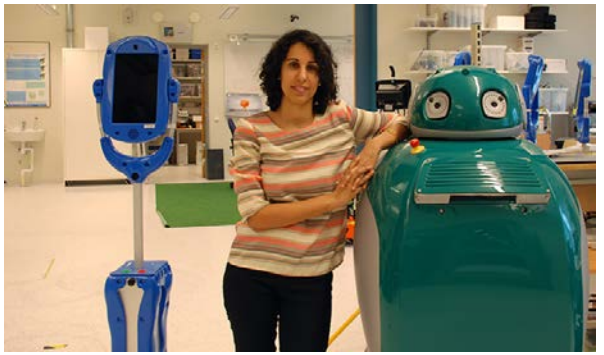
ÖREBRO UNIVERSITY

Keynote:
AI och Robotik

Amy Loutfi

Örebro University, Sweden
Center for Applied Autonomous Sensor Systems

About me



19XX - Born Saint John, Canada

1997 – Bsc. Electrical Engineering

1999 – Came to Örebro as a undergrad exchange student

2001 – Returned to Örebro as a Ph.d student

2006 – Post-doc Spain

2009 – Coordinated National projects in AI

2014 – Coordinated two EU projects to completion

2016 – Head of Center for Applied Autonomous Sensor Systems, Örebro University (AASS)

Center for Applied Autonomous Sensor Systems (AASS)

- **50+** Researchers
- **7** Professors
- **20** Ph.d students
- **3** Research Labs
- **3** Education Programs
- **2** KKS Profiles since 2001
- **19** EU projects since 2009

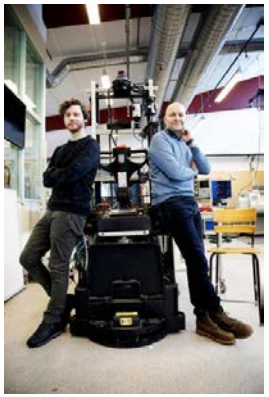
AASS performs research in AI and autonomous systems

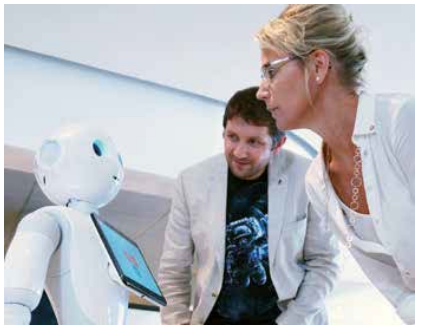
Utbildning Forskning Samverkan

A Swedish and European Research Center

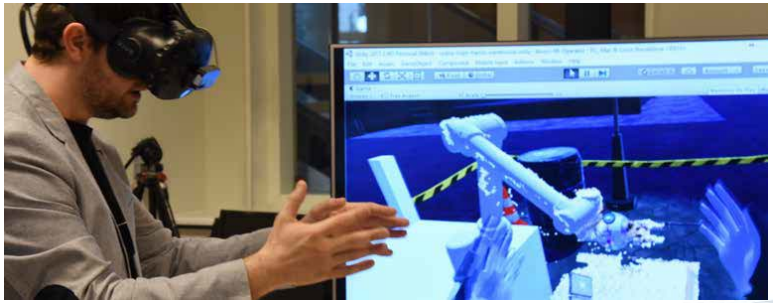
Dust-Bot
DIADEM
Handle
RobLoG
MOnarCH
GiraffPlus
Gert
ROBOT-ERA
RUBICON
RACE

