Get Ready for Artificial Intelligence in Construction

Michael Moran
Founder/Consultant, Telos

Josh Kanner
Founder/CEO, Smartvid.io

Talk Outline

- What is AI anyways?
  - What can AI do for construction:
    - **Smartvid.io** (photo/video)
    - **BIM360 IQ** (project data)
- What can we expect in the coming years?

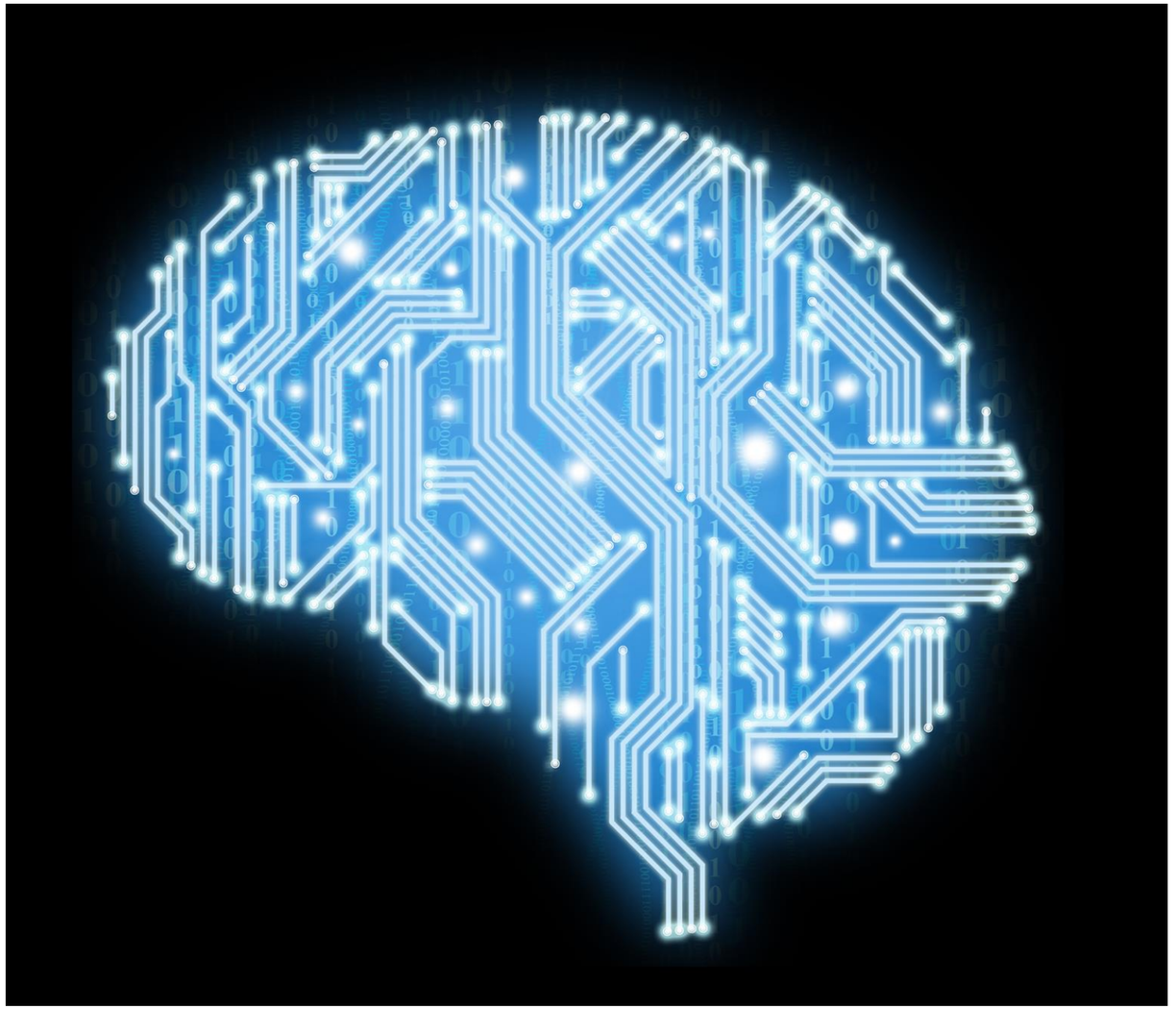


Image Credit: computerhope.com

Speakers



Michael Moran

Founder/Consultant, Telos



Josh Kanner

Founder/CEO, Smartvid.io



What is artificial intelligence anyways?

