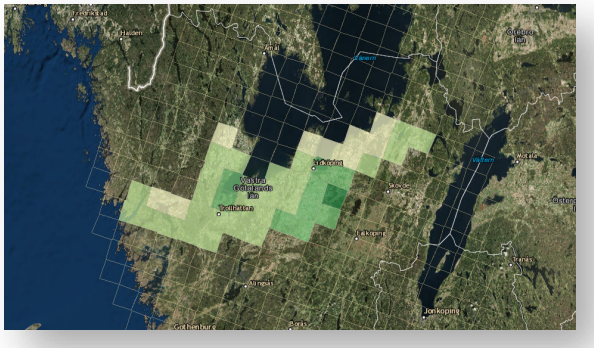
	Initial Lead Compound				AI-Optimized Compound			
No	*Structure*	*MW*	*clogP*	*PSA*	*Structure*	*MW*	*clogP*	*PSA*
1	 CHEMBL210405	318.2	3.2	24		320.2	2.0	50
2	 CHEMBL256492	374.2	3.4	34		405.2	2.7	56
3	 CHEMBL3335542	365.2	4.4	22		381.2	3.0	47

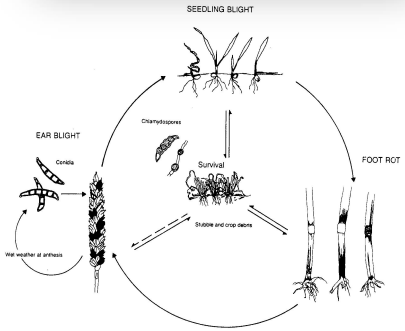


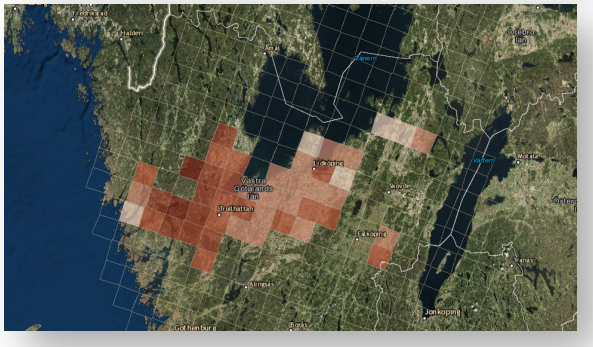
Sthål et al. (2019) *J. Chem. Inf. Model.*

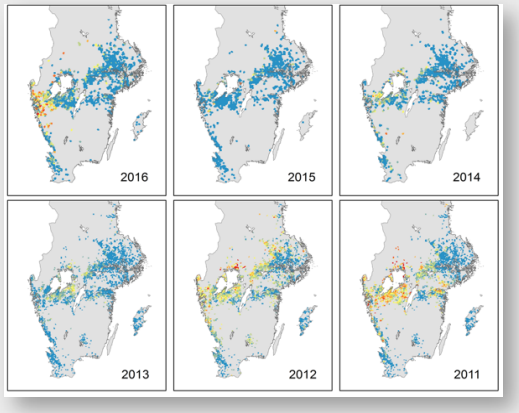
INFOFUSION FUSARIUM

Prediction of fungal infestation on oat

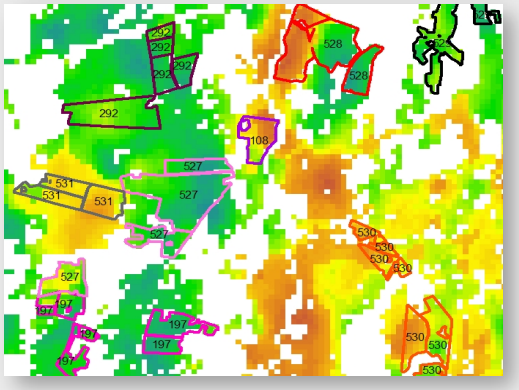


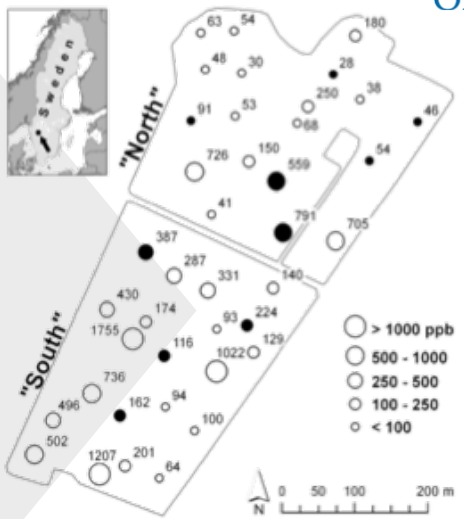






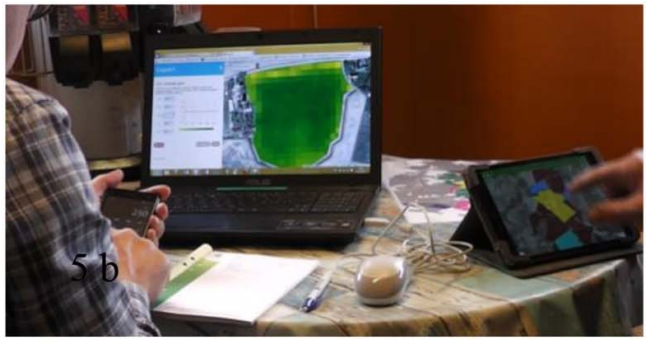
GRIDP	DAT	TEMP20MIN	TEMP20X	TEMP20MAX	RF	NEDERB	MEDELMOLN	VIND	VINDRIKTN
190	20170101	3.45	5.259166	6.33	94.875000	1.90	80.791600	5.320416	261.262500
190	20170102	-3.65	-0.400833	4.36	83.791600	0.00	11.458300	3.667083	306.111250
190	20170103	-4.67	2.165416	6.45	92.041600	4.29	74.208300	5.478750	268.396250
190	20170104	-3.71	0.802916	6.59	71.166600	0.69	70.083300	7.617916	228.690416
190	20170105	-10.52	-7.572916	-0.53	59.000000	0.00	12.791600	4.900416	81.949583
190	20170106	-13.35	-8.833333	-3.88	68.083300	0.00	36.208300	1.792500	229.278750
190	20170107	-8.90	-1.349583	0.63	86.333300	2.67	96.958300	4.017500	193.694583
190	20170108	-2.85	-1.547916	0.41	95.291600	0.00	93.125000	1.912083	150.266666
190	20170109	-1.92	1.119583	2.54	95.291600	0.41	96.958300	3.998333	223.532500
190	20170110	-0.32	0.292500	1.76	86.750000	0.00	88.291600	5.470416	167.971250
190	20170111	-0.57	1.017083	3.51	91.958300	2.76	90.916600	8.182083	203.765000





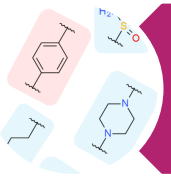
FARMERS' SITUATED KNOWLEDGE

We recomment that *the "role of advisors and AgriDSS in advisory situations is reconsidered, changing from focusing on decision-making events/outputs towards thinking in terms of learning how to improve farmers situated seeing, and care"*



Lundström & Lindblom (2018) *J. Agr. Sys.*

NEXT STEPS



Design by AI

- Decision support in design
- Drug design, Industrial settings, ergonomics

Open AI

- Data privacy
- Data lock in

Interaction with intelligent systes

- Transparent and Explainable AI
- User Experience Design

Tack!

- https://www.his.se/en/sail/
- https://www.his.se/en/Research/informatics/Interaction-Lab/