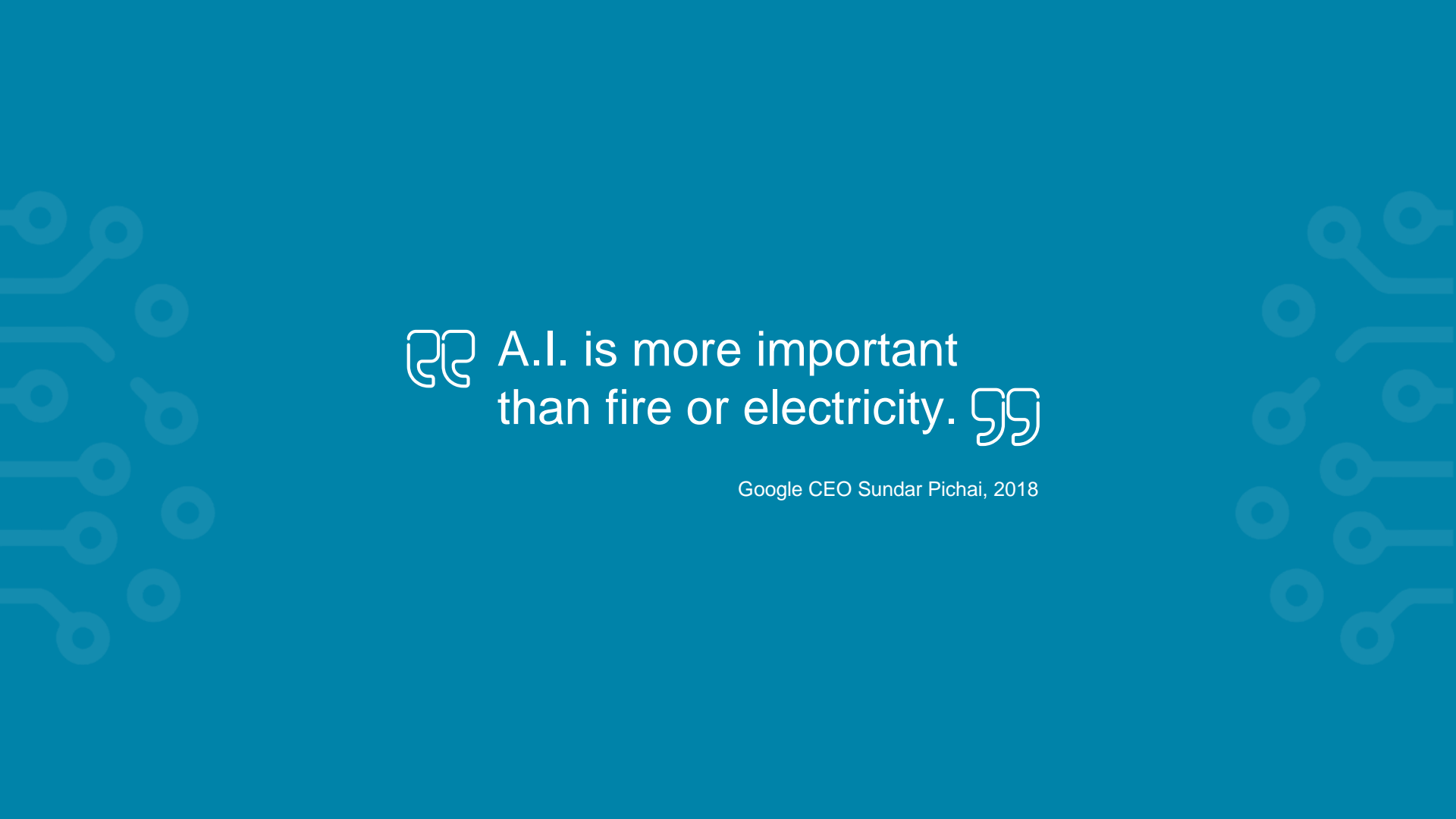# AI in Assessment
What's coming?