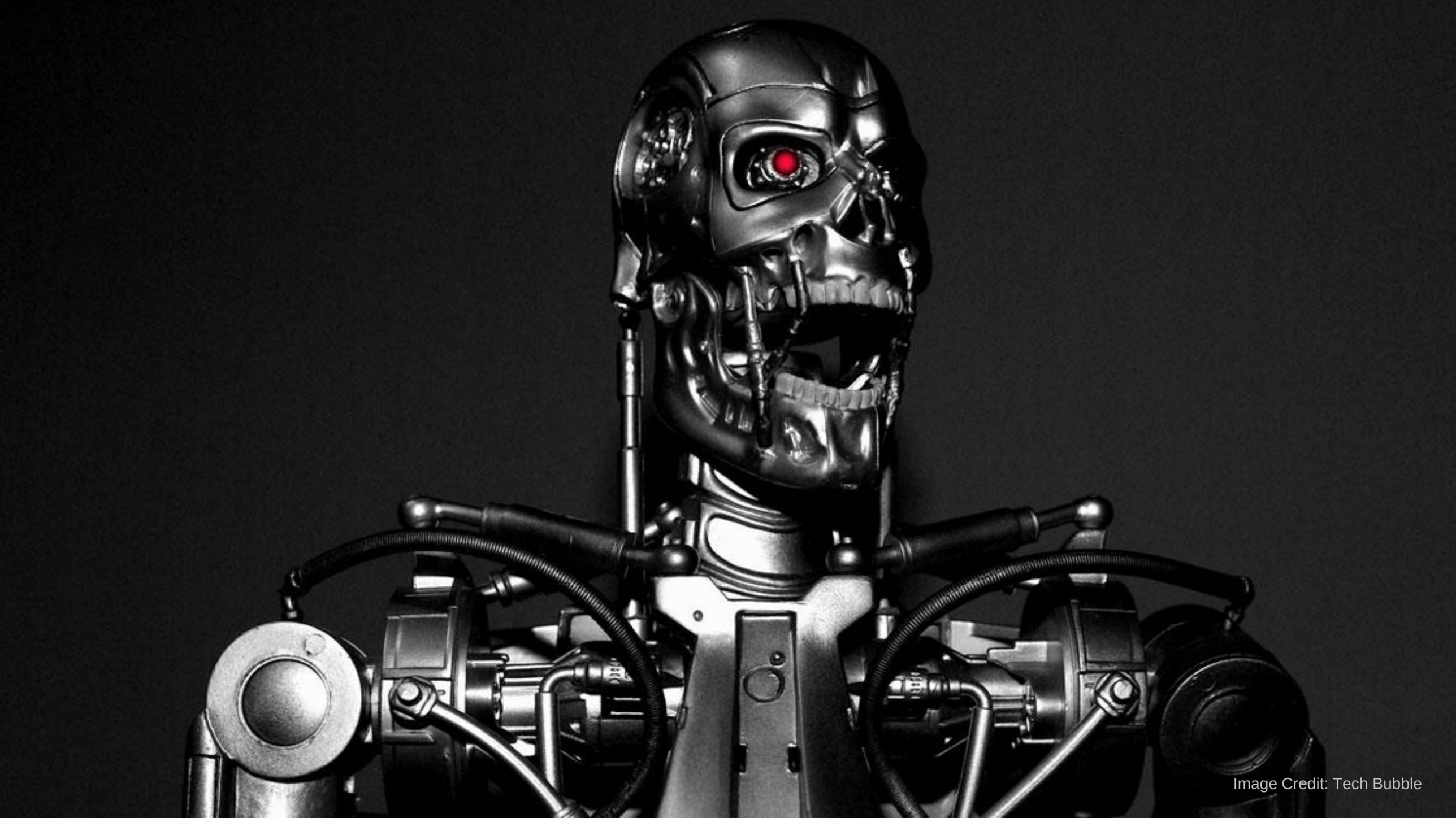


Image Credit: Tech Bubble

Computers until recently



Image Credit: computerhope.com

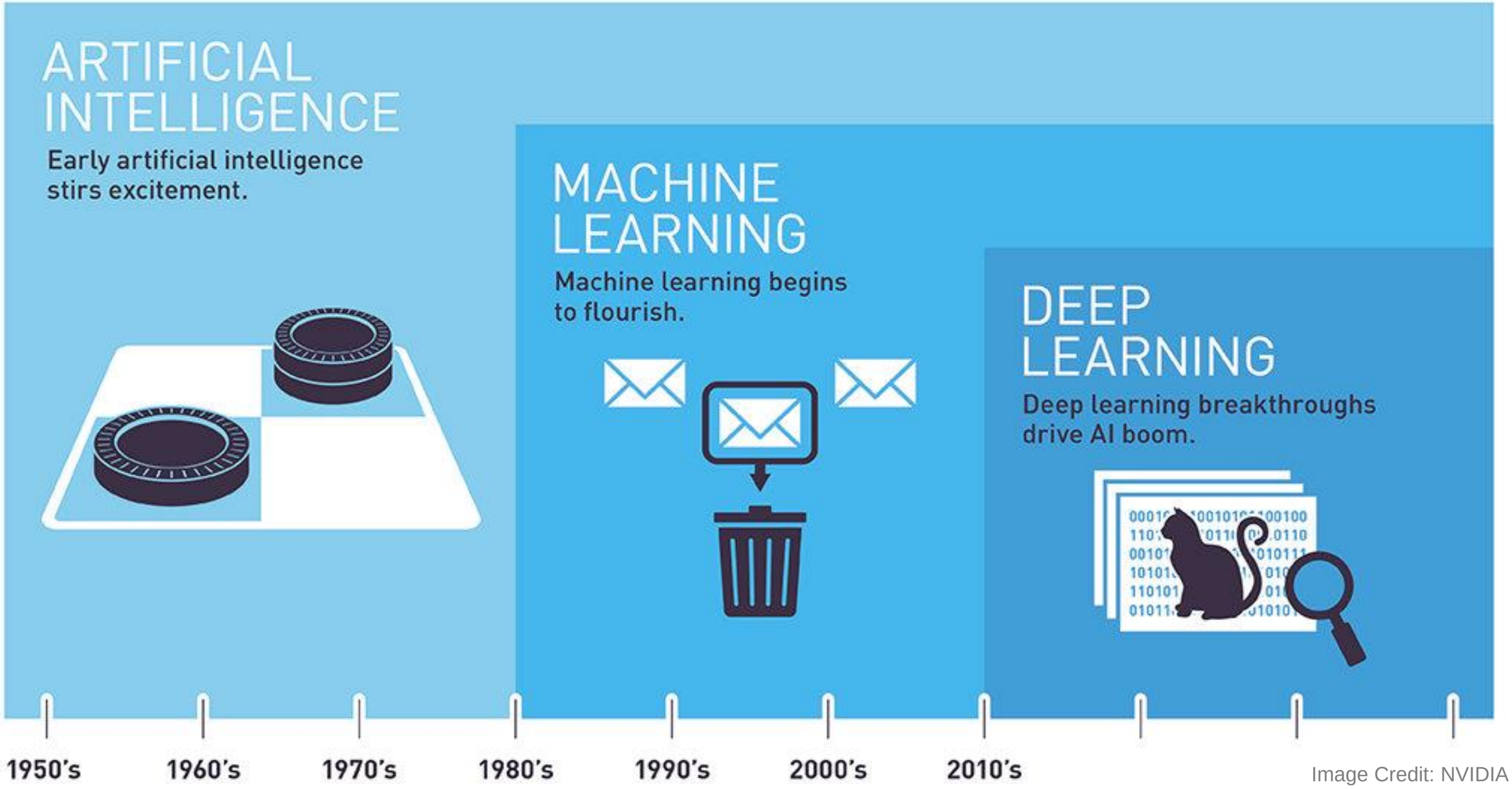


Image Credit: NVIDIA

Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

Deep Learning

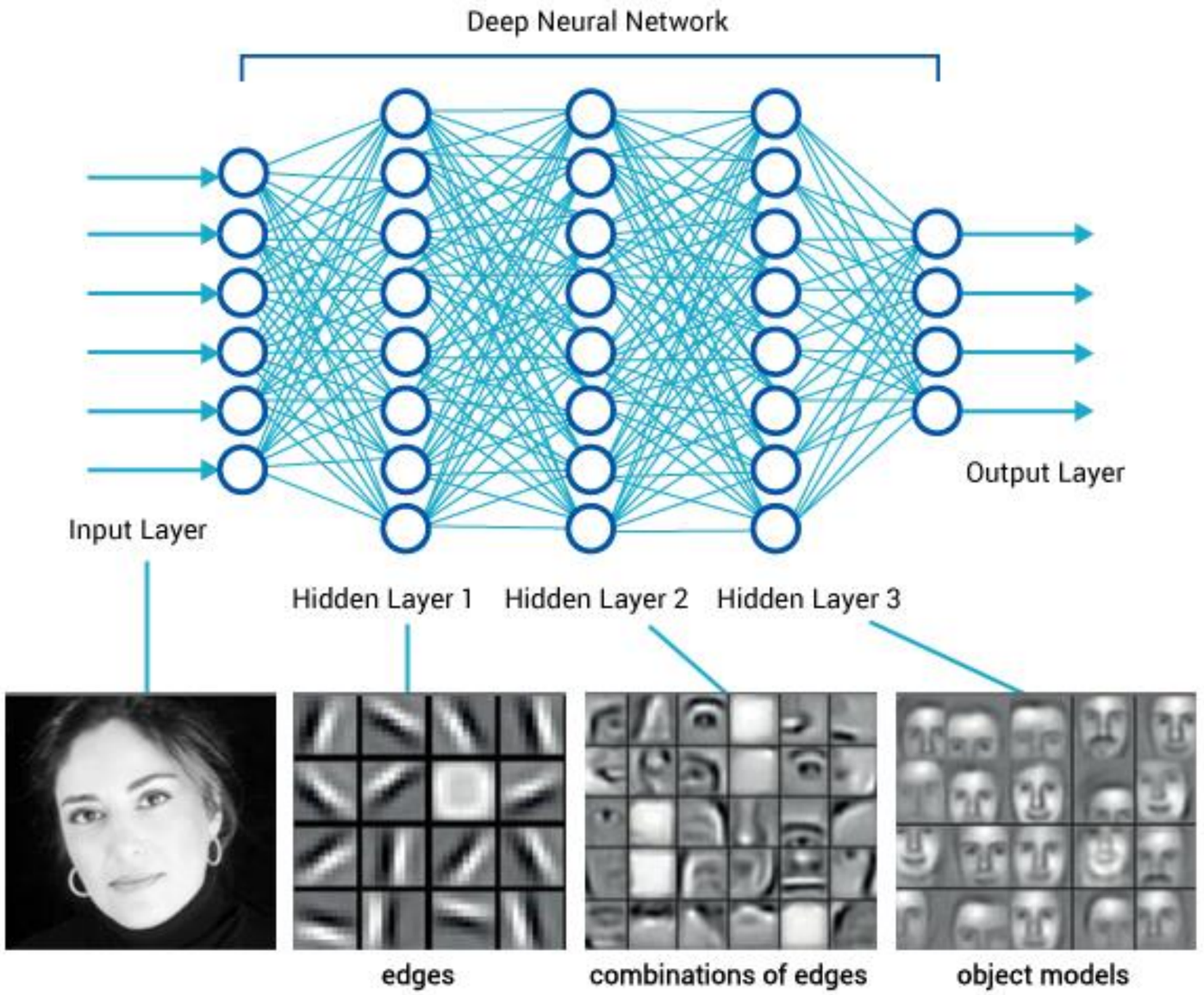


Image Credit: amax.com

Computers today

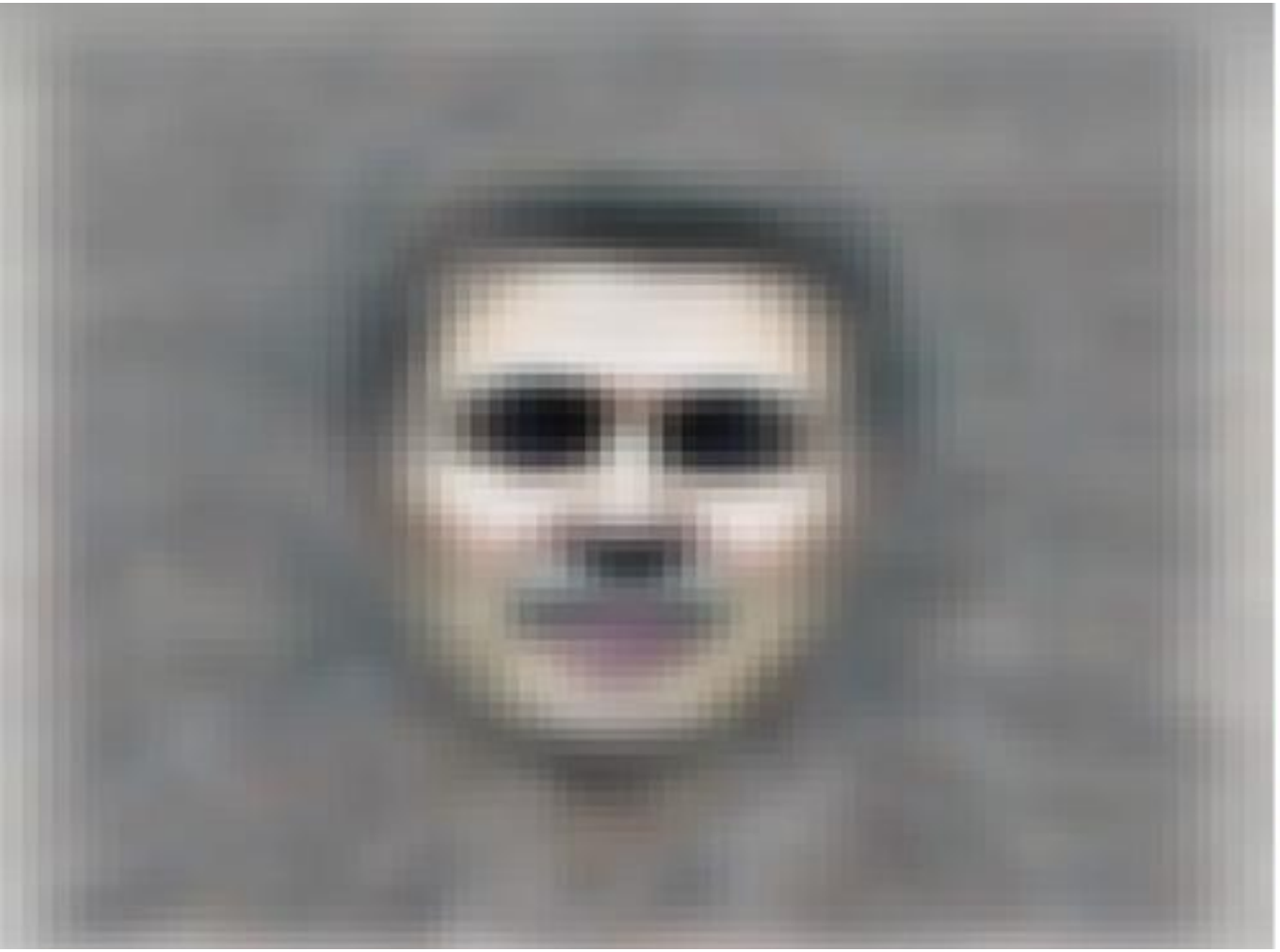




Image Credit: Google

Impacting virtually every industry

e-Paper | Sunday Chronicle

Deccan Chronicle

TECHNOLOGY, IN OTHER NEWS

Google's AI is now detecting cancer with Deep Learning

DECCAN CHRONICLE

Published Mar 4, 2017, 12:04 pm IST Updated Mar 4, 2017, 12:04 pm IST

