

BIM-frukost: AI i projektering -så skapas nytta för bygg och förvaltning

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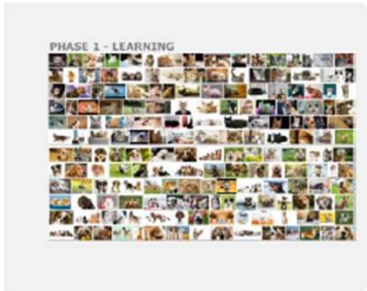
We still treat AI as an experimental “cool” IT-project

AI
SWEDEN

**Process
Problem
Product** +  **AI** = **PoV**

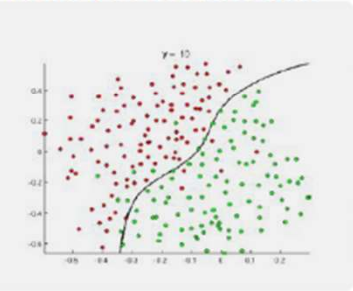
We need to clearly define the user and/or business value!

Fakta – att träna upp en algoritm

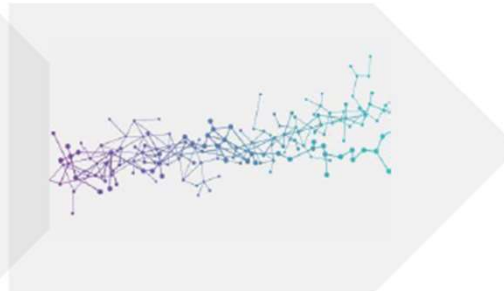


RÅDATA

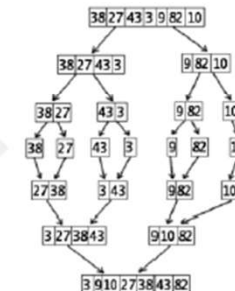
HUNDAR & KATTER...



TRÄNA PÅ URVAL
- KLASSIFICERA



ALGORITM(-ER)



