



Sådan kan byggebranchen gribe mulighederne i AI

Fællesfonden: Kunstig intelligens i bygge- & installationsbranchen

Ole Berard, 17.09.2024

CON TECH LAB

EN DEL AF
MOLIO

ConTech Lab blev etableret i 2020 af MOLIO, Industriens Fond og Realdania.

Det er byggebranchens fælles udviklingsplatform, hvor virksomheder på tværs af værdikæden sammen kan udvikle og eksperimentere med nye måder at benytte data, digitalisering og teknologi på til at skabe fremtidens byggeri – et mere bæredygtigt og produktivt byggeri.

Her deles al viden og læring, så det kommer hele branchen til gode.

Formål med forløbet



Identificere use cases for AI



Diskutere udfordringer og muligheder



Undersøge forretningsmodeller



Identificere muligheder for en fælles indsats –
f.eks. kompetencer, data, løsninger

Workshops om AI i byggeriet

Workshop 1

Vision og inspiration
Hvilke cases er der?
Hvordan arbejder vi med
AI i fremtiden?

Mandag d. 18.03
kl. 09:00-12:30
Lokation: BLOXHUB

Workshop 2

Impact
Risici og trusler vs
muligheder og
potentialer.
Hvad betyder det
branchen?

Mandag d. 22.04
kl. 12:30-15:30
Lokation: DI

Workshop 3

*Strategi og
implementering*
Hvordan ser en strategi
ud ift. Ukendt fremtid?
Hvordan sikrer vi
implementering?

Mandag d. 13.05
kl. 12:30-15:30
Lokation: BLOXHUB

Workshop 4

*Forretningsmodeller og
fælles indsats*
Hvordan ændrer
samarbejder sig og hvad
tjener vi pengene på?
Hvordan sikrer vi
udbredelse?

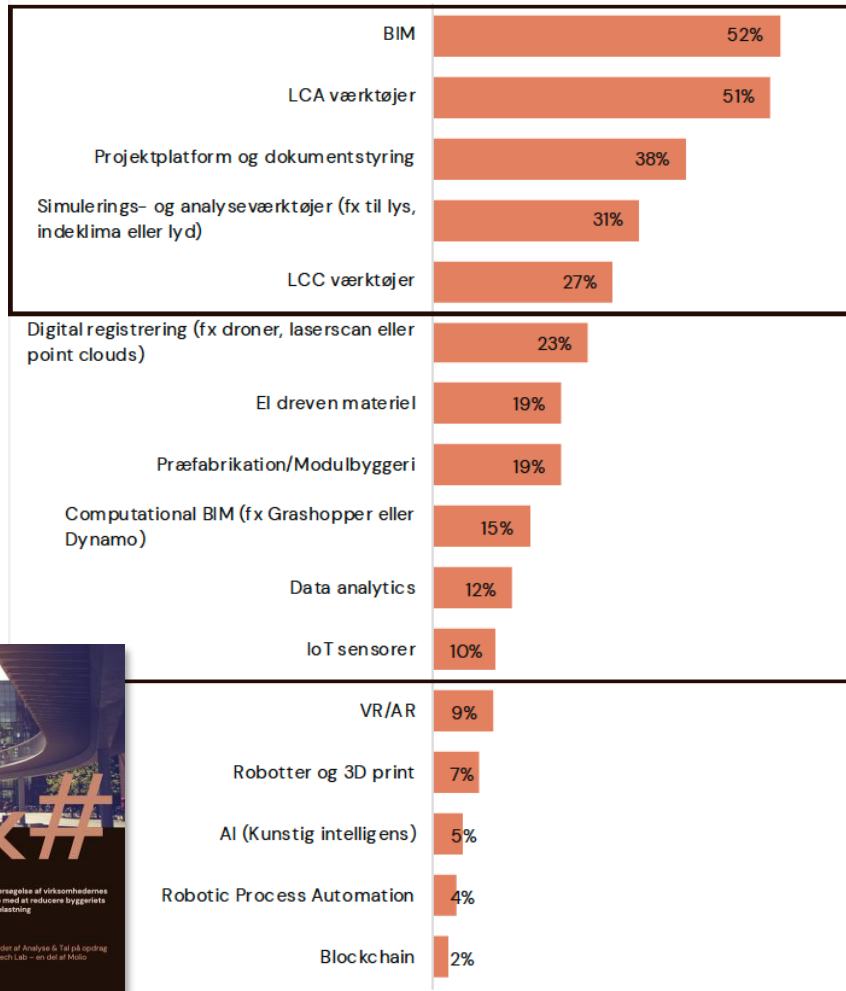
Mandag d. 17.06
kl. 12:30-15:30
Lokation: Molio

Afslutningskonference og Scrap book

Onsdag d. 28.8.2024
kl. 12:00-16:00
Lokation: DI

Bruger branchen AI?

2023



Source: Byggeriets Modenhedsmåling

2024



Årets nøgletal kort fortalt III / III



Branchens brug af kunstig intelligens er firedoblet

21%

anvender AI i deres arbejde, sammenlignet med 5% sidste år. Det gælder primært frit tilgængelige generative modeller blandt arkitekt- og ingeniørvirksomheder.

Omtrent en tredjedel af de virksomheder, der anvender AI, gør det i form af AI-modeller, der er udviklet til byggebranchen eller er i gang med at træne deres egne modeller.



Dokumentation giver procesoptimering og besvær på samme tid

74%

af entreprenører og produktleverandører dokumenterer deres ressourceforbrug.

Dokumentation bruges som redskab til at optimere interne processer, men det opleves samtidigt omkostningstungt og tidskrævende.



Mange arbejder med certificeringer og med ESG-rapportering

77%

arbejder med bæredygtigheds-certificerede byggerier. Det er en stigning på 9 procentpoint fra 2023

60% arbejder med ESG-rapportering, men kun 9% af virksomhederne mener, at det er let.

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AI i byggeriet

HVOR LANGT ER VI,
OG HVAD ER PÅ VEJ?

SCRAPBOG

AI i byggeriet August 2024

https://issuu.com/contechlab/docs/ai_i_byggeriet



VR/AR

BIM

IoT

Robotter

Blockchain

Hvorfor er det anderledes denne gang?

Det er brugerdrevet teknologi ikke en virksomhedsimplementering, ligesom internettet og smartphonen