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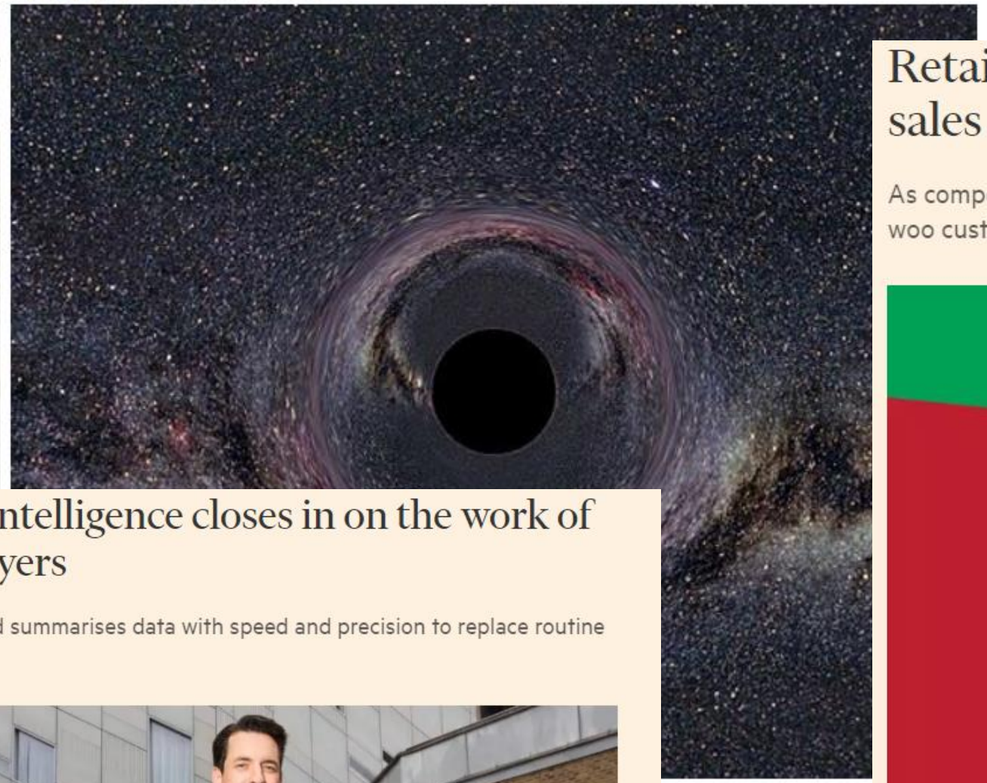
Training models is just the first of many steps in translating interesting re product.



Google is off to a very promising start, and Google ho

MIT Develops New Machine-Learning Algorithm Designed to Capture True Images of A Black Hole

By John Raphael Jun 09, 2016 01:50 AM EDT



Artificial intelligence closes in on the work of junior lawyers

'Lawtech' sifts and summarises data with speed and precision to replace routine tasks



Retailers look to artificial intelligence to bag sales

As competition grows ever tougher, more brands are using the technology to woo customers