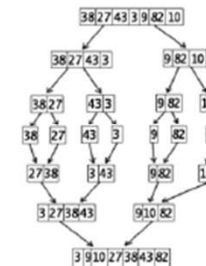
"UPPLÄRD" / FÄRDIG
PRODUKT



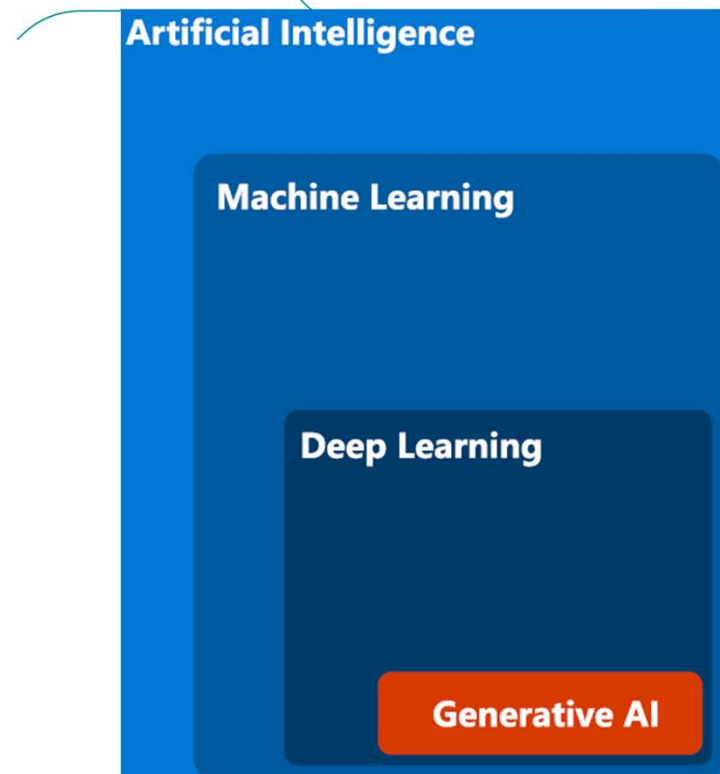
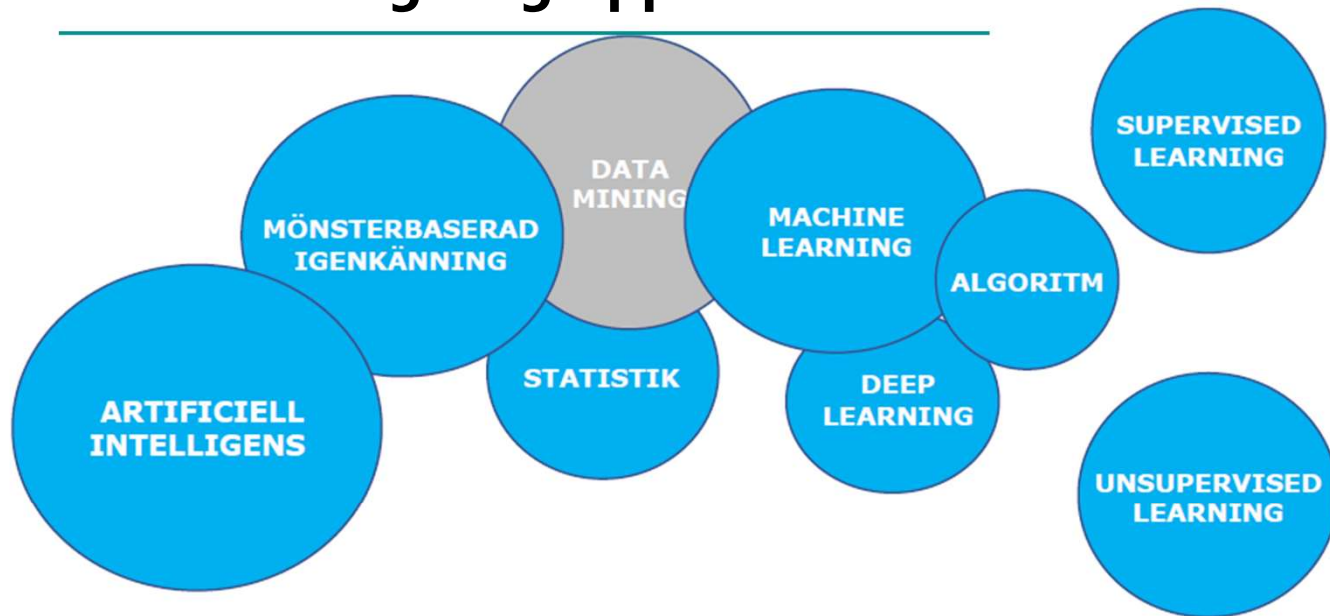
MODELL



NY DATA

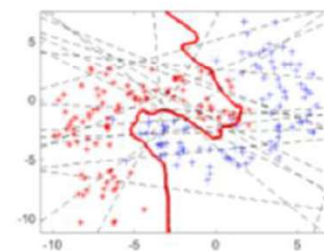
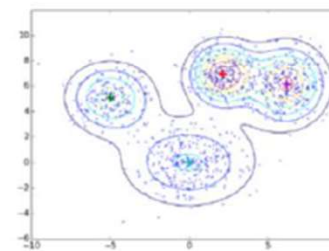
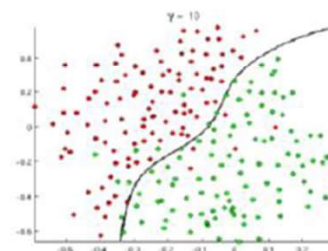