Richard Justenhoven | Director Global Products
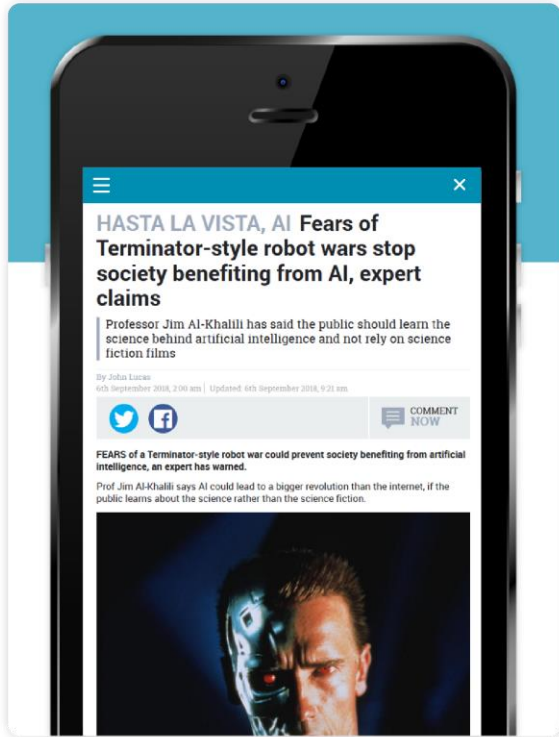Aon's Assessment Solutions

AON
Empower Results®

" A.I. is more important than fire or electricity. "

Google CEO Sundar Pichai, 2018

" There's no chance that the iPhone is going to get any significant market share. No chance. "

Microsoft CEO Steve Balmer, 2007

Adverse Reactions to AI are Common…Newspaper Voices

HASTA LA VISTA, AI Fears of Terminator-style robot wars stop society benefiting from AI, expert claims

Professor Jim Al-Khalili has said the public should learn the science behind artificial intelligence and not rely on science fiction films

By John Lucas
6th September 2018, 2:00 am | Updated: 6th September 2018, 9:21 am

COMMENT NOW

FEARS of a Terminator-style robot war could prevent society benefiting from artificial intelligence, an expert has warned.

Prof Jim Al-Khalili says AI could lead to a bigger revolution than the internet, if the public learns about the science rather than the science fiction.

This is how artificial intelligence is undoing women's rights

Through AI we are unpicking the seams of what feminism and the women's movement has long fought for: agency, women's liberation and the idea that men and women have equal capabilities.

Dejan Jotanovic   14 comments

Franker-algorithms: the deadly consequences of unpredictable code

The death of a woman hit by a self-driving car highlights an unfolding technological crisis, as code piled on code creates "a universe no one fully understands"

Andrew Smith   8 comments

Artificial intelligence poses bigger risk to humanity than terrorism or climate change, expert warns

Jasper Hamill   2 comments

The end of humanity as we know it is "coming in 2045" and Google is preparing for it

The death of a woman hit by a self-driving car highlights an unfolding technological crisis, as code piled on code creates "a universe no one fully understands"

Alex Hudson   27 comments

Trust Issues

Adverse reactions to machines talking control are common...

...but not universal.

ABS
A machine overrides human actions and decisions.

Think of driving on a wet road at night theres an obstacle on the road and you hit the breaks.

01

The moment the wheels lock up, your car's ABS system takes control and releases the brakes again.

02

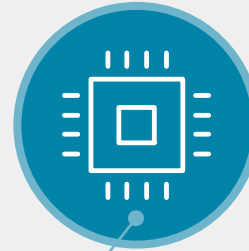You could say a machine overrides a human's action and does the exact opposite.

03

But in this case the common reaction would be to be thankful that the ABS stepped in and possibly saved you from crashing.

**What are we talking about?**

Artificial Intelligence:
Is the academic discipline of designing machines that demonstrate intelligent behaviour.

Cognitive Technology:
Is the application of artificial intelligence to simulate human expert behaviour for problem detection, problem solving and decision making based on some sort of knowledge representation.