© FT Graphic

Parallel computing



Parallel computing



Better Algorithms

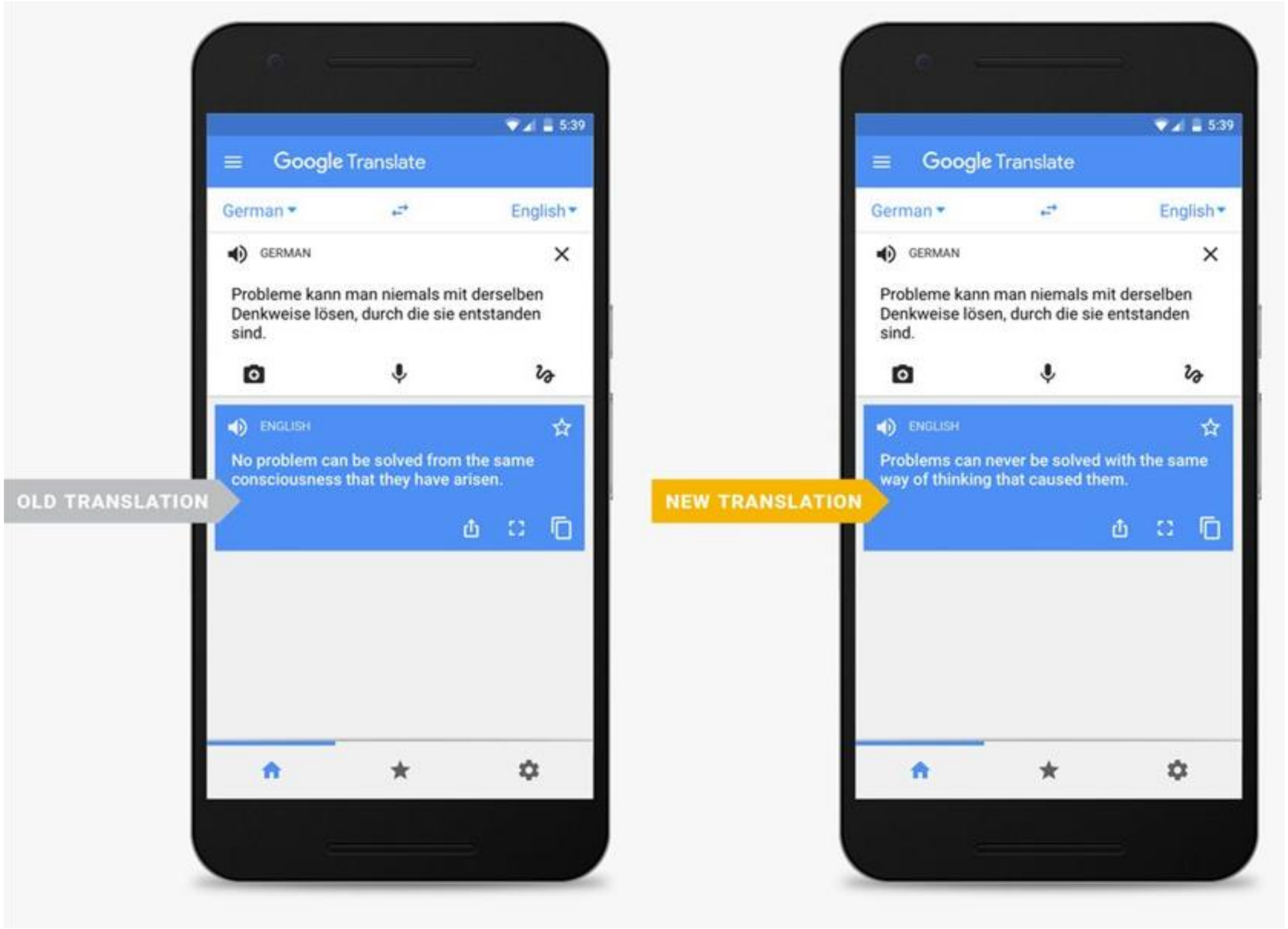
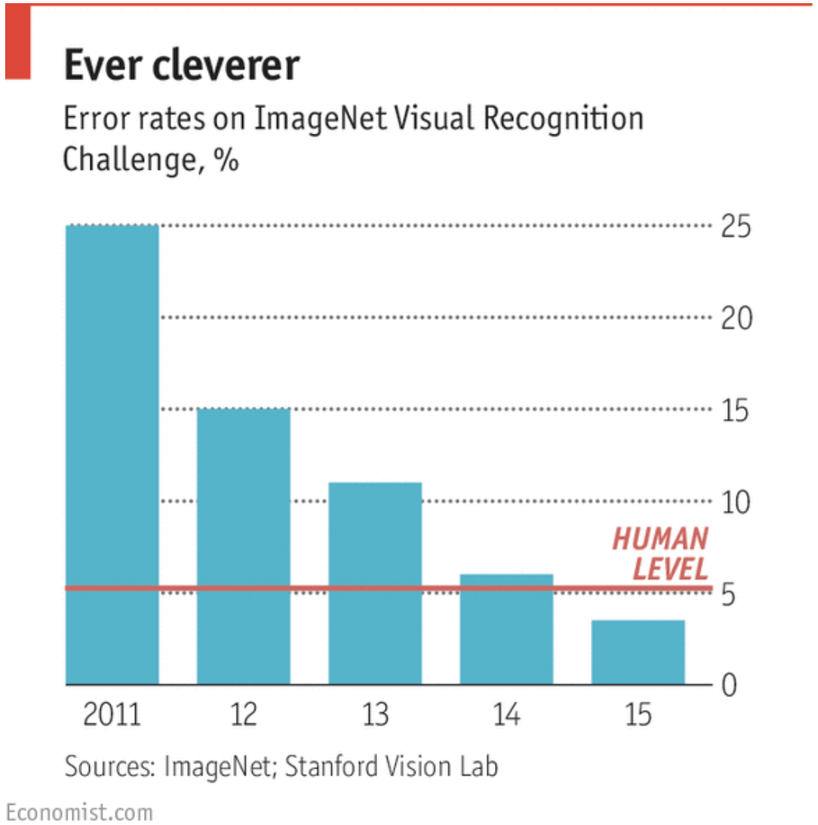


Image Credit: Google



Lots More Data



Image Credit: Familian

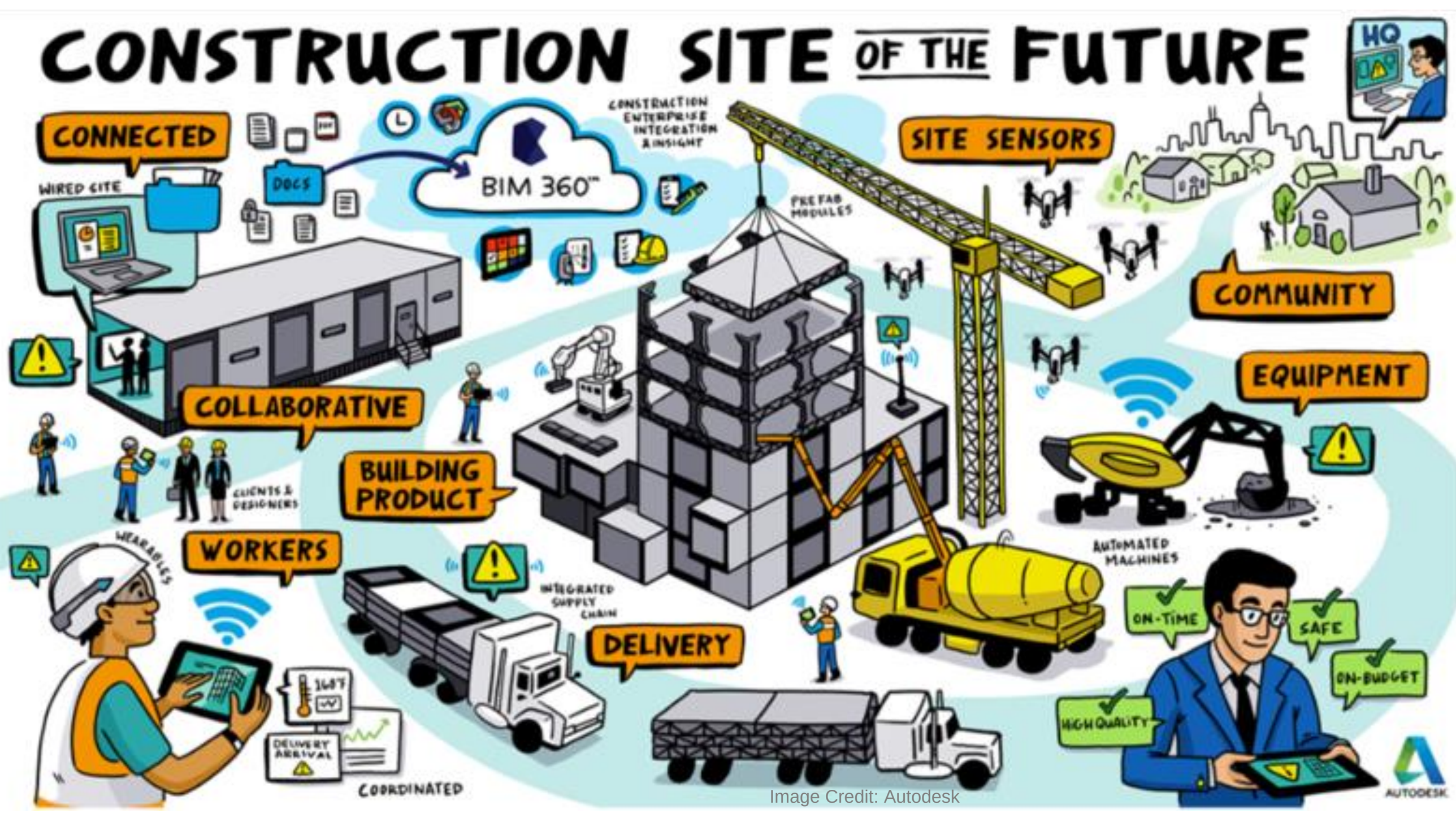


Image Credit: Autodesk

Construction Data Explosion

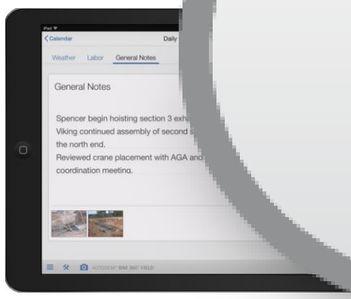












Text

Images

Voice

Sensors/ IOT

Structured data

AI & Analytics

Object level design data





Image Credit: Autodesk

AUTODESK.