Fakta – Vanlig begrepp och termer



NÅGRA (KÄNDA) TILLÄMPNINGAR

- Självkörande bilar
- Medicinsk diagnostik
- Strömningstjänster på internet



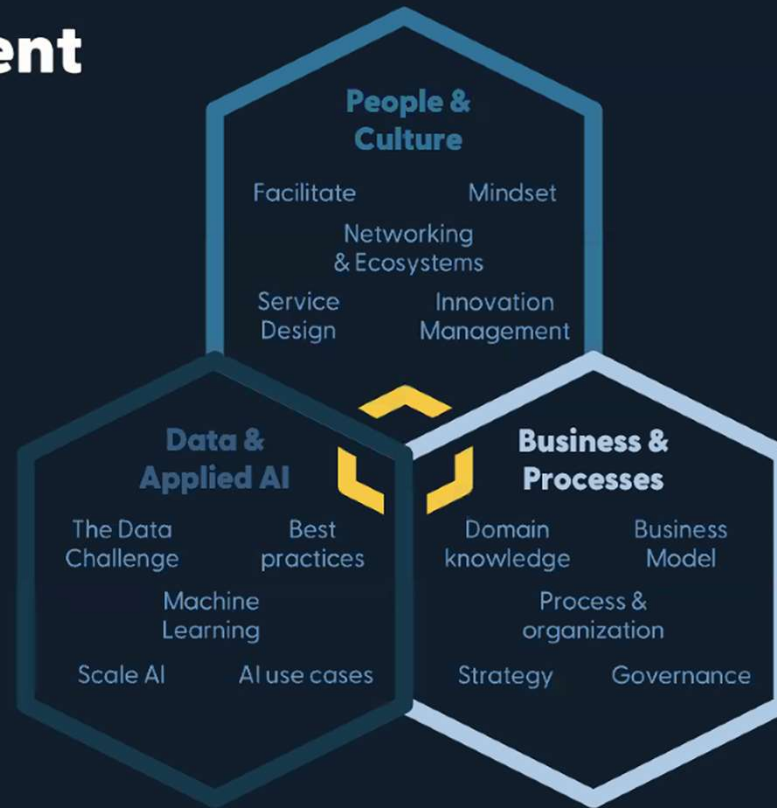
Kopplingen till sektorn och BIM processer generellt



Kopplingen till sektorn och BIM processer generellt

AI Change Agent

“A mediator between people, business and technology with the focus on accelerating AI value creation in organizations”



** No individual have all these skills and capabilities but should be aimed for when building teams or functions in organizations.*

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Microsoft Bets Big on the Creator of ChatGPT in Race to Dominate A.I.

[Microsoft Bets Big on the Creator of ChatGPT in Race to Dominate A.I. - The New York Times \(nytimes.com\)](#)

GPT-3: We're at the very beginning of a new app ecosystem

[GPT-3: We're at the very beginning of a new app ecosystem | VentureBeat](#)

ChatGPT has given everyone a glimpse at AI's astounding progress

[OpenAI's ChatGPT is a fascinating glimpse into the scary power of AI - Vox](#)

A.I. Can Now Write Its Own Computer Code. That's Good News for Humans.

[A.I. Can Now Write Its Own Computer Code. That's Good News for Humans. - The New York Times \(nytimes.com\)](#)

OpenAI's new DALL-E model draws anything — but bigger, better and faster than before

[dall-e | TechCrunch](#)

Hi GPT-4, can you write a c# plug-in for revit that gets the X, Y and Z coordinates of the location of all point-based structural foundations in a model?

Yes, I can help you write a C# plug-in for Revit to get the X, Y, and Z coordinates of all point-based structural foundations in a model. To accomplish this, you'll need to use the Autodesk Revit API.

Make sure you have Revit installed, along with Visual Studio, and have the Revit API references added to your project. You'll need to reference the following DLLs:

- * Autodesk.Revit.DB.dll
- * Autodesk.Revit.UI.dll
- * Autodesk.Revit.ApplicationServices.dll

Here's a sample code for a Revit plug-in that gets the X, Y, and Z coordinates of point-based structural foundations:

```
csharp Copy code

using System;
using System.Collections.Generic;
using System.Linq;
using Autodesk.Revit.ApplicationServices;
using Autodesk.Revit.Attributes;
using Autodesk.Revit.DB;
using Autodesk.Revit.DB.Structure;
using Autodesk.Revit.UI;
using Autodesk.Revit.UI.Selection;

[Transaction(TransactionMode.ReadOnly)]
public class PointFoundationCoordinates : IExternalCommand
{
    public Result Execute(ExternalCommandData commandData, ref string message, ElementSet elements)
    {
        UIApplication uiApp = commandData.Application;
        UIDocument uiDoc = uiApp.ActiveUIDocument;
        Document doc = uiDoc.Document;

        FilteredElementCollector collector = new FilteredElementCollector(doc);
        ICollection<Element> pointFoundationElements = collector.OfClass(typeof(Foundation))
        .Of
```

GPT-3

Generate and Understand Text

Codex

Generate and Understand Code

DALL·E

Generate images from text prompts

ChatGPT

Generate conversational responses

Prompt:

Write a tagline for an ice cream shop.

Response:

We serve up smiles with every scoop!