Spencer
ExCITE
Saapho
SmokeBot
SOCRATES
ILIAD
MoveCare
CARESSES





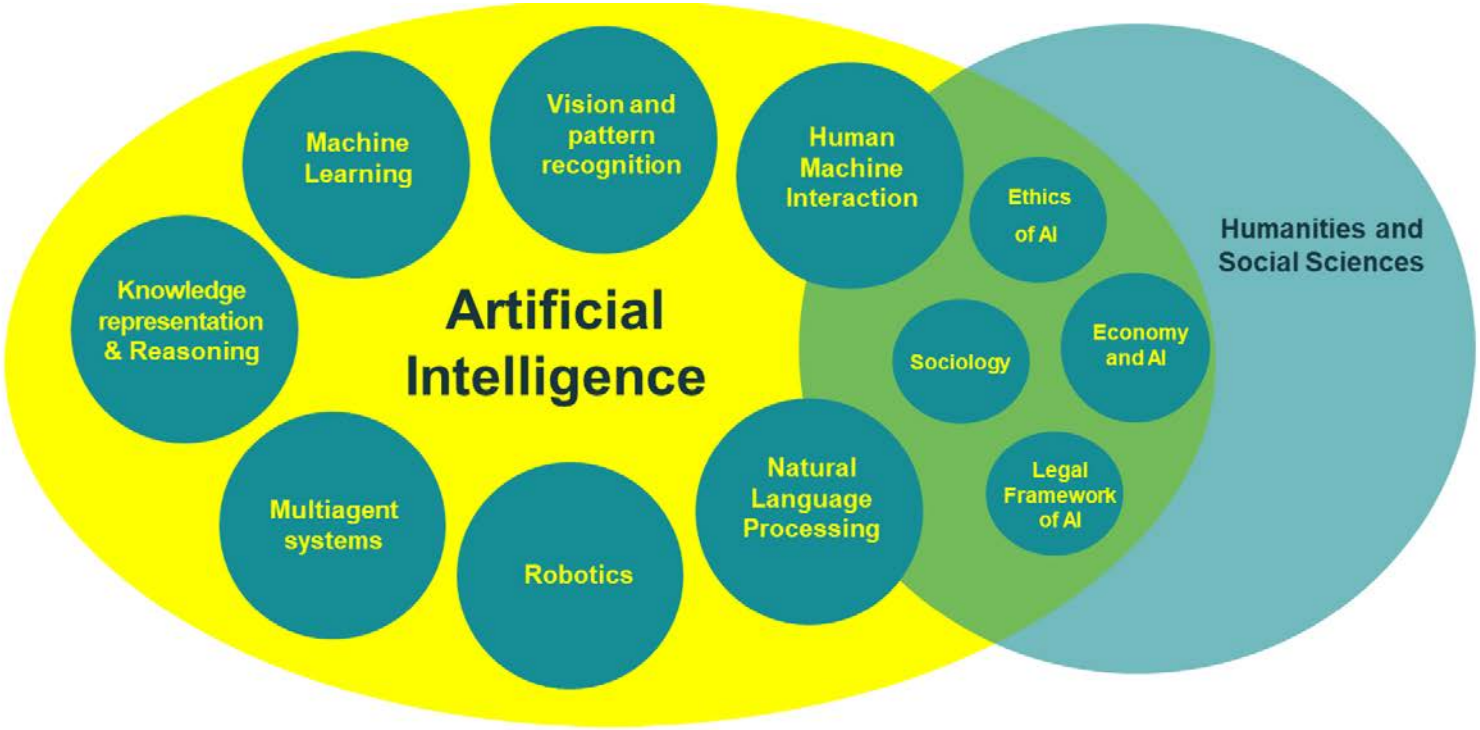
- Health and Ageing
  - **(H2020) MoveCare, Carresses**
  - **(ITN) Socrates**
  - **(Vinnova) AI Decsion Support**
  - **(KKS Sidus) E-care@Home**
- Environmental Inspection
  - (FP7) SmokeBot
- Warehouse Logistics
  - **(H2020) Iliad**
- Smart Industries
  - (EU Chist-era) Reground
  - **(VR) Grounding Language for Robots**
  - **(KKS)** AMICI
  - (Vinnova) Iqmobility
  - (Vinnova) TracMac
  - (KKS Sidus) AIR
  - (KKS) Semantic Robots