SMARTVID.IO

AU London 2017

An untapped resource

MEDIA FROM THE FIELD

The amount of pictures & videos captured every day in the field keeps getting bigger.

50GB of data is generated on the typical project.



Much of it ends up unused, siloed across different systems and devices.

The Smartvid.io solution

OUR MISSION

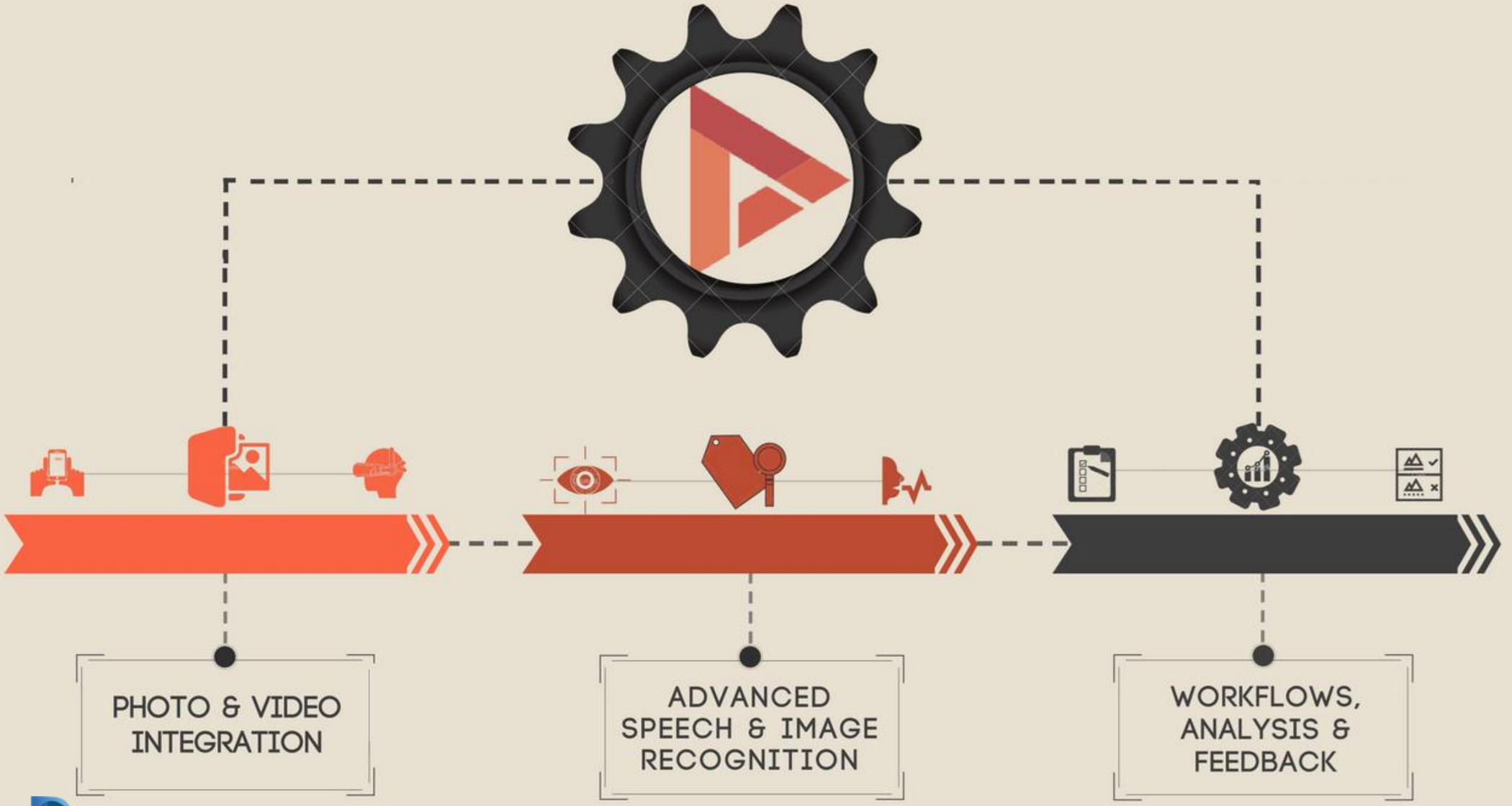


@ SMARTVID.IO,

we're unlocking the value of photos and videos to dramatically improve **safety, quality and productivity** in the AEC industry**.**

How it works

SMARTVID.IO



SMARTVID.IO IS FOR…

Everyone

who wants to more easily search and find photo and video content in the company

IT Pros

looking to leverage photos and videos across the company.

Safety Pros

wanting to put in place a proactive safety program

Training Pros

wanting to identify best practices and leverage them in the org



Operations Execs

who want to get better productivity metrics on their projects for weekly job meetings

Marketing

teams who need access to the latest project content and can't get it from the OPS teams

Operations teams

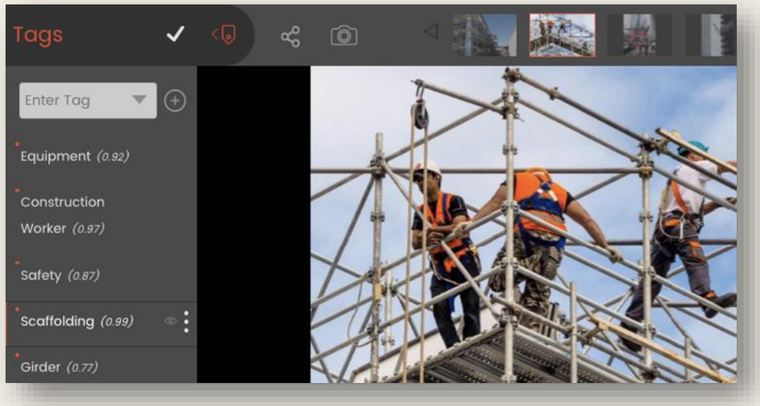
who want to give marketing a view into key imagery



Our deep learning for…

IMAGE RECOGNITION

- Basic: Object recognition
  - Is object present in image, Yes/No?
  - Example: Is there scaffolding in this picture? (Yes/No)
  - How used: image search within and across projects for key imagery (e.g., find me scaffolding images b/c I'm looking at a bill for scaffolding and want to check it)



- Advanced: Object analytics and logic
  - Where are the objects? How many of them are there? What is their volume? (Quantitative)
  - Examples: Is each person wearing high vis safety gear? What is the location and volume of visual defects like cracks?
  - How used: identifying and quantifying visual data
    - Safety (Hard hats, safety vests, more) , Quality (Cracks, more)



Example: Advanced image recognition finds people (1) then determines if they are safe (2), thus "focusing" the AI



Why it matters

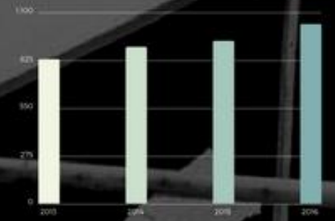
SAFETY IN CONSTRUCTION



1 in 10 American workers are injured on the jobsite every year.

20%

of all worker deaths occur in the construction industry.



Jobsite deaths have increased every year since 2007.

In a

$10 T

global industry,

accidents cost

6-8%.