Prompt:

Table customers, columns = [CustomerId, FirstName, LastName, Company, Address, City, State, Country, PostalCode]

Create a SQL query for all customers in Texas named Jane
query =

Response:

```
SELECT *  
FROM customers  
WHERE State = 'TX' AND  
FirstName = 'Jane'
```

Prompt: A white Siamese cat

Response:



What is the fastest animal on land?

the cheetah (*Acinonyx jubatus*), which can reach speeds of up to 68 miles (97 kilometers) per hour.

What makes them so fast?

Cheetahs are built for speed and have several adaptations that make them the fastest land animal: lean body, long legs, flexible spine, large nostrils and claws that don't retract.



OpenAI

DALL·E 2

An astronaut riding a horse in a photorealistic style



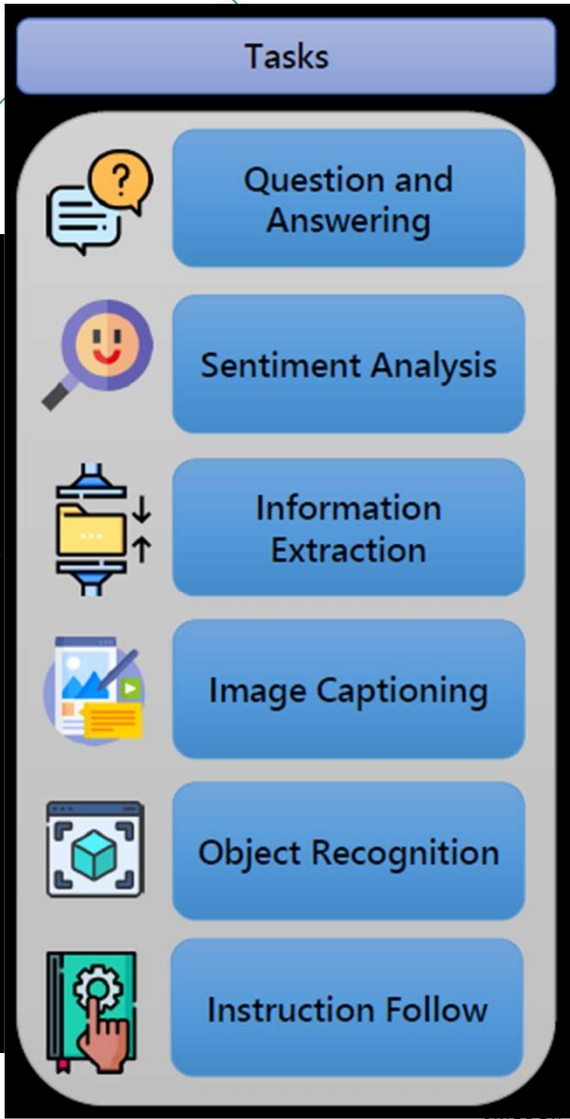
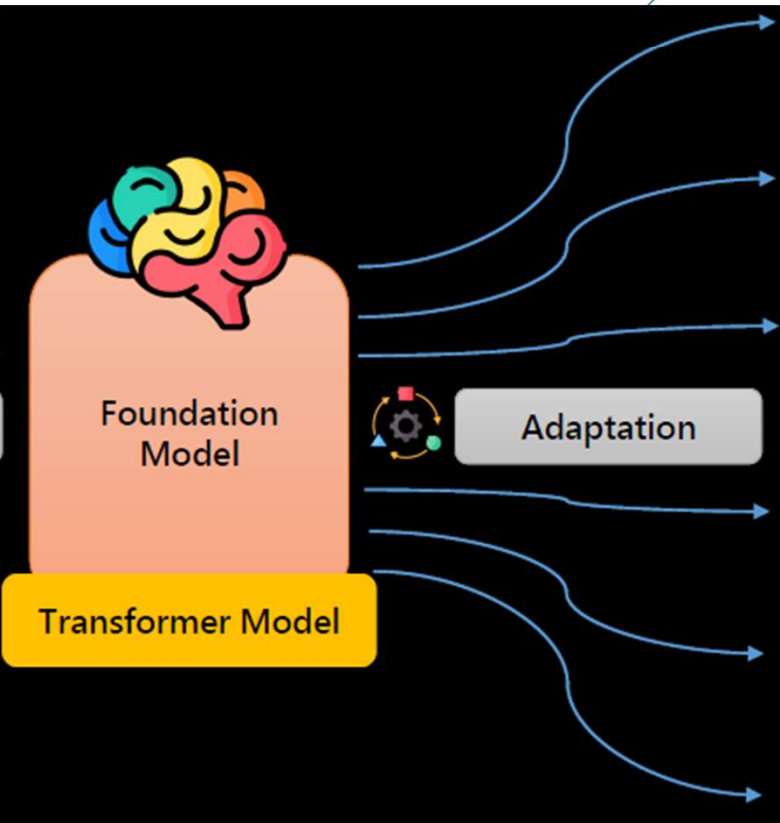
Teddy bear working on new AI research on the moon in 1980