Machine Learning:
Is the automated adaptation of artificial knowledge representations.
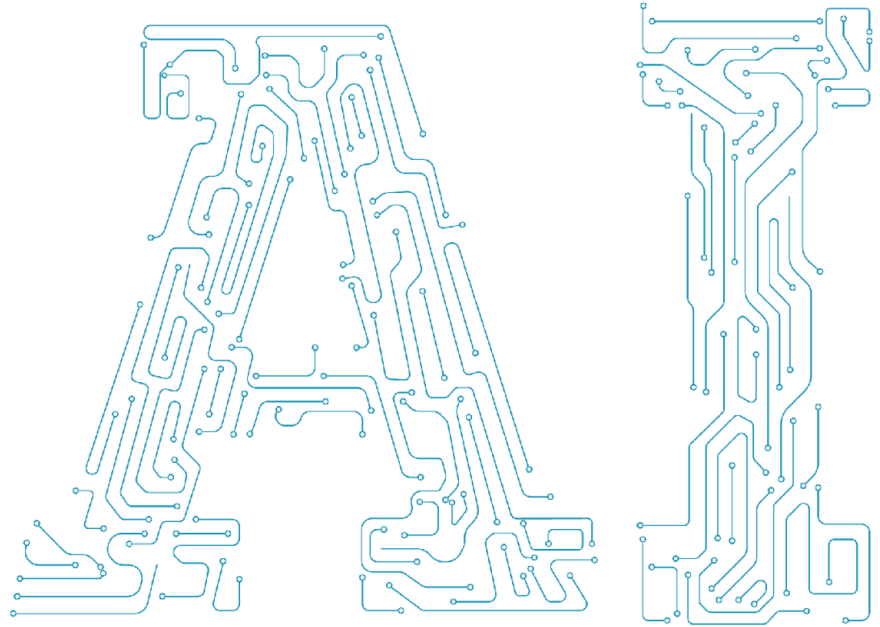
Key Events in the History of AI

1943 — W. McCulloch and W. Pitts describe a simplified neural **network architecture**

1965 — First expert **system DENDRAL** applies knowledge via if-then rules

1966 — NLP environment **ELIZA** by J. Weizenbaum simulates a conversation partner

1989 — **Deep Thought** is first computer to defeat a master chess player (David Levy)
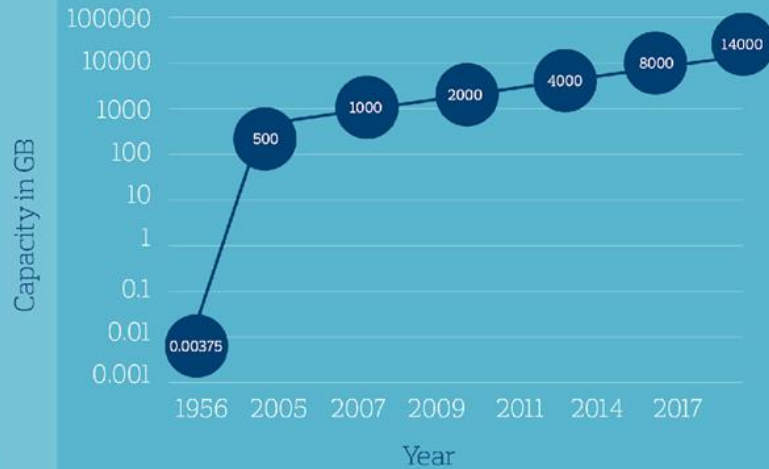
2010 — **IBM Watson** defeats Jeopardy! champion contestants analysing natural language questions
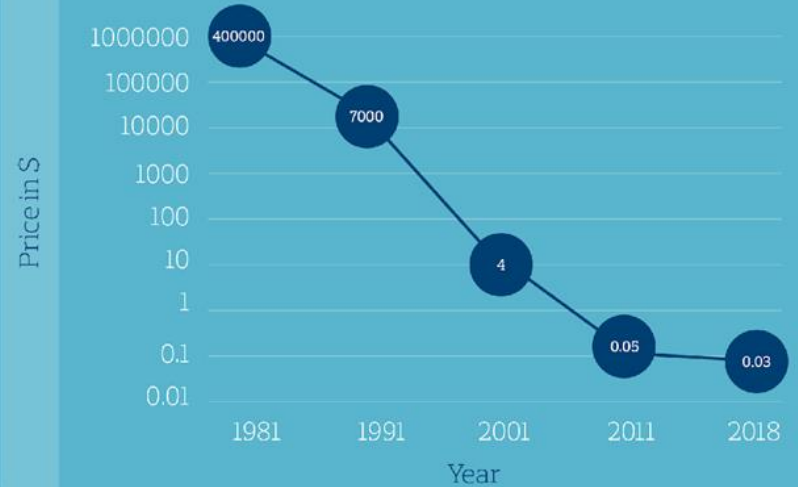
Why AI Now?