The results

IMPACT

2016 Annual AI for Safety Photo Contest

# Reviewed	*1,080 photos*
Human expert time	*4.5 hours*
SmartVid.io time	*<10 minutes*

ENR
Engineering News-Record

Typical Construction Project

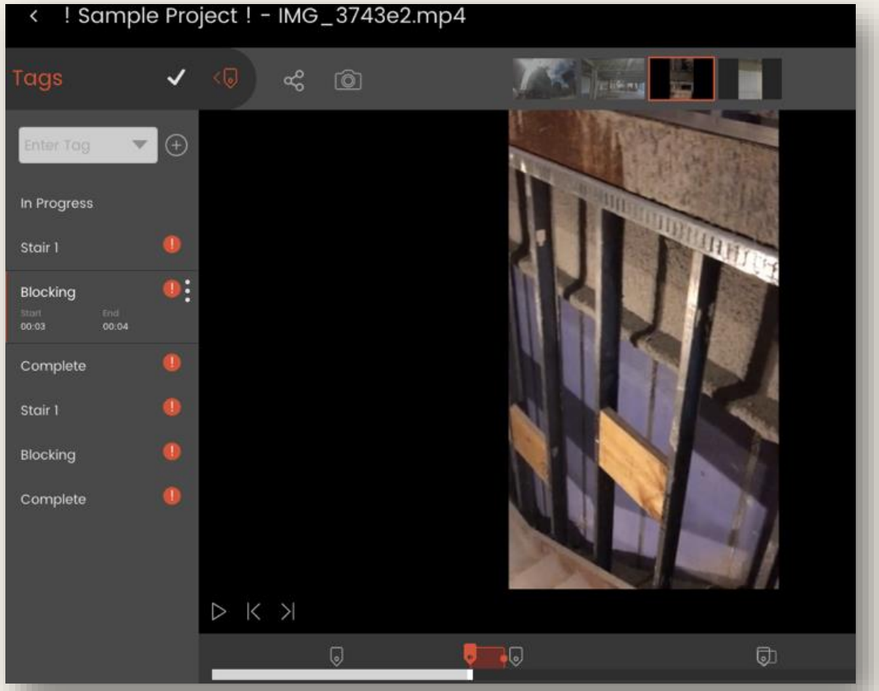
# Reviewed	*15,000 photos*
Human expert time	*80 days*
SmartVid.io time	*~8 days*

And deep learning for…

SPEECH RECOGNITION

- Industry keywords automatically detected from speech in video
- Tags are linked to timeline of video for instant retrieval and easy sharing or collaboration
- How used
  - Field worker narrates video using Smartvid.io app or native IOS or Android device
  - Office user (manager) can search by keyword
  - Example: see all installation of blocking, by location





WE’RE JUST GETTING STARTED

Smartvid.io for AEC

SAFETY

QUALITY

PRODUCTIVITY

Platform

ENTERPRISE ACCESS CONTROLS

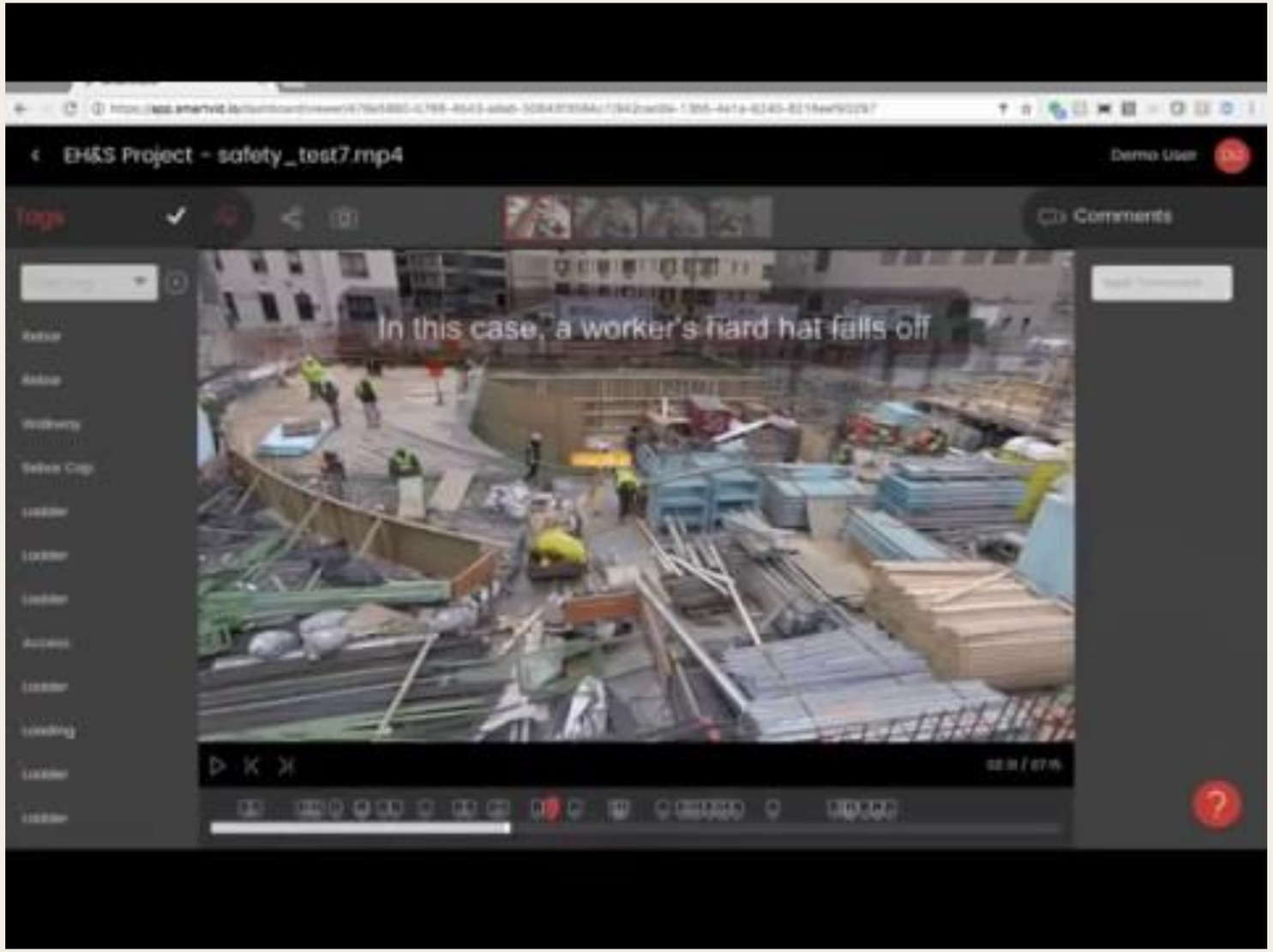
DATA INTEGRATION & MANAGEMENT

MACHINE LEARNING ANALYTICS

WORKFLOW & REPORTING

Where things are going…

SMARTVID.IO





THANK YOU!

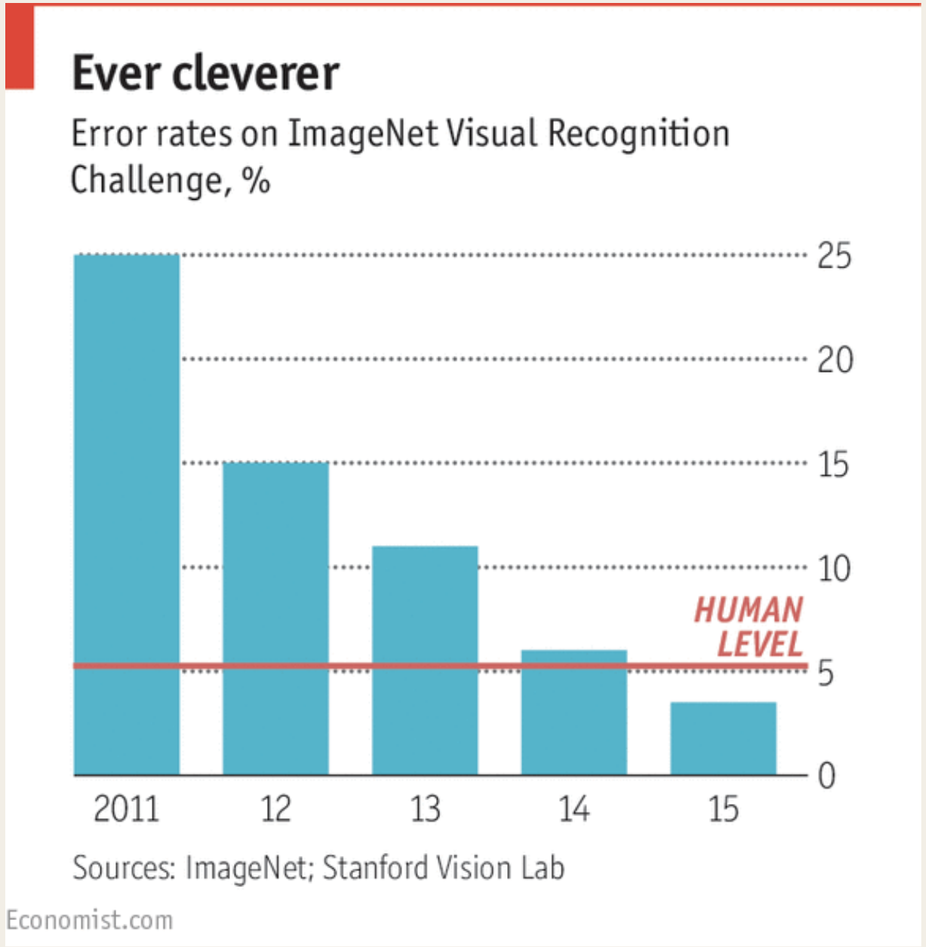
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AI/ML IS GETTING BETTER, FASTER THAN EVER

- Rapid advancements in deep learning frameworks – convolutional/deep neural networks are driving huge gains in performance





AUTODESK.