A bowl of soup that looks like a monster knitted out of wool



Foundation Models



Generative AI – 3D modell skapas från text

We've built the first, 3D Generative AI that creates 3D models from text prompts that are directly usable within games and other 3D applications.



Source: Masterpiece Studio

Artificial Intelligence

Machine Learning

Deep Learning

Generative AI



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Generative AI on ROBLOX

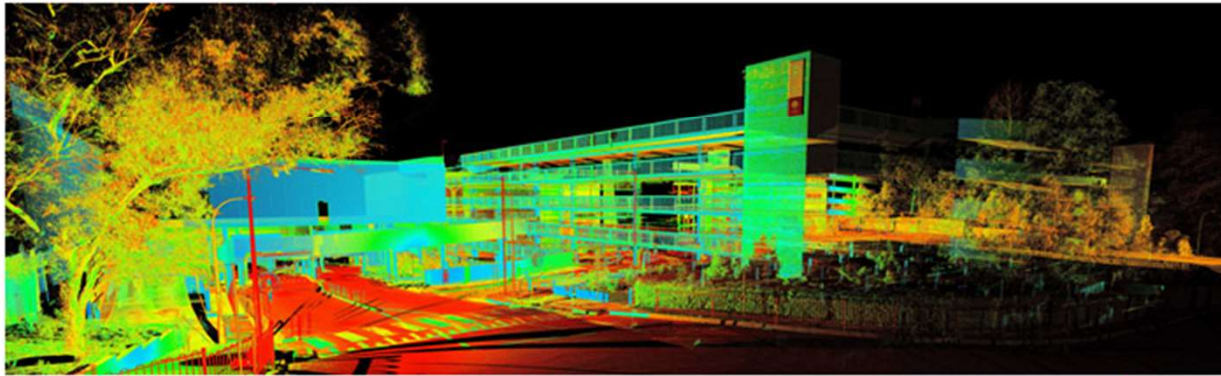


Everyone becomes a creator

<https://youtu.be/e2w0mBheCQ4?t=5>

Even more powerful, the convergence of media supported by generative AI will allow creators to develop integrated 3D objects that come with behavior built in. For example, a creator could design a car through a simple statement such as “A red, two seater, convertible sports car with front-wheel drive”. This new creation would both look like a red sports car but also have all the behavior coded into it to be driven through a 3D virtual world.

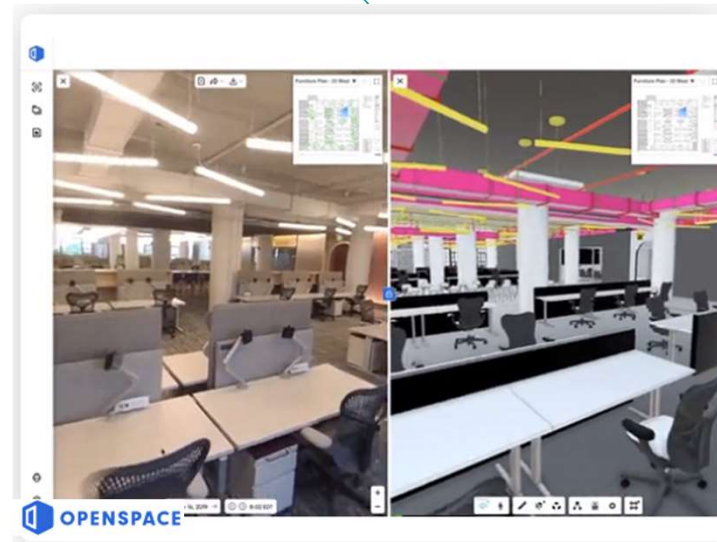
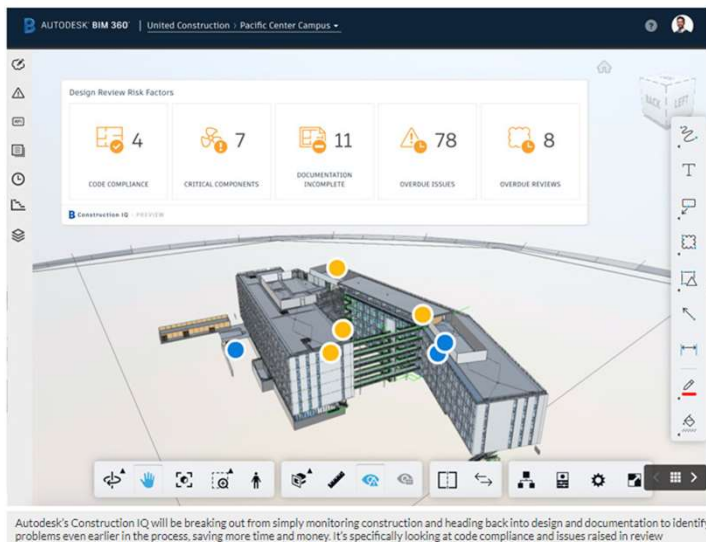
Exempel – Projektering (modellering, analys och kvalitetssäkring)