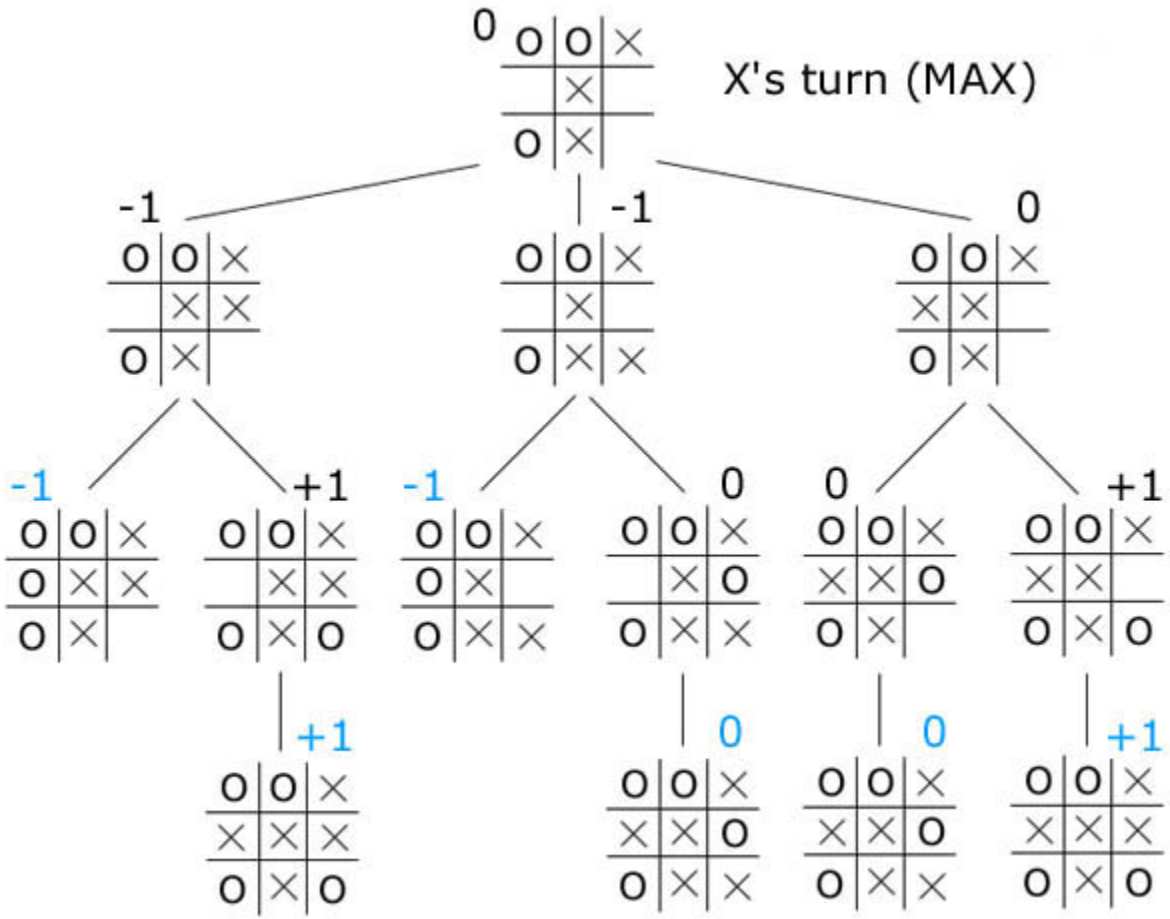
What is AI?

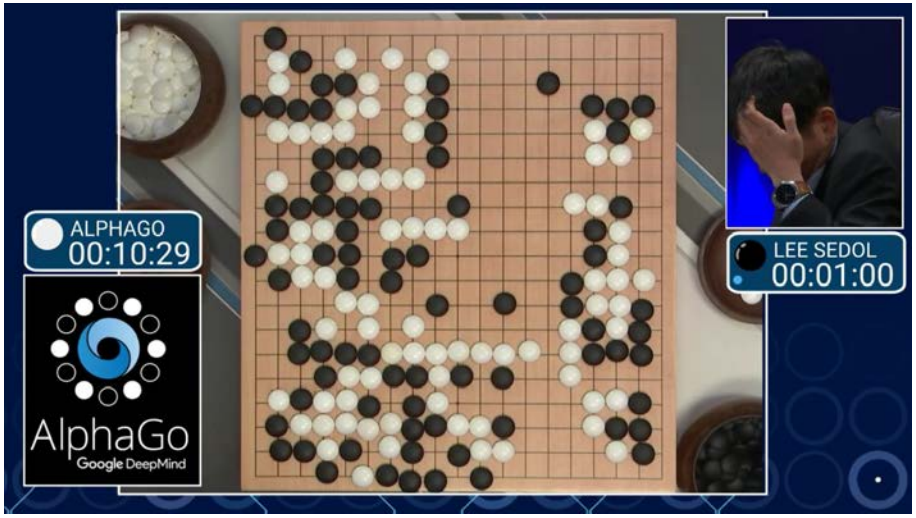
What is AI?