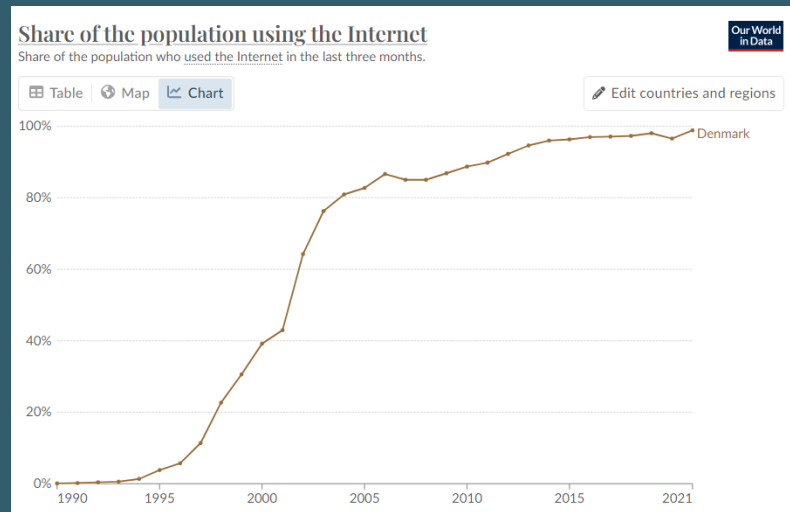


Internet



smartphone

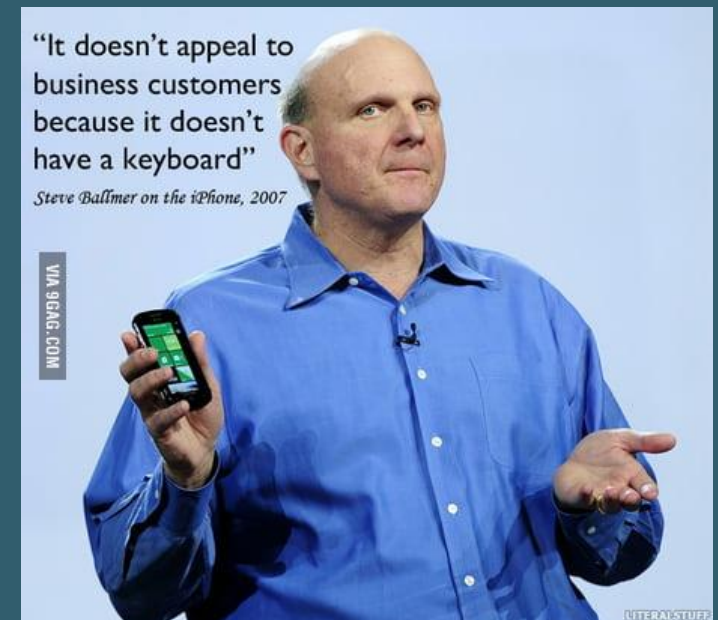
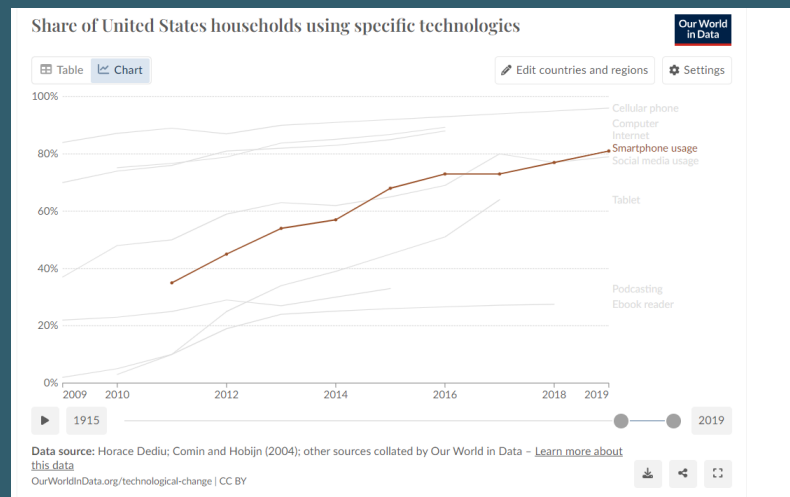
Disruptiv teknologi – til hjemmebrug



Hvem havde i 1997, da jeg fik min første Hotmail.com adresse

Google, facebook, Tinder eller den amerikanske valgkamp 2016?

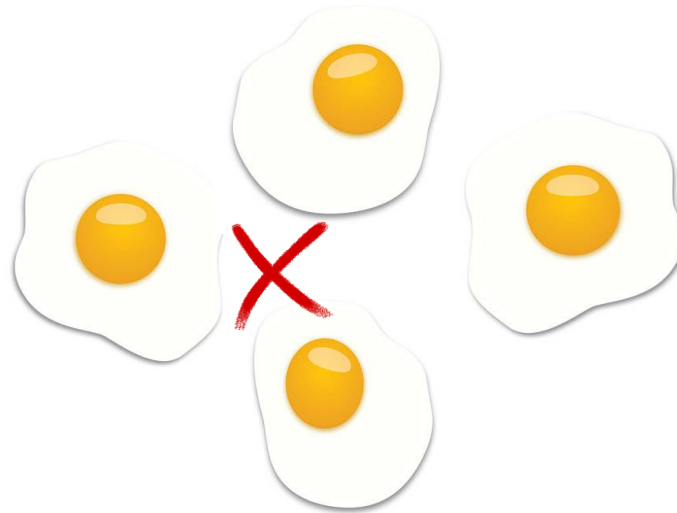
Og hvem havde forudset I 2008 forudset hvad iPhone betyder for vores liv?



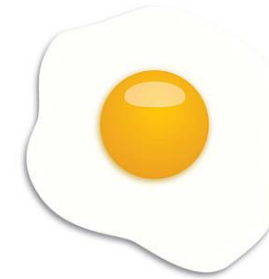
AI is best where ...



... there is loads of data.



... it can fill in the holes.



AI hallucinates if we ask question far away from the data is.





This why Gen AI works better with fluffy kittens...

And in construction we don't have that much data in construction

2.5

quintillion (10^{18}) bytes
generated every day in construction

329

quintillion (10^{18}) bytes
generated every day

That is 0,76%; Gaming is 10% and online shopping 5%

And construction uses less then 4% of its data

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Hvad gør virksomhederne?



Styrke den enkelte medarbejder



Skabe sandkasser



Bygge specifikke værktøjer og rulle dem ud?



Planer og strategier



Venter og ser hvad der sker

AI anvendelse i byggeri



Design

GPT sandboks

Kontrakter

Kontoropgaver

Risikostyring

Planlægning af byggeri

Billedegenkendelse

Tilbud

Visualiseringer

Planlægning af FM

Informationshåndtering

Visualiseringer



Billede AI værktøjer som **Stable Difusion**, **Midjourney** og **Dall-E** kan bruges til at skabe grundlaget for visualiseringer.



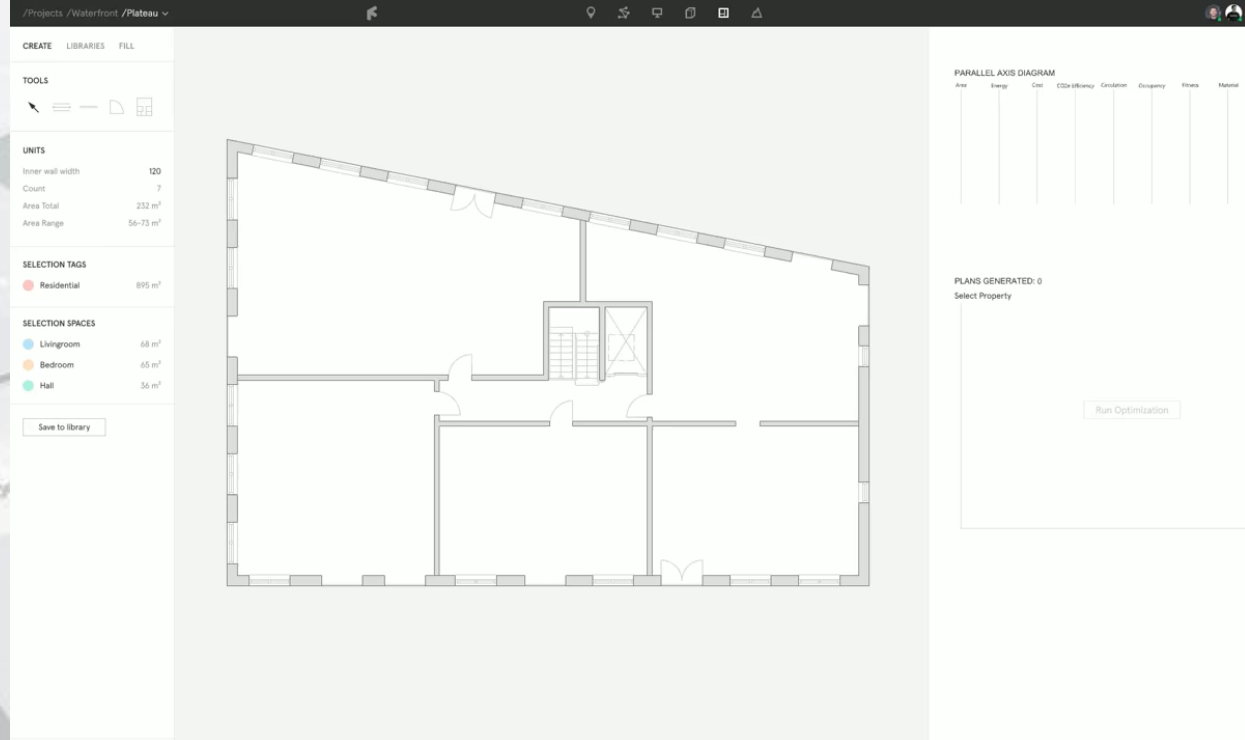
Også Ais til video redigering som **Runway** kan hjælpe med at skabe et hurtigere indtryk af byggeriet.