- Inom en snar framtid förbättra infrastrukturinvesteringar med prediktiv planering
- Point Clouds - automatisk modellering till riktiga objekt
- Automatisk krockkontroll och informationsövervakning
- Automatisk analys av modell
- Optimering av tekniska system i realtid en möjlighet
- Automatiska rapporter och uppföljning av "issues"
- Hantering av data och algoritmstöd i molnet
 - Utveckling snabb och integrationen mellan system utvecklas snabbt
 - Cyber security är en viktig komponent

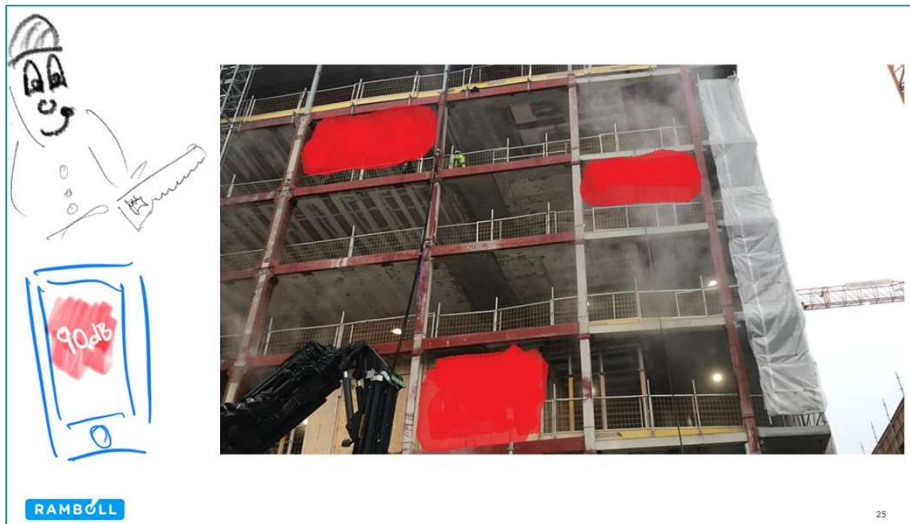
Exempel – Riskminimering i projekteringen

- Mjukvaror/tjänster finns idag där AI och ML hjälper oss med risk minimering
 - Riskerna flaggas upp tidigt under projekteringen för att minimera kostnaden
- AI klarar av att hantera data från tusentals projekt på nolltid
 - Realtidsdata från digitala modeller hanteras av algoritmer och analyseras
- Ett annat exempel är byggplatsuppföljning/status med "3D kamera material" som bearbetas av AI och mappas mot rätt koordinater i de digitala modeller som används i projekteringen. AI är otroligt effektiv på att hantera och strukturera data och man kan bläddra mellan olika datum momentant och effektivt följa upp progress på byggarbetsplatsen.