"Artificial Intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs." John McCarthy, Stanford

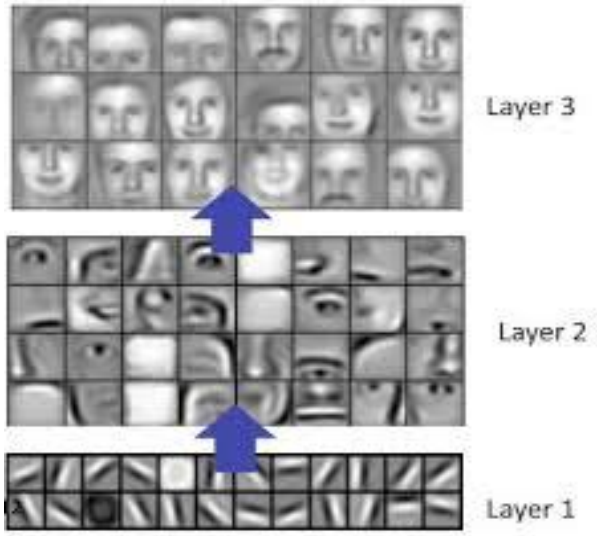


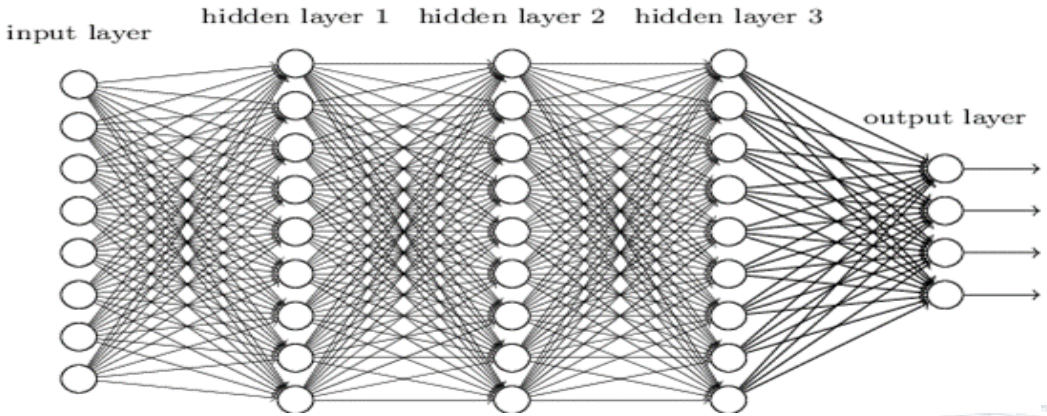
What does AI Look Like?