Design, projektering og BIM

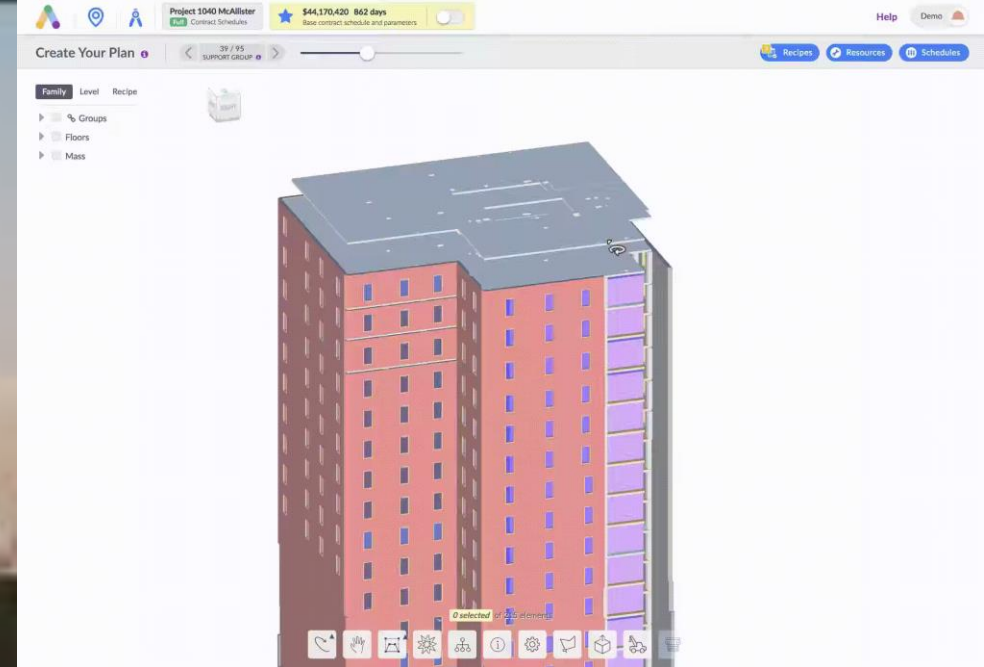
Løsninger som Autodesk Forma, Testfit.io, skema.ai og Finch 3D bruger kunstig intelligens og optimering til at skabe alt fra tidlige volumen modeller over grundplaner til detaljerede BIM modeller.

Generative design der tidligere krævede at man kunne kode er på vej ind i kommercielle værktøjer der ændrer den måde vi samarbejder og bygger på.



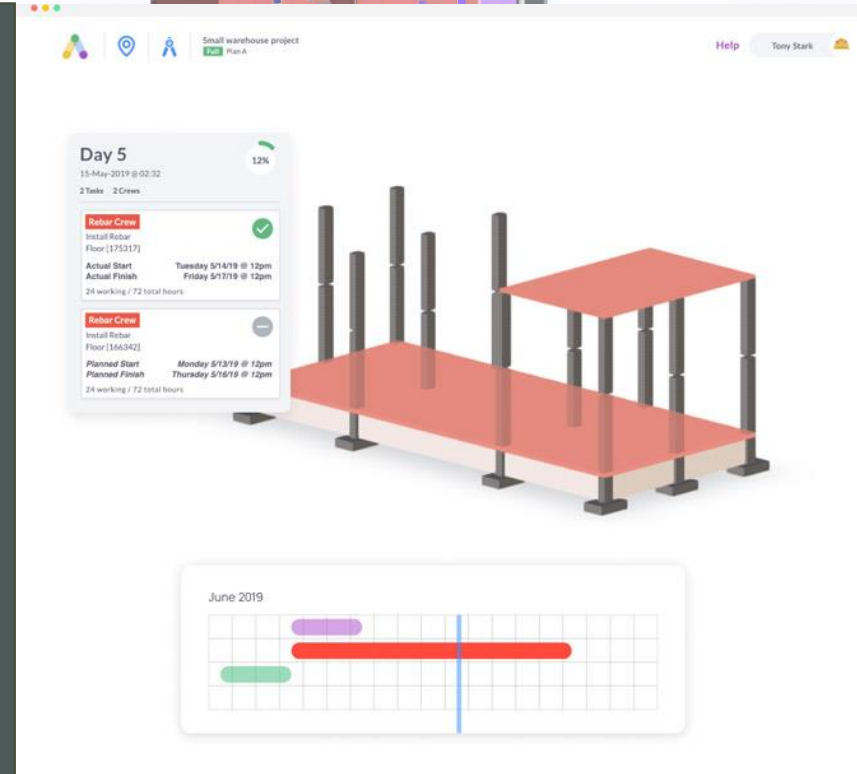
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LAB_

Planlægning af byggeri

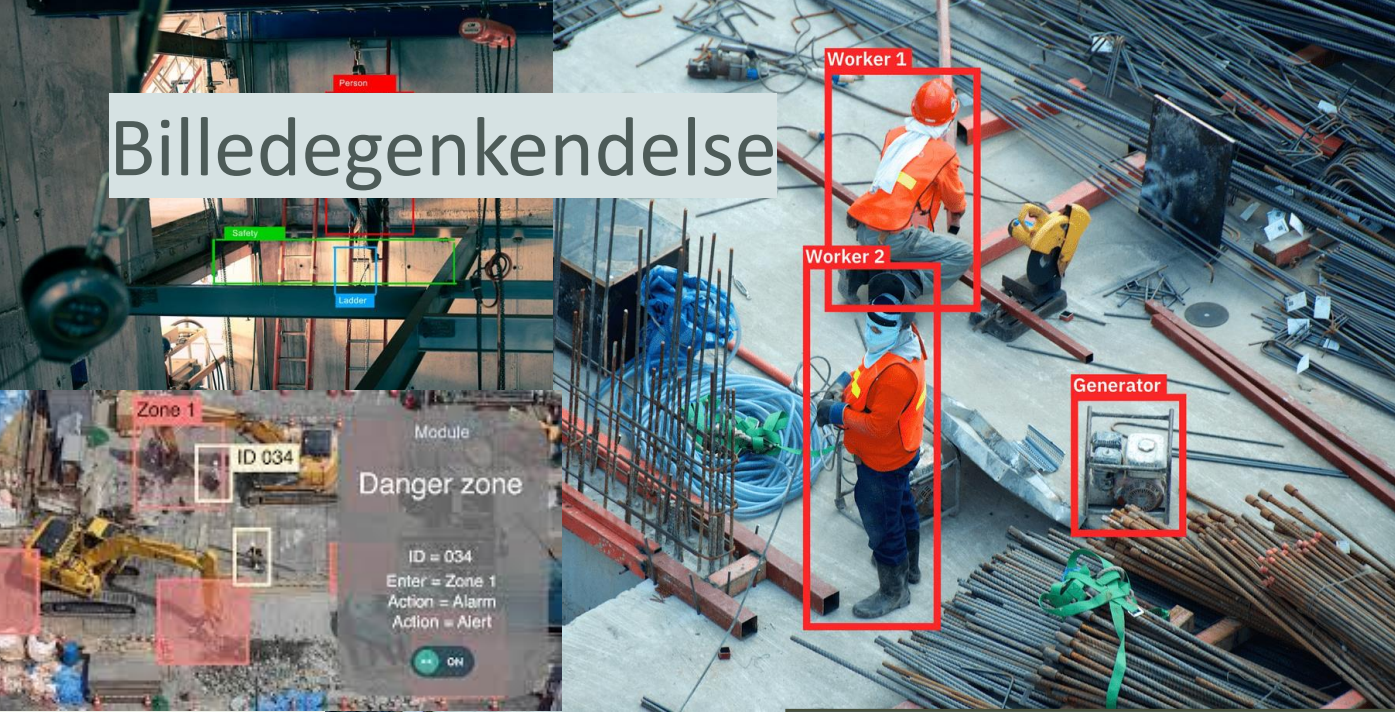


Alice Technologies bruger optimering for at skabe tidsplaner der sikre laveste omkostninger, den hurtigste tid eller de laveste klimapåvirkninger.