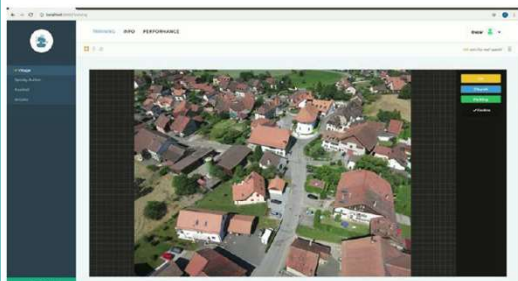


Exempel – Bildigenkänning / sensorer

- Bildigenkänning för att minimera risker på bygget
 - Ljudnivåer
 - Rökgas
 - Fall
 - Avfallshögar för borttransport
- AI som arbetar mot bilder som kommer från kamera på byggplatsen (eller också helt inbyggt i kameran)
- Flera projekt har på byggkranen monterat kamerautrustning för att med AI få en säkrare arbetsplats



TILLÄMPNINGSSOMRÅDEN



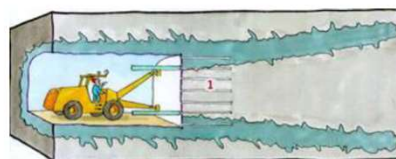
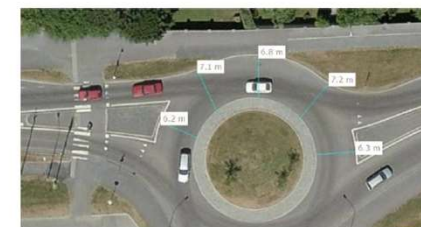
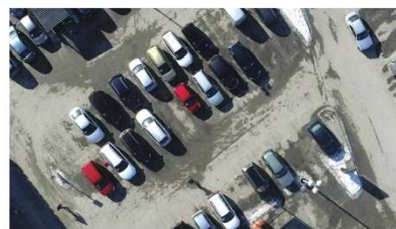
Bilder
Video
Ljud
Stora volymer
av datapunkter
Text



Saknade / smutsiga skyltar
Dags att röja träd eller städa
Skymd sikt

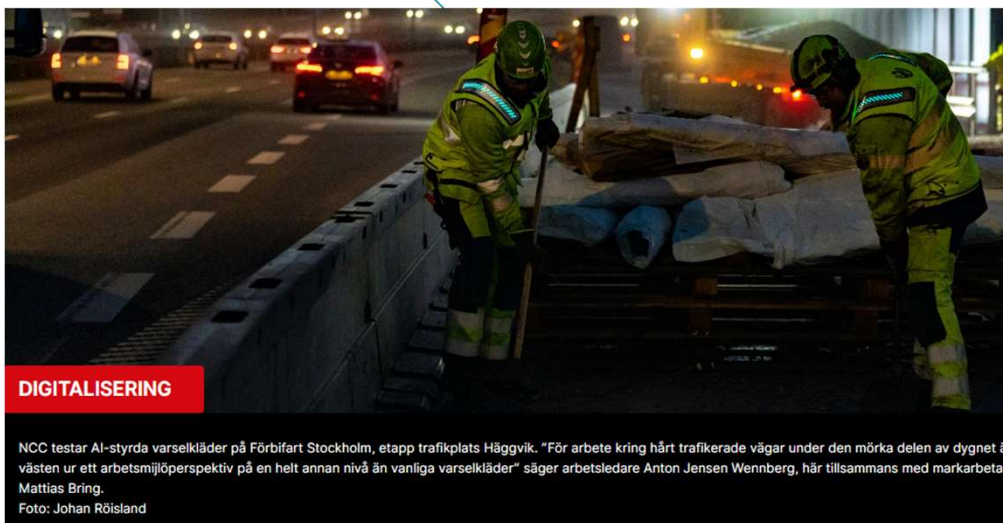


TILLÄMPNINGSSOMRÅDEN



Exempel – Säkerhet på byggplatsen

- Transporter
- Logistikhantering
- Beställning av bortforsling av massor
- AI-styrda varselkläder
- Kameror och/eller sensorer (IoT) är också flera projekt som använder sig av för ovan exempel



Exempel – Proaktivt underhåll

- AI och ML genomför analys hur den tekniska anläggningen mår
- Starkt kopplat till digital tvilling konceptet
- AI hanterar data interaktioner mellan system