ENR
Engineering News-Record

Search

Skanska, CBT Architects Save $6M With First-In-New England Collaboration Method

Project team uses BIM 360 Project IQ software on Boston's only elliptical tower

May 8, 2017

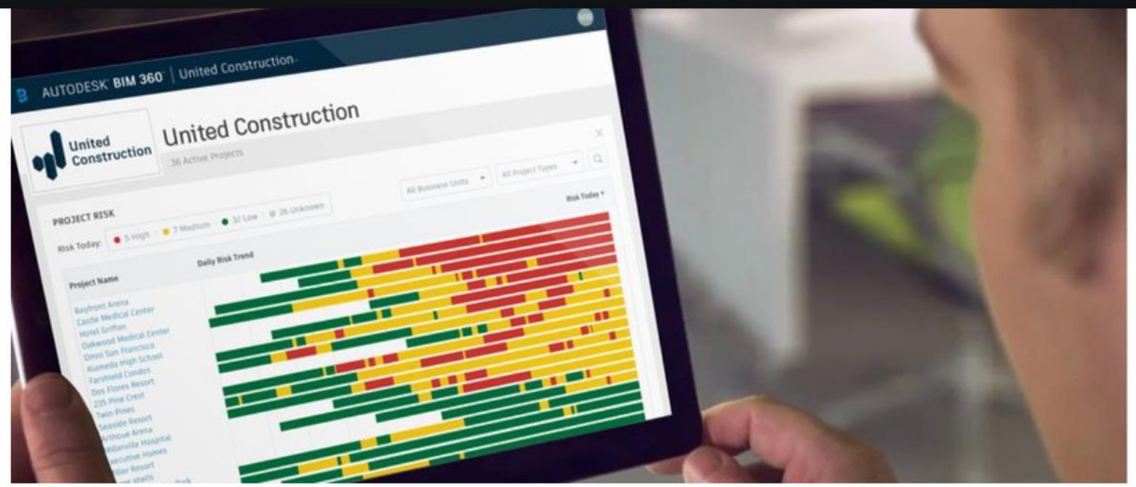
Johanna Knapschaefer

KEYWORDS 121 Seaport / Autodesk / BIM / building / CBT Architects / construction / Skanska / Skanska USA

Collaboration between CBT Architects and Skanska USA accelerated construction of an elliptical building that distinguishes itself in Boston's booming Seaport District.

As part of Autodesk's annual AEC Media Summit, Skanska hosted a panel discussion and site visit to the 121 Seaport building on May 4. Approximately 65% complete, the 17-floor, 400,000 sq-ft building that

ConstructionDIVE



FEATURE

How construction companies are shaping the workflow software of the future

A look at Autodesk's Project IQ shows how machine learning could transform the building process.

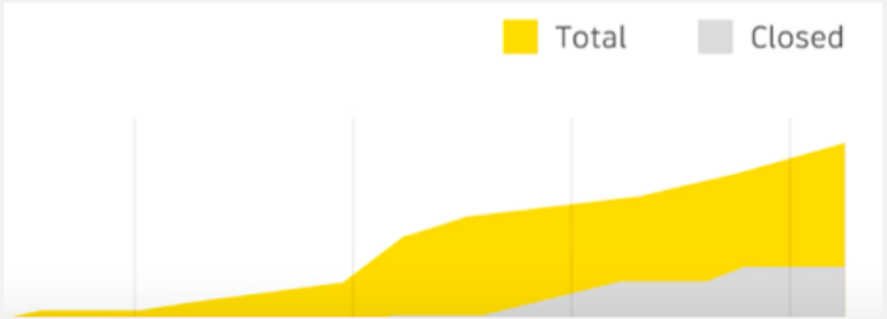
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Construction Daily Risk

1 Hundreds of subcontractors



2 Thousands of open issues



3 Daily change



4 Path to Efficiency



Image Credits: Autodesk

AUTODESK.

High

Categories

Water Rework

- [x] **Water** - Risk of a water event (building enclosure, site da system, weather) that will result in damage to existing construct lean up effort
- [ ] **Key Activity** - Risk of impacting a key activity or mileste t team committed to in their quality plan
- [x] **Rework** - Risk of causing major rework above a se to any party - owner, designer, contractor or trade
- [ ] **Inspection** - Risk of a failed inspection or test that expected to pass