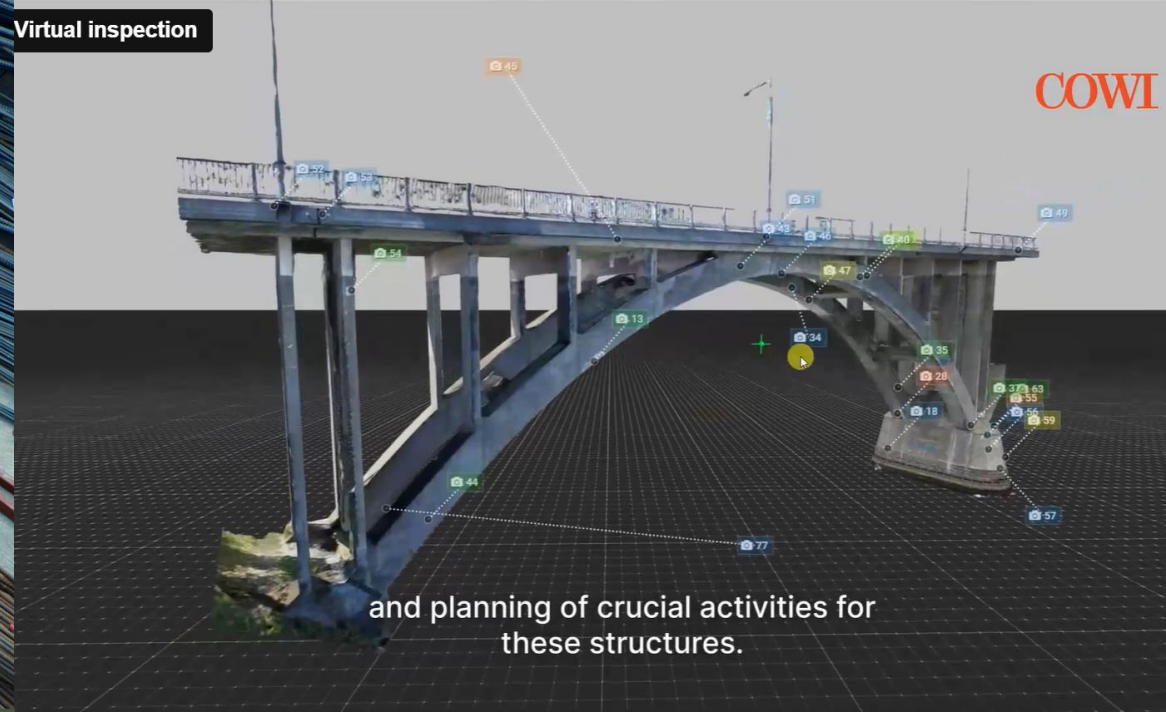
Buildots bruger billedegenkendelse og BIM modeller til at registrere fremdriften på byggeriet.



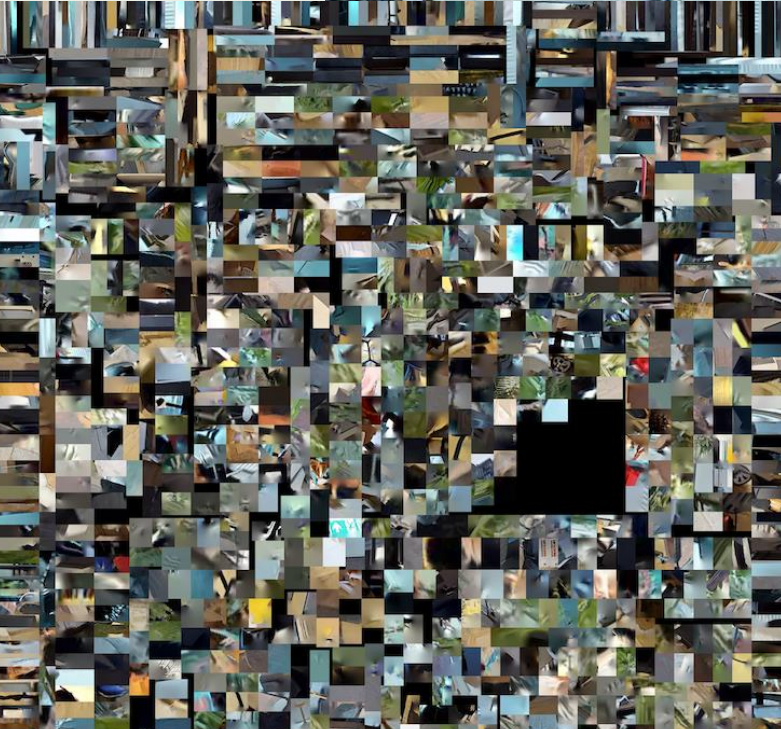
Billedegenkendelse



Virtual inspection



and planning of crucial activities for these structures.



Kunstig intelligens til genkendelse af indholdet i billeder har en lang række use case om det er at identificere skader som i COWIs virtual inspection eller identificere brud på sikkerhedsreglerne.

Med fx Lobe.ai kan du træne dine egne billed genkendelses Ais.

Tegl-AI-(C)

- Label
- Train
- Use

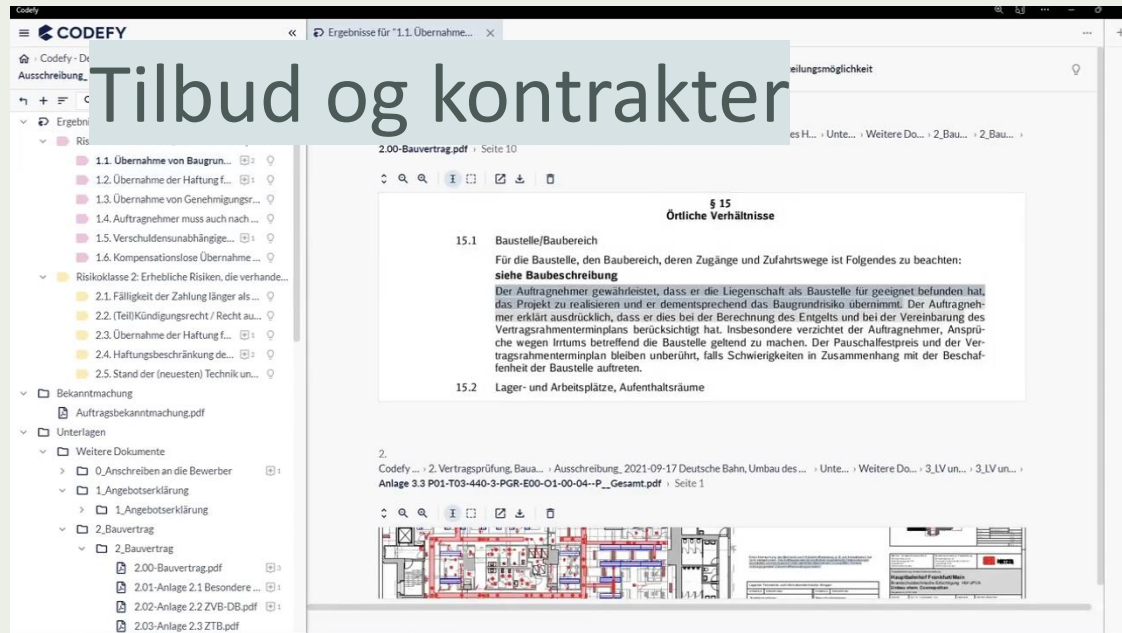
All Images 94%
Cracked 94%
Intact 94%

94% of your images are predicted correctly, 6% incorrectly.

All Images

Correct 94%

Incorrect 6%

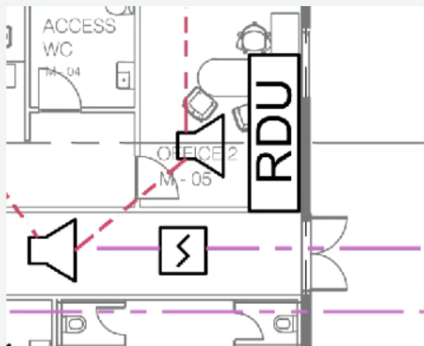


Tilbud og kontrakter

Virksomheder eksperimenterer med at lave deres egne GPT til at forstå og analysere kontrakter, lave udbudstekster eller svare på tilbud.

Tilbuds- og mængdeudtagsværktøjer, som **Togal** eller **Sparkel** bruger billedgenkendelse til at lave mængdeoversigter fra tegninger og modeller og **Codefy** analyserer kontrakter for risici, dog desværre kun på tysk og engelsk lige nu.

Draw a box around each symbol with the appropriate label. If there is no label for that symbol then ignore it.