0
X's turn (MAX)
-1
-1
0
-1
+1
-1
0
0
+1
+1
0
0
+1

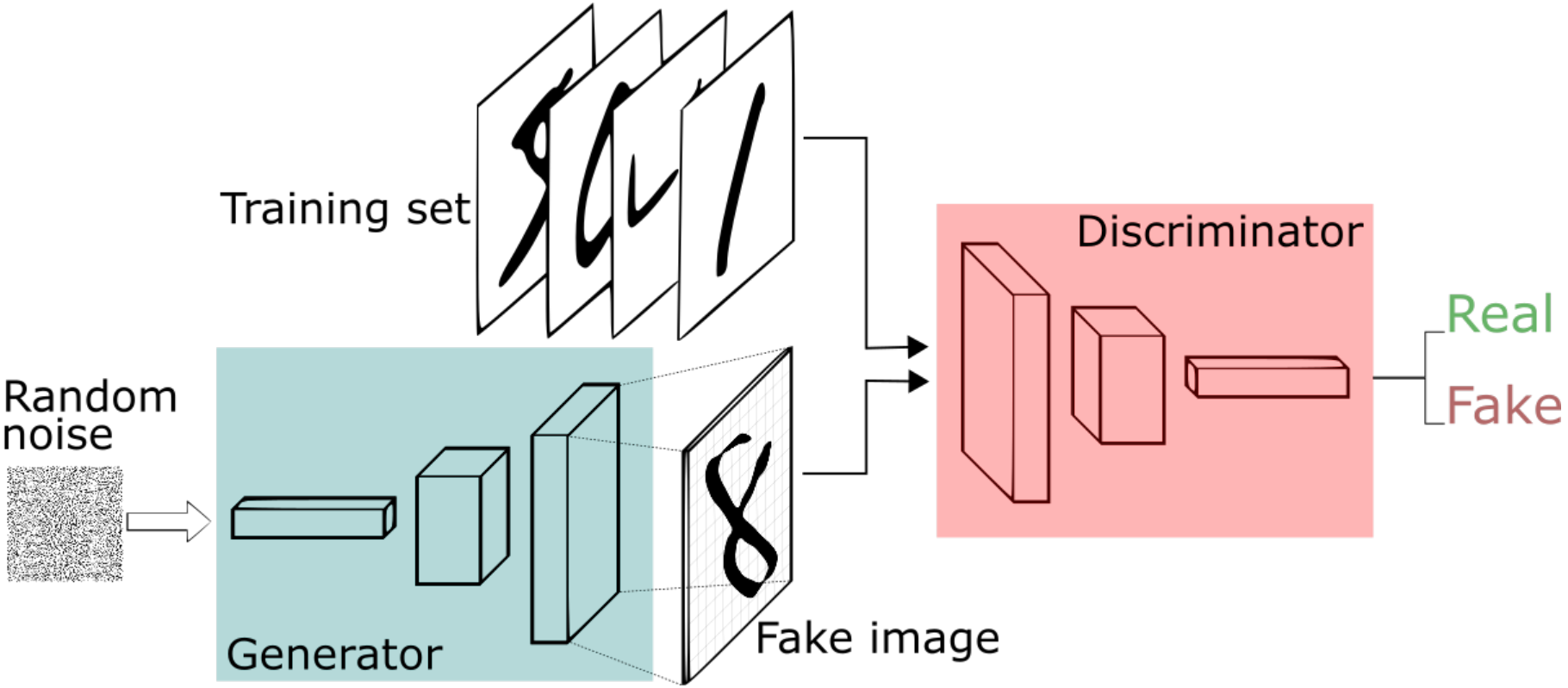

ALPHAGO
00:10:29
LEE SEDOL
00:01:00
AlphaGo
Google DeepMind

AI in 2016


Layer 3
Layer 2
Layer 1


input layer
hidden layer 1
hidden layer 2
hidden layer 3
output layer

AI in 2019



https://sthalles.github.io/intro-to-gans/

AI in 2019

Polygon Landscape Paintings ...
mymodernmet.com

Marlise le Roux - Landsca...
pinterest.com

Landscapes Art | Fine Art Ame...
fineartamerica.com

Abstract landscapes Painti...
saatchiart.com

art, paintings, prints, Main...
dianebeem.com

Edward Henry Potthast Beach Sc...
dhgate.com

Sunset On The Rocks Oil Pain...
pixels.com

Claude Monet paintings Lands...
aliexpress.com

Coral Belles - Painting of L...
arte-cera.com

art, paintings, prints, Main...
dianebeem.com

4th Annual Landscapes Art...
artsy.net

13 tips for better impasto landsc...
artistsandillustrators.co.uk

https://github.com/robbiebarrat

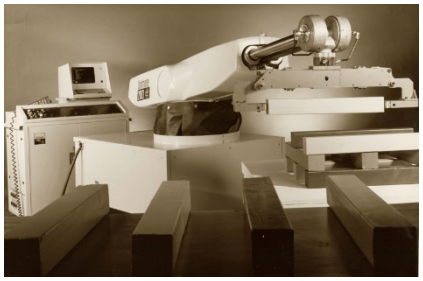
AI in 2019

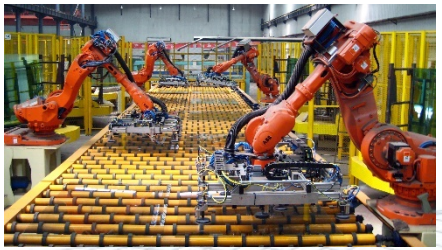
https://github.com/robbiebarrat

When AI meets robotics

History of AI and Robotics

- Large Amount of Research in 1960s
  - Simple Problem Solver, logic theorem prover
  - People got too enthusiastic about AI
- First AI Winter (70s)
- First Revival (80s)
  - Expert Systems, and $$$ in business
- Second AI winter (85-90)
- Second Revival (90s-now)
  - Increasing computer power, multi-disciplinary approach, focus on subproblems