Factor 1: Storage

Hardrive capacity in GB

Year	Capacity in GB
1956	0.00375
2005	500
2007	1000
2009	2000
2011	4000
2014	8000
2017	14000

Storage price in $ per GB

Year	Price in $
1981	400000
1991	7000
2001	4
2011	0.05
2018	0.03

Source: mkomo.com

Why AI Now?

Factor 2: Computing Power

Apollo Guidance Computer (1966)

CPU = 2 MHz

RAM = 36 KB + 2 KB erasable

CPU = 2390 MHz x2

+ 4 supplementary processors

RAM = 3 GB / 3145728 KB

iPhone X (2017)

Why AI Now?

Factor 3: Data Availability

2.5 billion GB of data generated each day, in 2012

Global datasphere by **2025** will be **163 zettabytes (a trillion GB)**

Mobile devices accounted for **36% of internet** consumption in 2011 and an estimated 73% in 2018
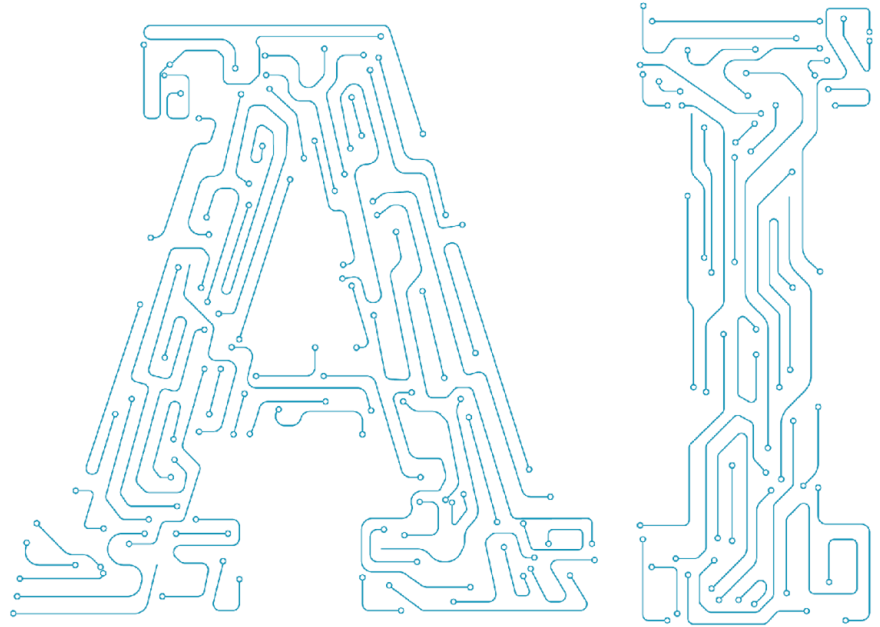
AI-based Automation in Psychometrics

Past
- Invigilators
- Administrators
- Item generators
- Report generators

Today → Future
- Scoring 2.0
- Decision making

The Interview Process

Interviewer

Preparation
- Job requirements
- Competencies/concepts
- Questions/stimulus
- Clues: Positive and negative indication/evidence