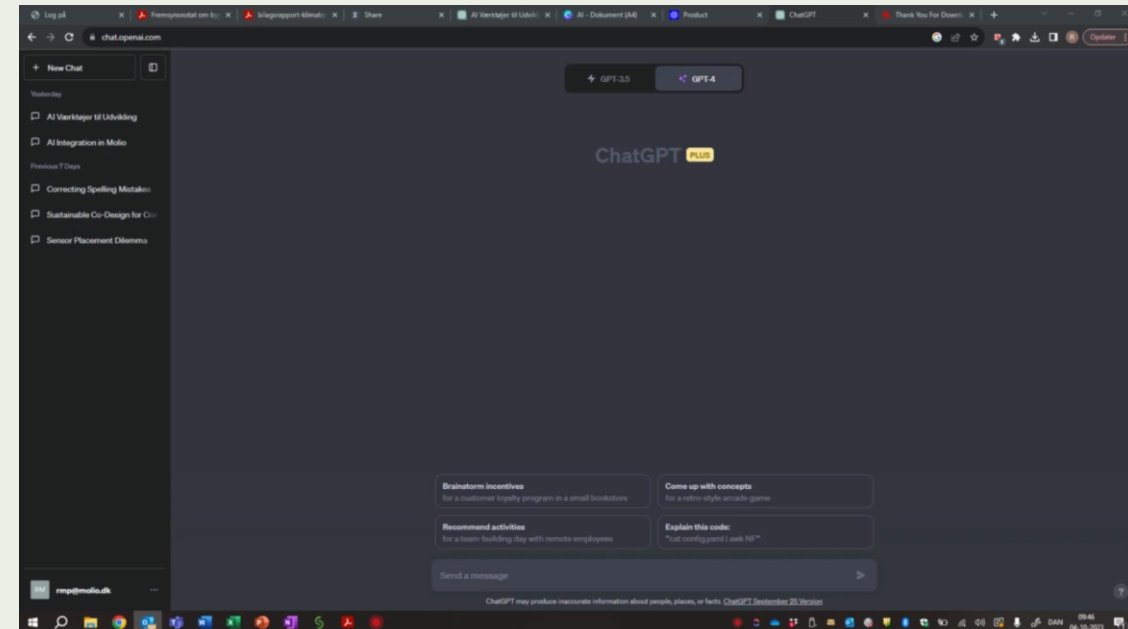


Labels


Filter labels



- New Horn Type Speaker 1
- New Smoke Detector 2
- Smoke Detector in Duct 3
- End of Line Device (ELD) 4
- Manual Call Points Outdoor 5
- Strobe Lights
- FIP or "FDCIE" Panel 7
- New Thermal Detector - Exp... 8
- New Recessed Speaker 9
- Smoke Detector with Sound... 0


Symbol	Label
	New Horn T
	New Smo
	Smoke Det
	End of Line
	Manual Call P
	Strobe
	FIP or "FD
	New Thermal D
	New Reces
	Smoke Detector




AI for filer








Ask Humata




what legal risks can the Company face due to the absence of specific mention of subcontractor indemnification?




The absence of specific mention of subcontractor indemnification could expose the Company to potential legal risks such as liability for damages or losses caused by the subcontractor, or disputes arising from unclear allocation of responsibilities and liabilities [4]. This could potentially lead to costly legal proceedings and damage to the Company's reputation [1]. Therefore, it may be prudent to consider drafting a separate indemnity clause for subcontractor obligations to clearly define the responsibilities and liabilities of all parties involved [4].

Pages: [3](#) [4](#)

Ask ...

should a separate indemnity clause be drafted for the Company's obligations towards a subcontractor?



of this Agreement), Customer shall be billed for such usage and Customer agrees to pay the additional fees in the manner provided herein. If Customer believes that Company has billed Customer incorrectly, Customer must contact Company no later than 60 days after the closing date on the first billing statement in which the error or problem appeared, in order to receive an adjustment or credit. Inquiries should be directed to Company's customer support department.

4.2 Company may choose to bill through an invoice, in which case, full payment for invoices issued in any given month must be received by Company thirty (30) days after the mailing date of the invoice. Unpaid amounts are subject to a finance charge of 1.5% per month on any outstanding balance, or the maximum permitted by law, whichever is lower, plus all expenses of collection and may result in immediate termination of Service. Customer shall be responsible for all taxes associated with Services other than U.S. taxes based on Company's net income.

5. TERM AND TERMINATION

5.1 Subject to earlier termination as provided below, this Agreement is for the Initial Service Term as specified in the Order Form, (the "Term").

5.2 In addition to any other remedies it may have, either party may also terminate this Agreement upon thirty (30) days' notice (or without notice in the case of nonpayment), if the other party materially breaches any of the terms or conditions of this Agreement. Customer will pay in full for the Services up to and including the last day on which the Services are provided. All sections of this Agreement which by their nature should survive termination will survive termination, including, without limitation, accrued rights to payment, confidentiality obligations, warranty disclaimers, and limitations of liability.

6. WARRANTY AND DISCLAIMER

Company shall use reasonable efforts consistent with prevailing industry standards to maintain the Services in a manner which minimizes errors and interruptions in the Services and shall perform the Services in a professional and workmanlike manner. Services may be temporarily unavailable for scheduled maintenance or for unscheduled emergency maintenance, either by Company or by third-party providers, or because of other causes beyond Company's reasonable control, but Company shall use reasonable efforts to provide advance notice in writing or by e-mail of any scheduled service disruption. HOWEVER, COMPANY DOES NOT WARRANT THAT THE SERVICES

7. INDEMNITY

Company shall hold Customer harmless from liability to third parties resulting from infringement by the Service of any United States patent or any copyright or misappropriation of any trade secret, provided Company is promptly notified of any and all threats, claims and proceedings related thereto and given reasonable assistance and the opportunity to assume sole control over defense and settlement; Company will not be responsible for any settlement it does not approve in writing. The foregoing obligations do not apply with respect to portions or components of the Service (i) not supplied by Company, (ii) made in whole or in part in accordance with Customer specifications, (iii) that are modified after delivery by Company, (iv) combined with other products, processes or materials where the alleged infringement relates to such combination, (v) where Customer continues allegedly infringing activity after being notified thereof or after being informed of modifications that would have avoided the alleged infringement, or (vi) where Customer's use of the Service is not strictly in accordance with this Agreement. If, due to a claim of infringement, the Services are held by a court of competent jurisdiction to be or are believed by Company to be infringing, Company may, at its option and expense (a) replace or modify the Service to be non-infringing provided that such modification or replacement contains substantially similar features and functionality, (b) obtain for Customer a license to continue using the Service, or (c) if neither of the foregoing is commercially practicable, terminate this Agreement and Customer's rights hereunder and provide Customer a refund of any prepaid, unused fees for the Service.

8. LIMITATION OF LIABILITY

NOTWITHSTANDING ANYTHING TO THE CONTRARY, EXCEPT FOR BODILY INJURY OF A PERSON, COMPANY AND ITS SUPPLIERS (INCLUDING BUT NOT LIMITED TO ALL EQUIPMENT AND TECHNOLOGY SUPPLIERS), OFFICERS, AFFILIATES, REPRESENTATIVES, CONTRACTORS AND EMPLOYEES SHALL NOT BE RESPONSIBLE OR LIABLE WITH RESPECT TO ANY SUBJECT MATTER OF THIS AGREEMENT OR TERMS AND CONDITIONS RELATED THERETO UNDER ANY CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHER THEORY: (A) FOR ERROR OR INTERRUPTION OF USE OR FOR LOSS OR