Don’t have to program everything

Improves performance over time by practicing

AI.MEE

TESTBED FOR

AUTONOMOUS INTELLIGENT MACHINES

FOR ENTERPRISE AND EXPLORATION

2017-2020

VÅRT UPPDRAG

"Målet med AI.MEE är att skapa långsiktig utveckling och tillväxt i Örebroregionen. Det gör vi genom att tillsammans med regionens företag och Örebro universitet ta fram konkreta tekniska lösningar och plattformar inom AI och autonoma system, som många kan dra nytta av."

Region Örebro län

EUROPEISKA UNIONEN
Europeiska regionala utvecklingsfonden

ÖREBRO UNIVERSITET

ALFRED NOBEL SCIENCE PARK

AI.MEE CASE
AUTOHIC

Status: COMPLETED

Demonstrator: **ROBOTLAB**

Continuation:

AUGMENTOR Case

AFA Application (Accepted for full submission)

Publications:

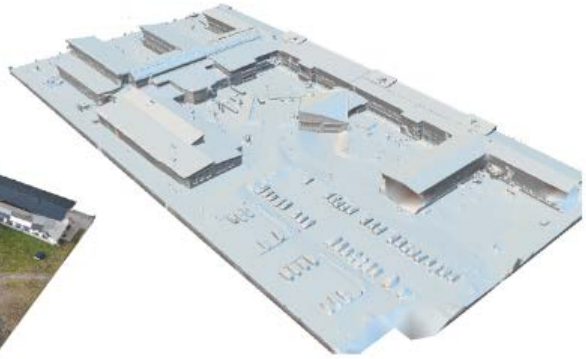
*** Automatica, IEEE THMS**

AI.MEE CASE

F2 SIM

AI.MEE CASE

Co-ROB



Marjan vill öppna AI:s ”svarta låda”

Marjan Alirezaie, AI-forskare vid Örebro universitet, ska försöka göra artificiell intelligens mer transparent.

AI-metoder som djupinlärning fungerar utmärkt för uppgifter som att diagnosticera hudcancer. Problemet är att vi inte riktigt vet hur, eller varför, de fungerar. Genom att kombinera två olika AI-metoder hoppas Marjan

AI.MEE CASE

Digitwin 2.0 (new)

Dynamic Digtial Twins of buildings from the ground up.