Execution
- Asking question
- Looking for clues
- Ratings per competency/ concept
- Total score
- Recommendation

Interviewee

Latent Traits /Dispositions

Expresses behavior based on question/stimulus and latent traits/dispositions
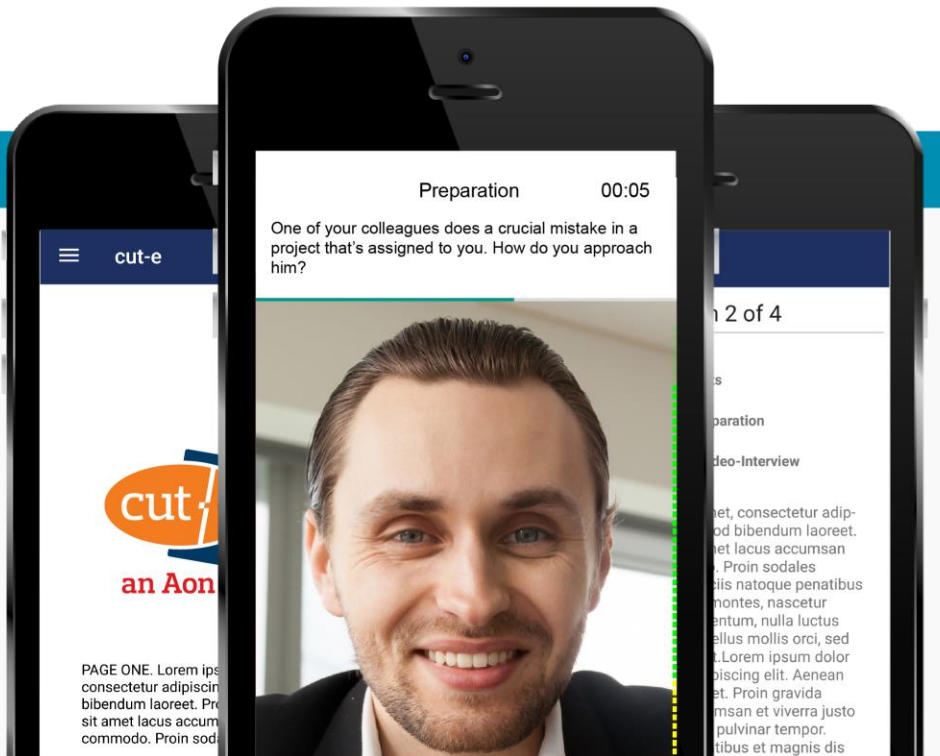
Video Assessment: Why Focus on Speech Content?

Defensibility	Defined Behavioral Anchors	Transparency
Retraceable Decisions	Focus on Responses	Reducing Bias

Preparation 00:05

One of your colleagues does a crucial mistake in a project that's assigned to you. How do you approach him?

cut-e

an Aon

PAGE ONE. Lorem ips
consectetur adipiscing
bibendum laoreet. Pro
sit amet lacus accum
commodo. Proin soda