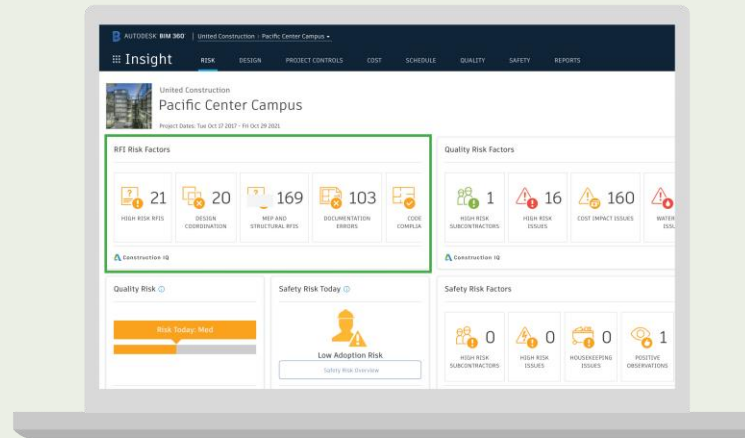
3

19

AI for risk management



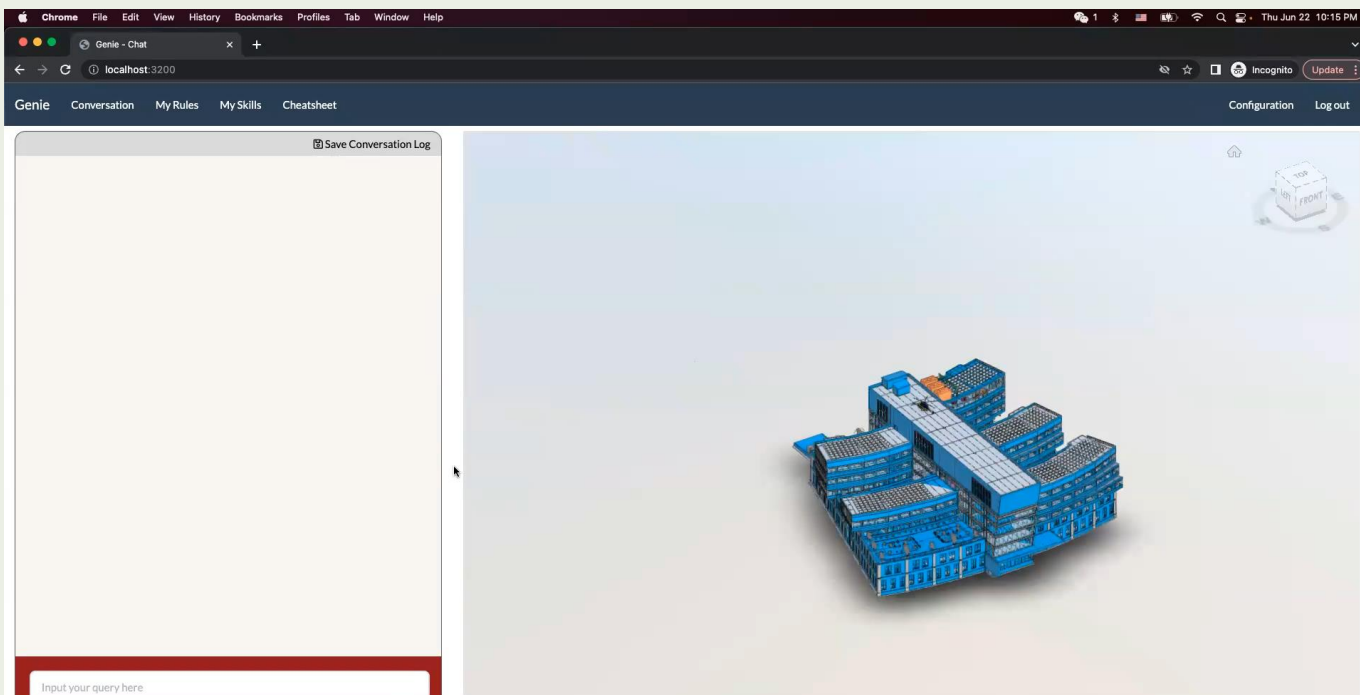
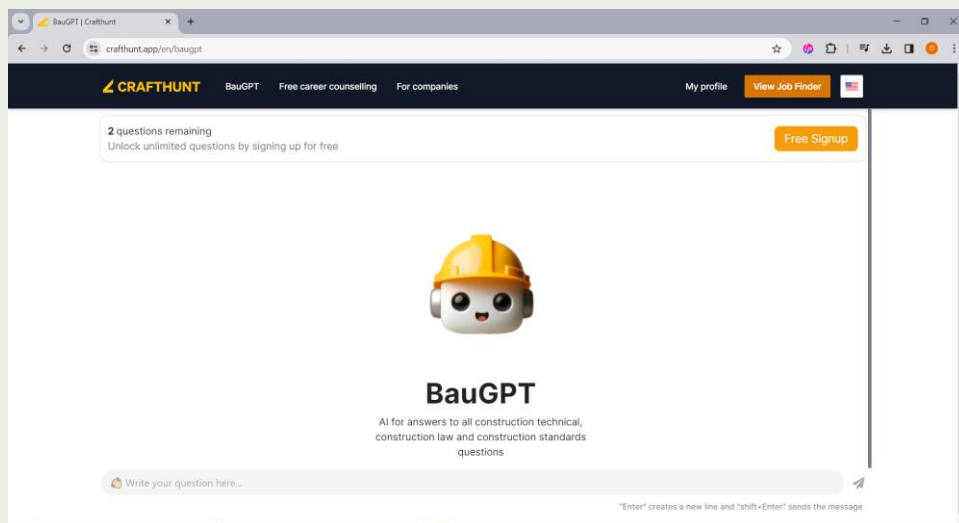
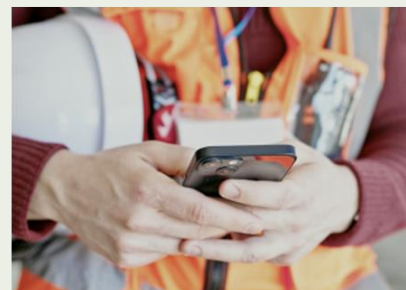
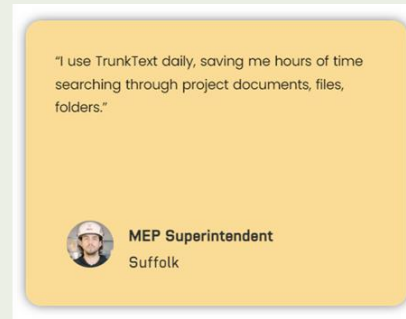
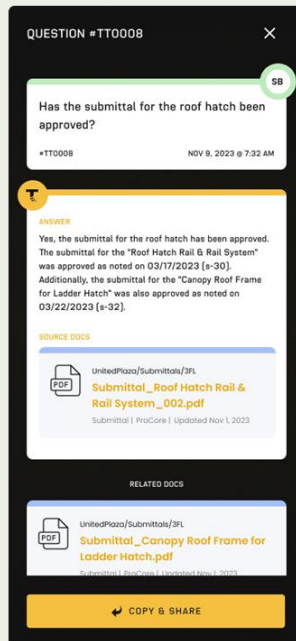
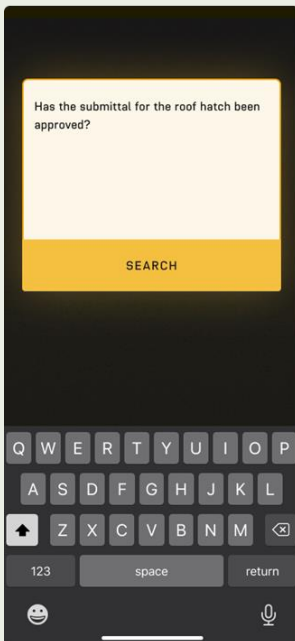
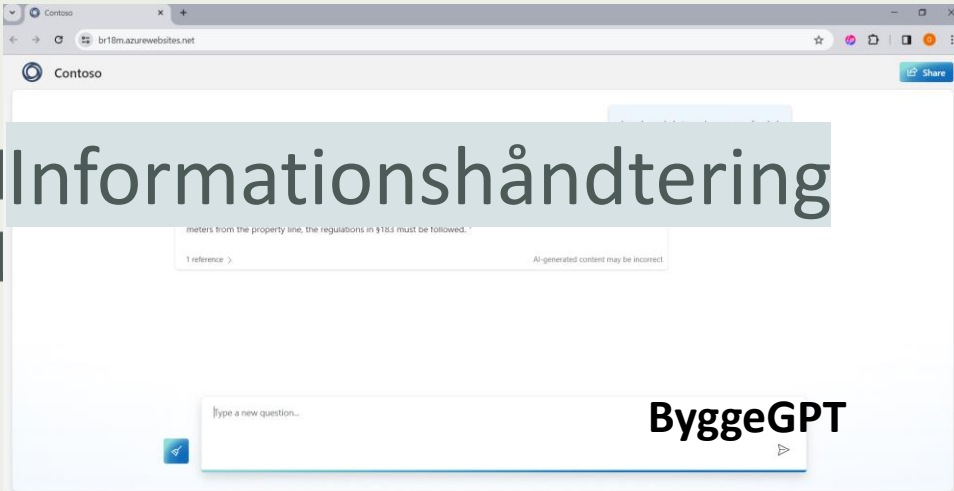
ORACLE
Construction and
Engineering



 **AUTODESK**
CONSTRUCTION
CLOUD

Projektplaforme som Oracles Construction Intelligences Cloud eller Autodesk Construction Cloud burger adgangen til project informationerne til at forudsige risici tidsplan, budget og projektmateriale.