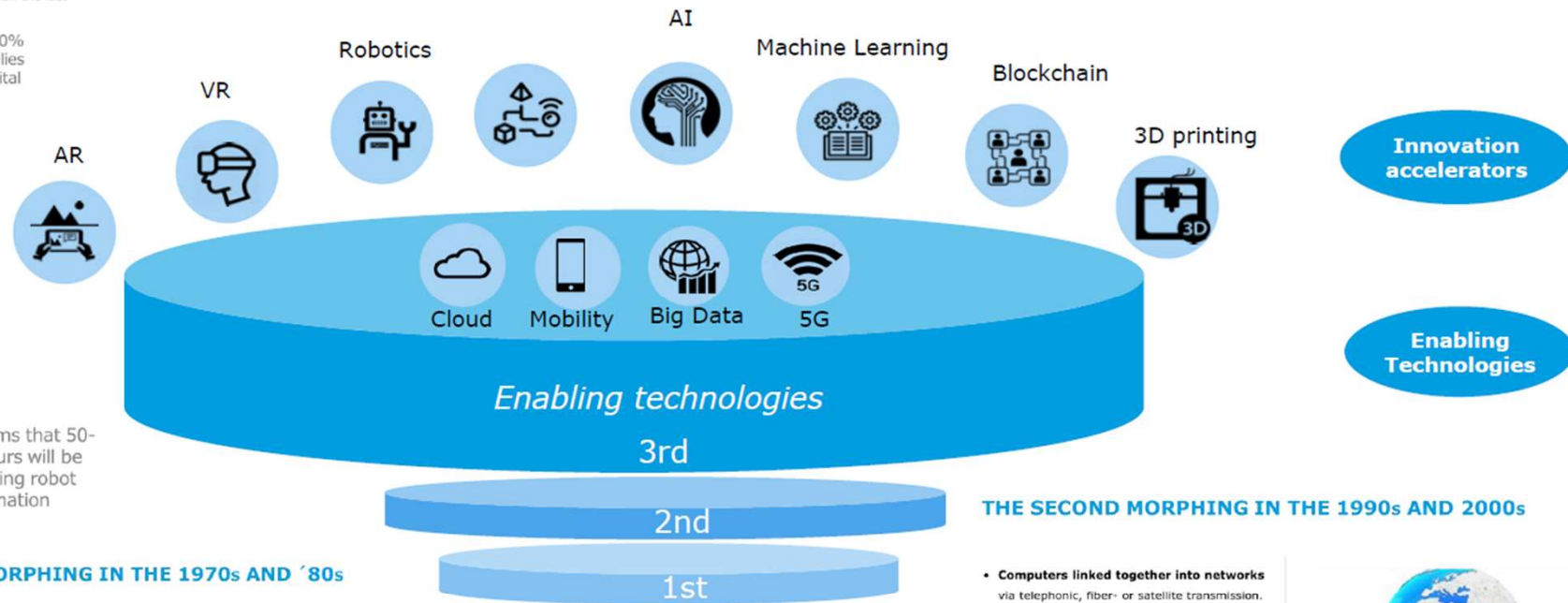


Exempel – Robotisering & industriellt byggande



Kopplingen till sektorn och BIM processer generellt

- Gartner claims that analytics will have an even bigger impact on our society in the next twenty years than the internet did on the last twenty
- BCG claims that 70% of all new ideas relies or depends on digital components



- ✚
- McKinsey claims that 50-80% of all hours will be automated using robot process automation (RPA)

THE FIRST MORPHING IN THE 1970s AND '80s

- Processors and memory on microchips
- Engineers could use computer-aided design programs
- The modern fast personal computation arrives and we got computational assistance



RAMBOLL

THE SECOND MORPHING IN THE 1990s AND 2000s

- **Computers linked together into networks** via telephonic, fiber- or satellite transmission.
- **The internet became a commercial entity**, and web services emerged.
- **Everything was in conversion with everything else.** Globalization had arrived and was very much the result of connecting computers.



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Sammanfattning

- Inspektion av infrastruktur med bildigenkänning
- AI hjälper till med riskanalys i realtid
- AI hjälper till med att optimera i projektering och i utförande fasen
- AI hjälper till i drift och underhåll med att optimera drift och service
- AI hjälper till i industriellt byggande
- Inom en snar framtid förbättra infrastrukturinvesteringar med prediktiv planering
- ChatGPT – vad kommer begränsningen vara?

ChatGPT plugins

SLUT

Daniel Sandhav, Ramboll



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