BIM 360 IQ

Project Team

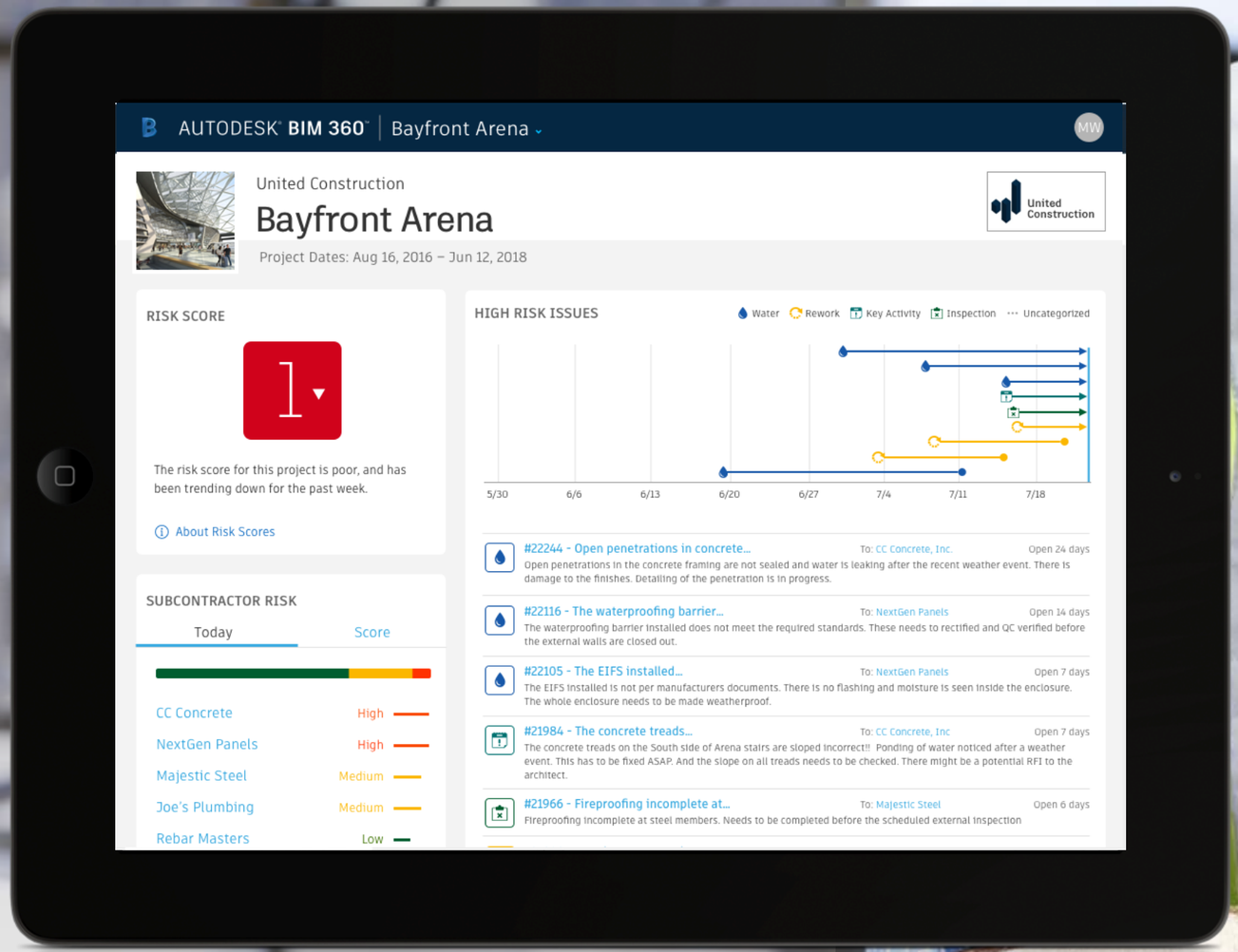


Image Credit: Autodesk

BIM 360 IQ

Subcontractor

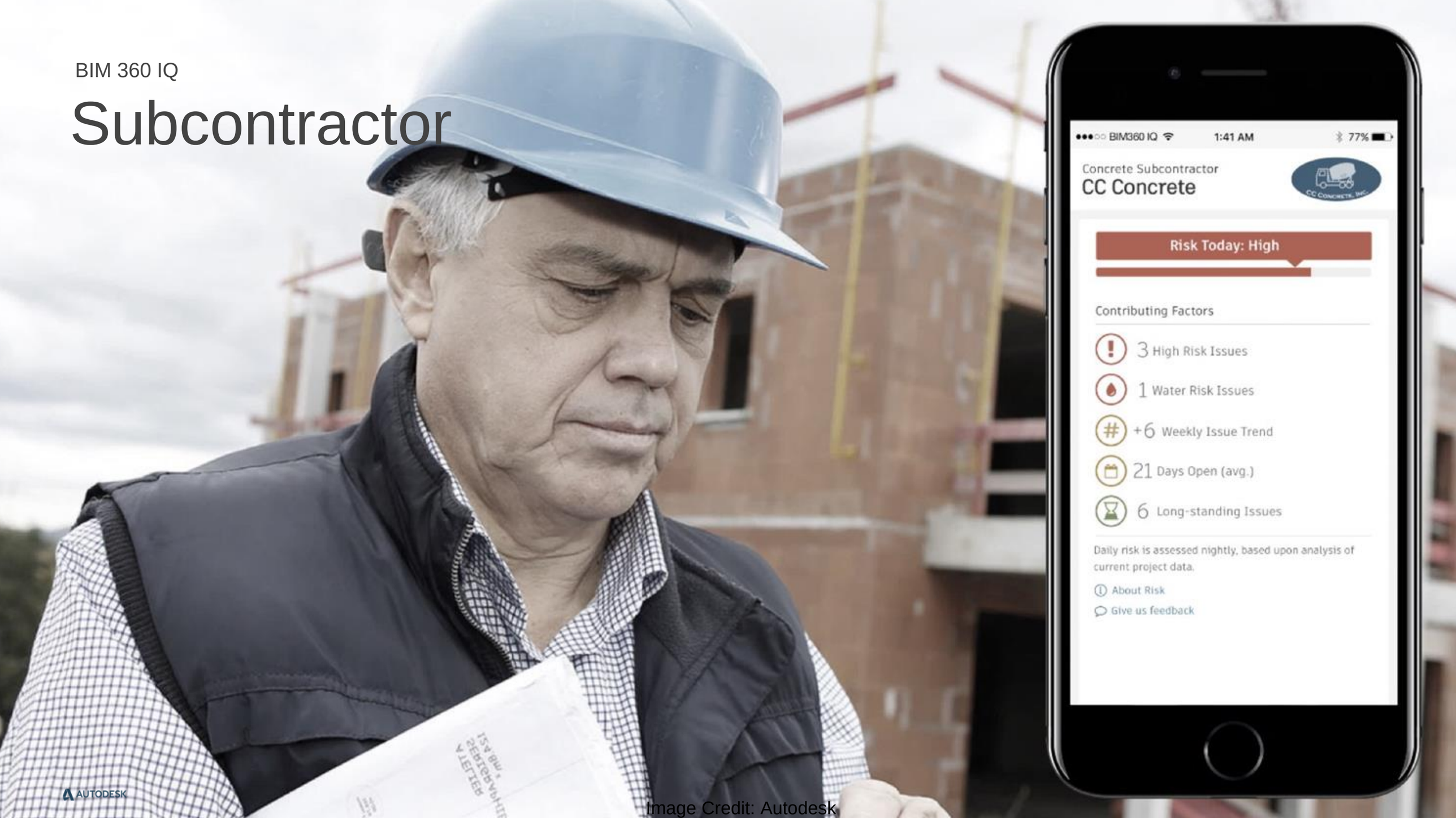


Image Credit: Autodesk

BIM 360 IQ

Executive

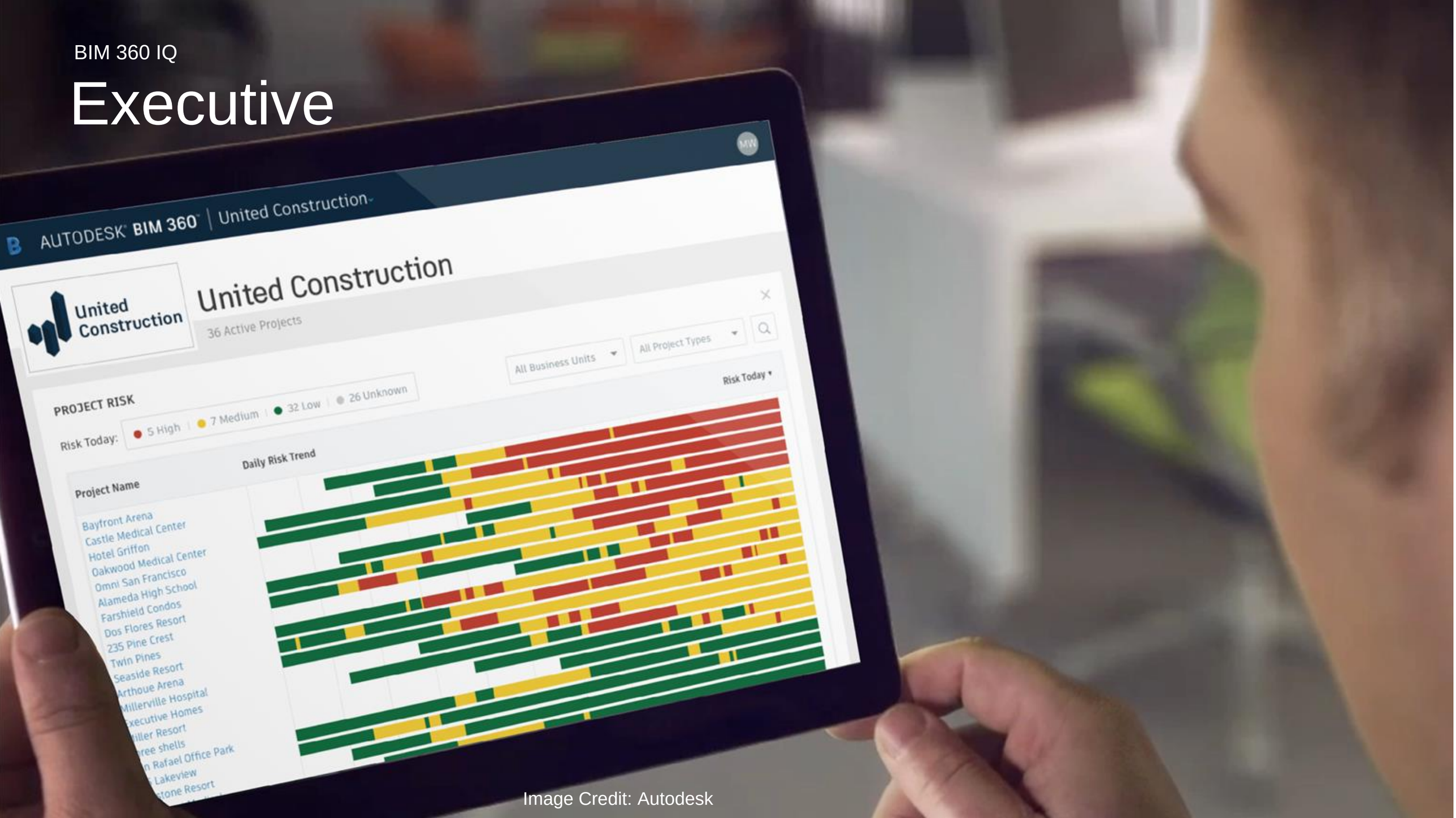


Image Credit: Autodesk



Image Credit: Daqri



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