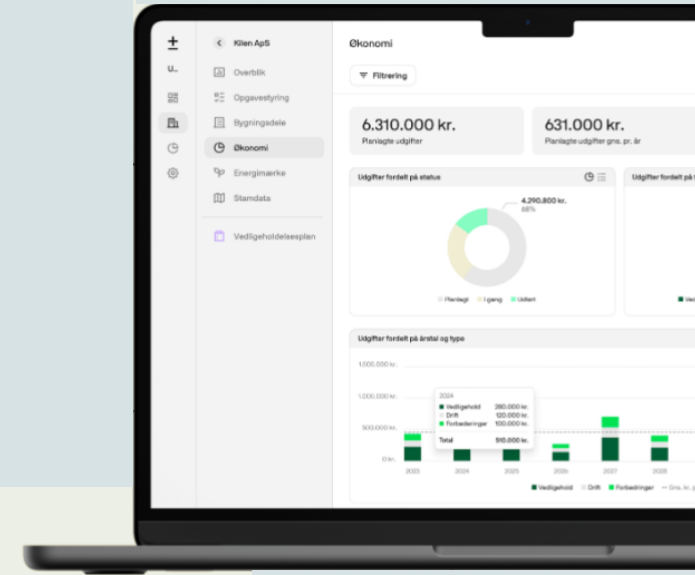
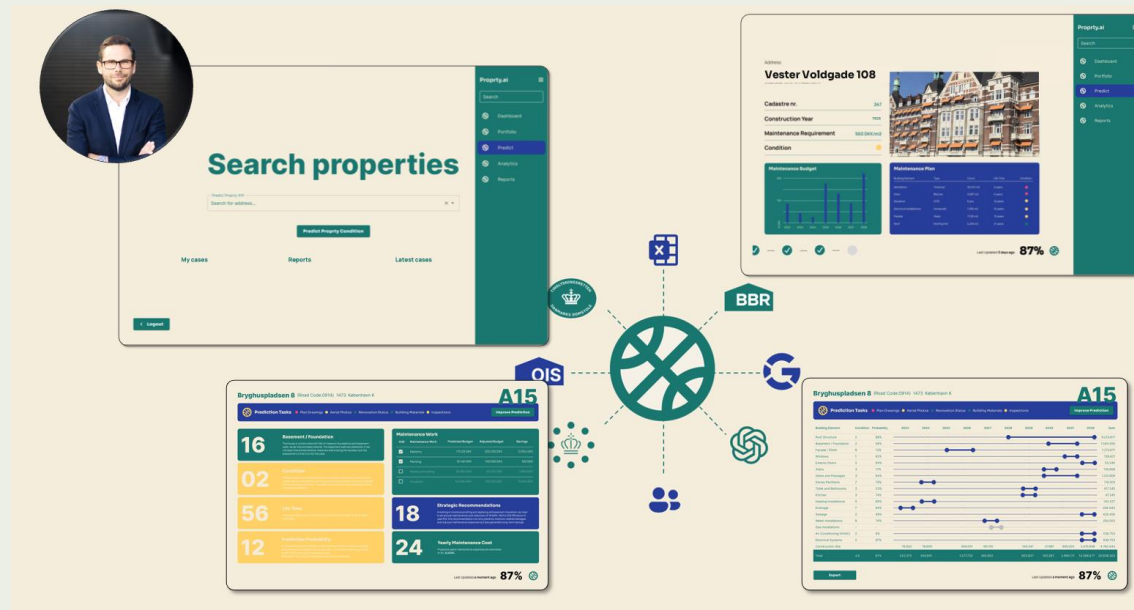
Informationshåndtering



Custom GPT løsninger som ConTech Labs **ByggeGPT**, tyske **bauGPT** eller hollandske **Struct** gør byggeriets samlede viden tilgængelig. **Trunk tools** sikrer på lignendevis at project informationer er tilgængelige, mens forskningsprojektet **BIMGPT** sikrer nemmere adgang til BIM modeller.



Planlægning af facilities management

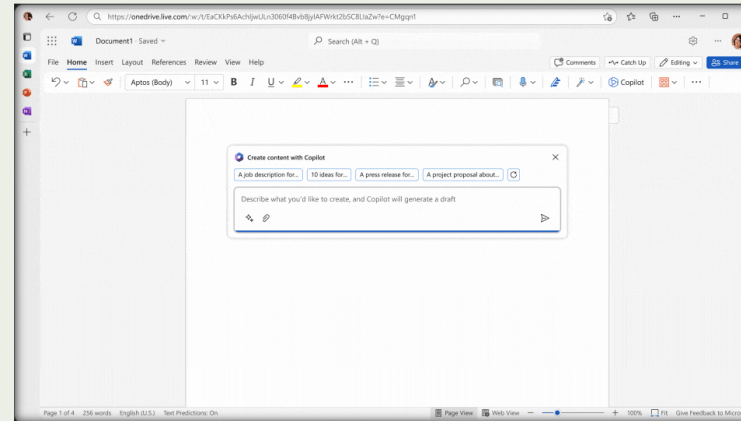


Upsite

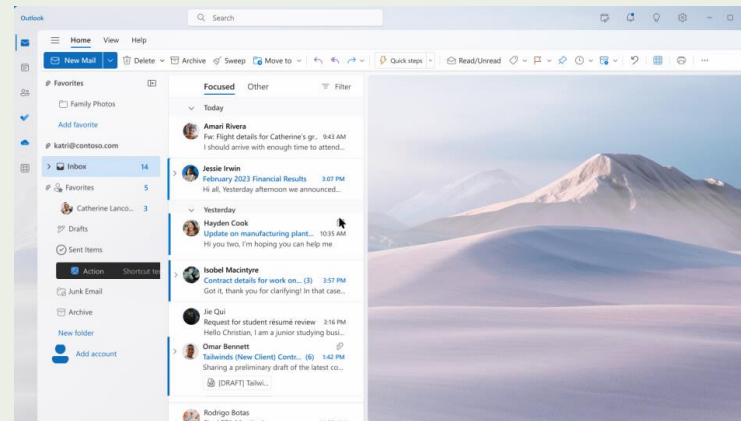
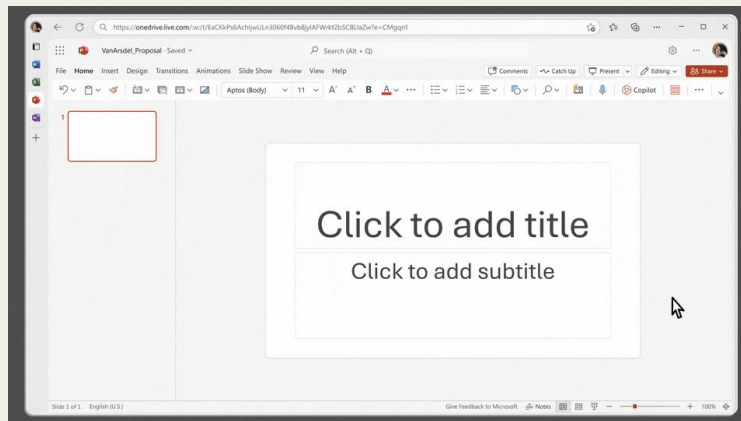
Property.ai og Upsite bruger kunstig intelligens til at planlægge vedligehold af bygningen.