Actors: Örebroporten, NCC, ViiNotion, Länsgården,

Digitwin of Kulturkvartet

Sensor testing at Novahuset

Validation at Ängen

AI.MEE

Digitwi

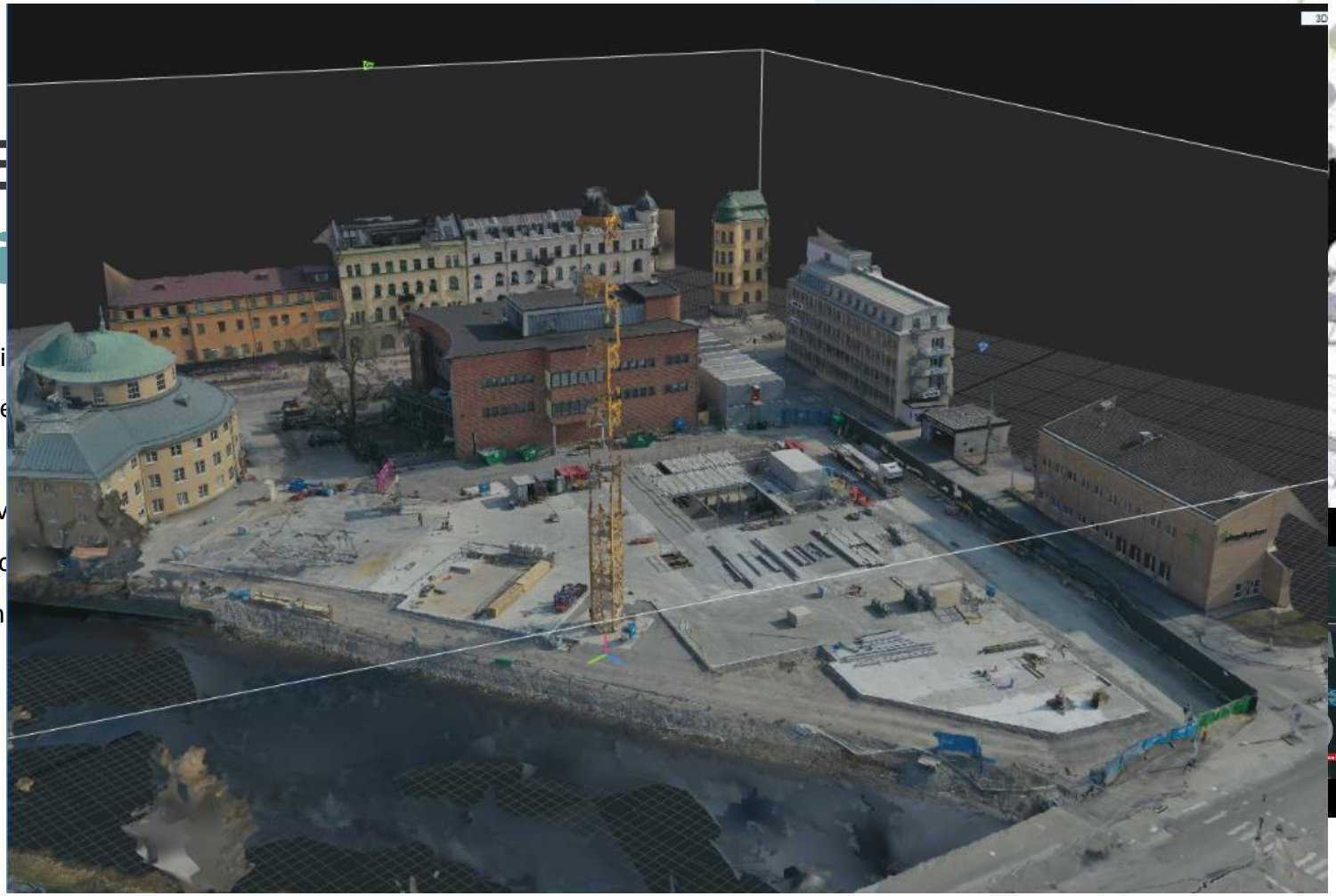
Dynamic Digtial Twi

Actors: Örebroporte

Digitwin of Kulturkv

Sensor testing at Nc

Validation at Ängen



AI.MEE CASE

AgTech

Multi-Robot Coordination without Coordination

Se mer i bifogad projektbeskrivning

- Our role is to ROS'ify' the platform
- American Company – Harvest Automation (interested in finding European partners, and a selling office)

- Next Step: Press Release in May

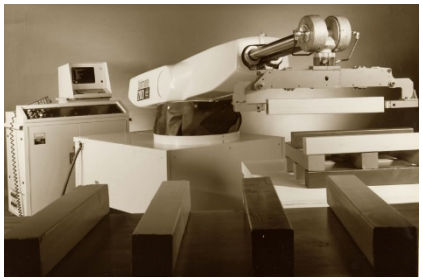
Competence Development

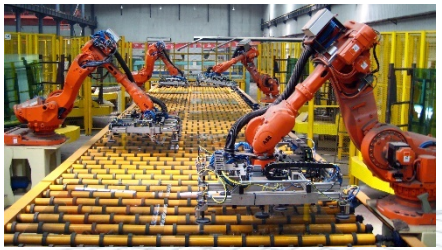
- Lifelong Learning to promote Collaboration

www.oru.se/smarter
ai-competence.se

History of AI and Robotics

- Large Amount of Research in 1960s
  - Simple Problem Solver, logic theorem prover
  - People got too enthusiastic about AI
- First AI Winter (70s)
- First Revival (80s)
  - Expert Systems, and $$$ in business
- Second AI winter (85-90)
- Second Revival (90s-now)
  - Increasing computer power, multi-disciplinary approach, focus on subproblems





Competence Development

- Lifelong Learning to promote Collaboration

Upcoming Courses

- Reinforcement Learning (RL)
- Search for Mobile Robots
- Machine Learning
- AI
- Autonomous Robots and ROS

- And many more.....

www.oru.se/smarter
ai-competence.se

Thank You