Administration og kontoropgaver

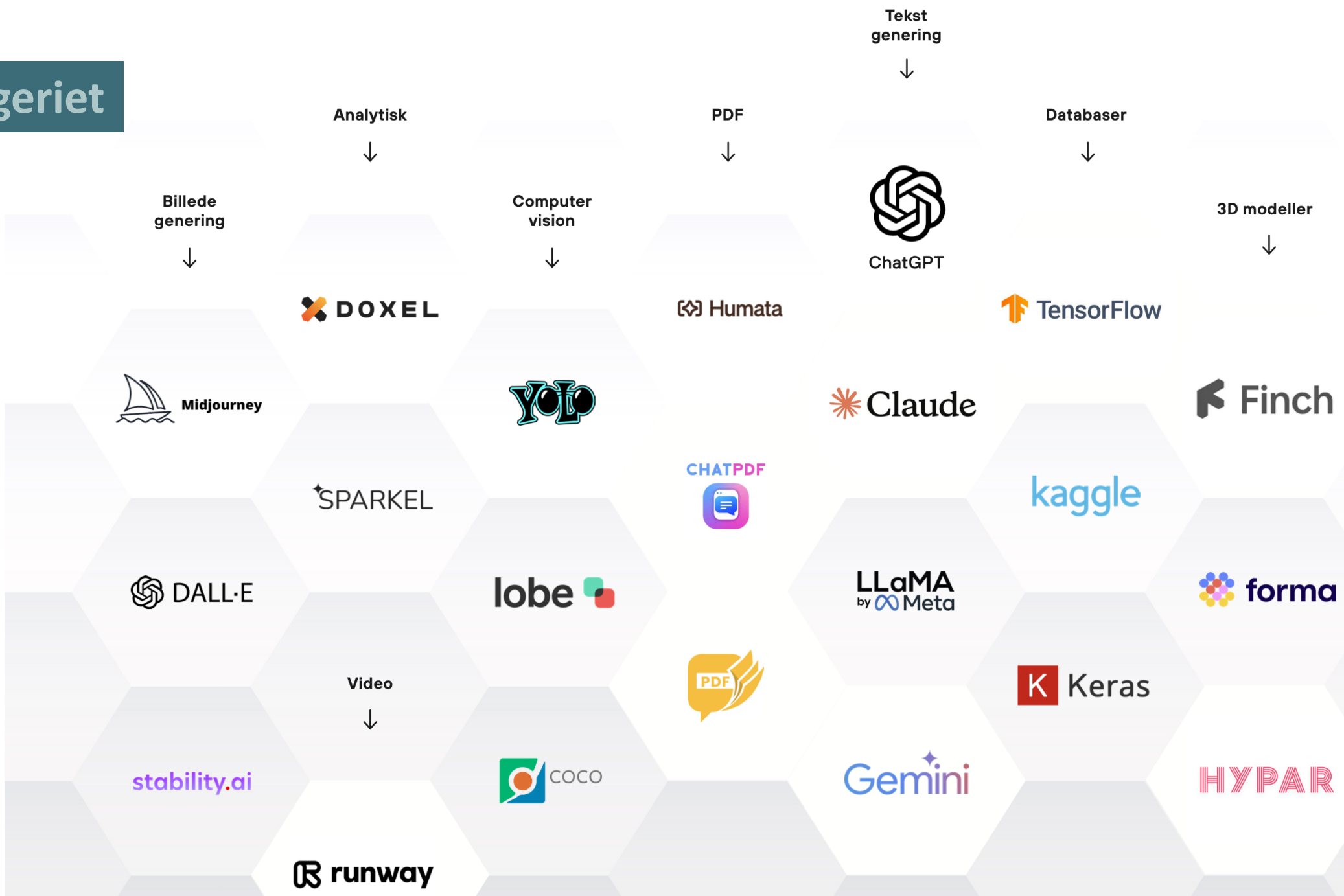
Country	Customer	Product	Discount Band	Units Sold	Manufacturing Price	Sales Price	Discounts	Sales	COGS
France	VanArndel	Biodegradable Cleaning Products	Low	4345	\$10	\$352	\$1,529,440	\$15,294	\$1,514,146
USA	VanArndel	Biodegradable Cleaning Products	Low	4245	\$10	\$352	\$1,494,240	\$14,942	\$1,479,298
Australia	VanArndel	Biodegradable Cleaning Products	None	4124	\$10	\$352	\$1,451,648	\$0	\$1,451,648
Mexico	VanArndel	Biodegradable Cleaning Products	Medium	3954	\$10	\$352	\$1,391,808	\$83,508	\$1,308,300
France	Contoso Pharmaceuticals	Biodegradable Cleaning Products	Low	4952	\$10	\$127	\$628,904	\$6,289	\$622,615
France	Contoso Pharmaceuticals	Recycled Can	Low	4903	\$0	\$127	\$622,681	\$6,227	\$616,454
Canada	Proseware	Natural Personal Care Products	Low	1954	\$270	\$302	\$596,108	\$5,991	\$590,117
Canada	Proseware	Biodegradable Cleaning Products	High	1950	\$220	\$302	\$600,980	\$84,137	\$516,843
USA	VanArndel	Compostable Food Packaging	Low	1254	\$3	\$380	\$476,520	\$4,765	\$471,755
USA	Proseware	Natural Personal Care Products	Medium	1465	\$224	\$302	\$442,430	\$26,546	\$415,884
USA	Proseware	Sustainable Snack Packaging	Medium	1410	\$120	\$302	\$425,820	\$25,549	\$400,271
Australia	Proseware	Natural Personal Care Products	Medium	1369	\$224	\$302	\$413,438	\$24,896	\$388,542
USA	VanArndel	Compostable Food Packaging	Medium	1052	\$3	\$380	\$399,760	\$23,986	\$375,774
Canada	VanArndel	Compostable Food Packaging	Low	880	\$312	\$380	\$332,400	\$3,724	\$328,676
Australia	Proseware	Sustainable Snack Packaging	Medium	1298	\$120	\$302	\$391,996	\$23,520	\$368,476
Australia	VanArndel	Compostable Food Packaging	None	954	\$3	\$380	\$362,520	\$0	\$362,520
Canada	Contoso Pharmaceuticals	Biodegradable Cleaning Products	Low	2785	\$110	\$127	\$353,695	\$3,537	\$350,158



Værktøjer som Microsofts Copilot, men også generelle GPT modeller bliver brugt til fra at skrive emails og tekster, over powerpoint slides til at analysere data i regneark.



AI'er til byggeriet



2023

Fire bølger af AI

2024-2025

2025-26

2026-28



Første bølge:

AI Natives

ChatGPT, Midtjorney, Gemini

Anden bølge:

1. Early startups:

Harvey, Perplexity

2. Fast midmarket incumbents: Zapier, Notion, ...

3. Outlayer enterprise:

Microsoft, Adobe

Tredje bølge:

1. Next startups: ...

Fjerde bølge Big Wave:

1. Real enterprise adoption

Hvad gør jeg så nu?

Det er vigtigt at experimentere

1) Lær en AI platform at kende

ChatGPT, Gemini, Midjourney, Dall-E

2) Identificer en anvendelse af AI

Referater, APVer, Tilbudstekster, osv osv

3) Tilpas en AI så den kan hjælpe din – det er ikke svært

4) Del din viden, få inspiration, tag på et kursus



Få noget hjælp...

SMV: Digital

Aktuelt

Åben for ansøgninger

Tilskud til privat rådgivning på 50.000 kr.

Vil du udforske nye veje inden for digitalisering eller e-handel? Ansøg om en tilskudsvoucher på 50.000 til en privat rådgiver, som kan understøtte din virksomheds udvikling eller implementering af nye digitale løsninger og ny teknologi.

[Læs mere om tilskuddet >](#)

Åben for ansøgninger

Tilskud til lån og afprøvning af robot på 125.000 kr.

Vil du forbedre din konkurrenceevne og din produktkvalitet? Og vil du frigøre dygtige medarbejdere fra gentagne og nedslidende arbejdsopgaver? Lige nu kan du søge om tilskud på 125.000 kr. til at låne og afprøve en robot i din virksomhed.

[Læs mere om tilskuddet >](#)

Åbner for ansøgning 30. september

Tilskud til privat rådgivning på 100.000 kr.

Har du ambitioner om at gennemføre større systemintegration på tværs af forretningsområder, eller drømmer du om at anvende nye digitale teknologier? Den 30. september åbner en ny pulje, hvor du kan søge om 100.000 kr. til indkøb af privat rådgivning til et større digitalt projekt.

[Læs mere om tilskuddet >](#)

Åben for indstillinger til 16. september 2024

Skal du vinde prisen for Årets Digitale SMV:Omstilling?

Har din virksomhed, eller en du kender, gennemgået en gennemgribende digital omstilling inden for de seneste år? Så har du lige nu mulighed for at indstille virksomheden til at vinde prisen for Årets Digitale SMV:Omstilling 2025.

[Indstil en virksomhed her >](#)

Hvor kan jeg lære mere

IDA

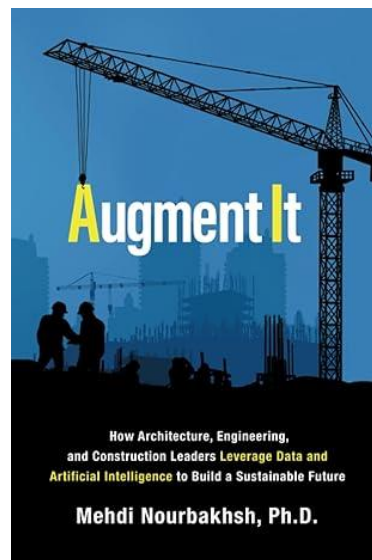
ChatGPT til ingeniør- og teknologiske opgaver

EN HURTIG GUIDE

1 Anvendelser for ChatGPT til ingeniør- og teknologiske arbejdsopgaver

- Teknisk skrivearbejde og dokumentation:
Opret manualer, vejledninger, specifikationer.
- Projektledelse og koordinering:
Generer rapporter, frem samarbejde.
- Forskning og innovation:
Opsummer forskning, forklar koncepter, skab planer.
- Design og udviklingsassistance:
Beskriv designparametre, generer kreativt indhold.
- Kvalitetssikring og regler:
Opret juridiske tekster, analyser feedback.
- Uddannelse og kommunikation:
Udvikl uddannelsesmaterialer, engager dig med samfundet.
- Tilgængelighed:
Konverter dokumenter til tale, skab tilgængeligt og forståeligt indhold.
- Grundlæggende matematisk og logisk assistance:
Udfør enkle beregninger, understøt dataanalyse.

<https://ida.dk/media/13392/chat-gpt-dk-1.pdf>



https://www.amazon.de/-/en/dp/1989737528?psc=1&smid=A3JWKAKR8XB7XF&ref_=chk_typ_imgToDp

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