2 of 4

paration

deo-Interview

et, consectetur adip-
d bibendum laoreet.
et lacus accum
. Proin sodales
iis natoque penatibus
ontes, nascetur
ntum, nulla luctus
llus mollis orci, sed
.Lorem ipsum dolor
iscing elit. Aenean
et. Proin gravida
msan et viverra justo
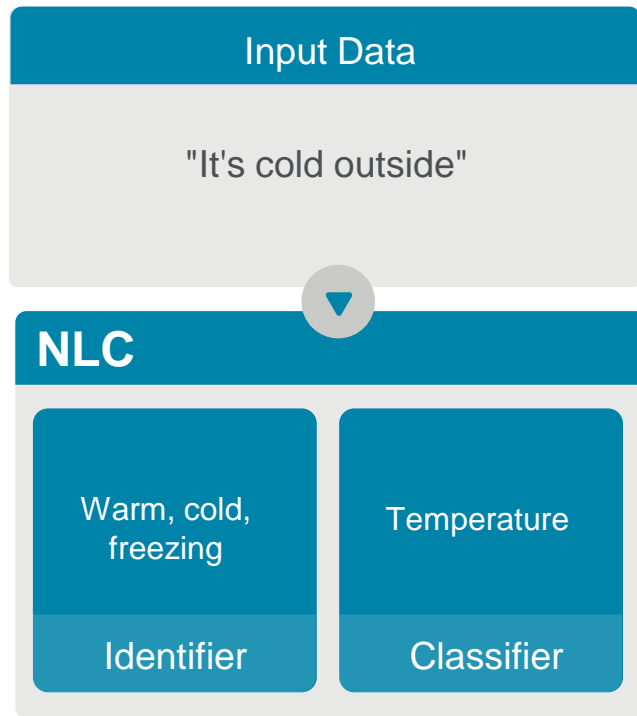pulvinar tempor.
ibus et magnis dis

Why focus on speech content

Natural Language Classifier

- **Simulating a Subject Matter Expert** (trained interviewer) to rate responses

- Identifiers vary in their weight and direction

- Extensive training data required

Input Data

"It's cold outside"

▼

NLC

Warm, cold, freezing	Temperature
Identifier	Classifier

Looking For Clues

NLC examples positive & negative indication

When facing **Structure** [green] tends to usually be many different tasks **cooperativeness** [green] to start by figuring out uhm **how urgent** each individual tasks is and if **other people rely on** the task being done or if its needed to continue w **Structure** [green] e as part of an bigger project and that usually gives me a pretty good idea of **what needs to be done first** and otherwise I start with quicker, easier tasks whic **cooperativeness** [green] just freeing up resou **Structure** [green] le **Structure** [green] er on and if there's **other people involved** its important to **start early** with **communicating** the **timeline** and the **priority** and then to regularly update them on the status of the work. And that also means letting them know about delays and potential problems to then avoid bigger problem **cooperativeness** [red] ough yeah if a minor task might not be done on time I **wouldn't necessarily communicate** that because it might just **not be worth the trouble**, but yeah.

And yeah, for the third question, how I feel when I have much to do, that really depends on **Positivity** [red] mes in, so if it's a lot of work coming up at the same time **Structure** [red] **overwhelming**, but if it just gradu **Structure** [green] be **hard to not forget about tasks** that **Structure** [green] y on. But yeah, that's why **writing things down** is good. And uhm **making plans** and overview of work to be done is usually a good first and low **Positivity** [red] that then helps with getting started with the work and also to reduce **negative feelings**. And as I said earlier, starting with smaller tasks or or also uhm alternative smaller and bigger tasks can help to build up and maintain momentum and also a feeling of accomplishing **Positivity** [red] with which then motivates to keep going. and **Structure** [green] potential **negative feelings** due to being overwhelmed it can also really help to **identify resources** such as colleagues that might be able to help should problems arise.
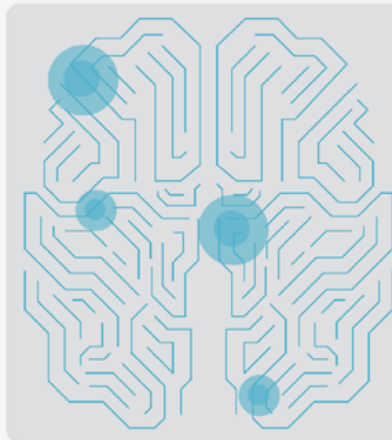
Facial Recognition ≠ Expression Recognition
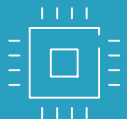
Facial recognition: facial features for person recognition
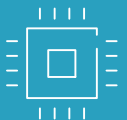
Expression recognition: expression indicators of emotions

Facial recognition is about the face itself and its uniqueness
Expression recognition is about what people do with their faces and regularities in that

Paul Ekman:
176 studies since 1957

Microexpressions:
1/25th of a second

It's not about one expression, but patterns in many, and that in conjunction with other data
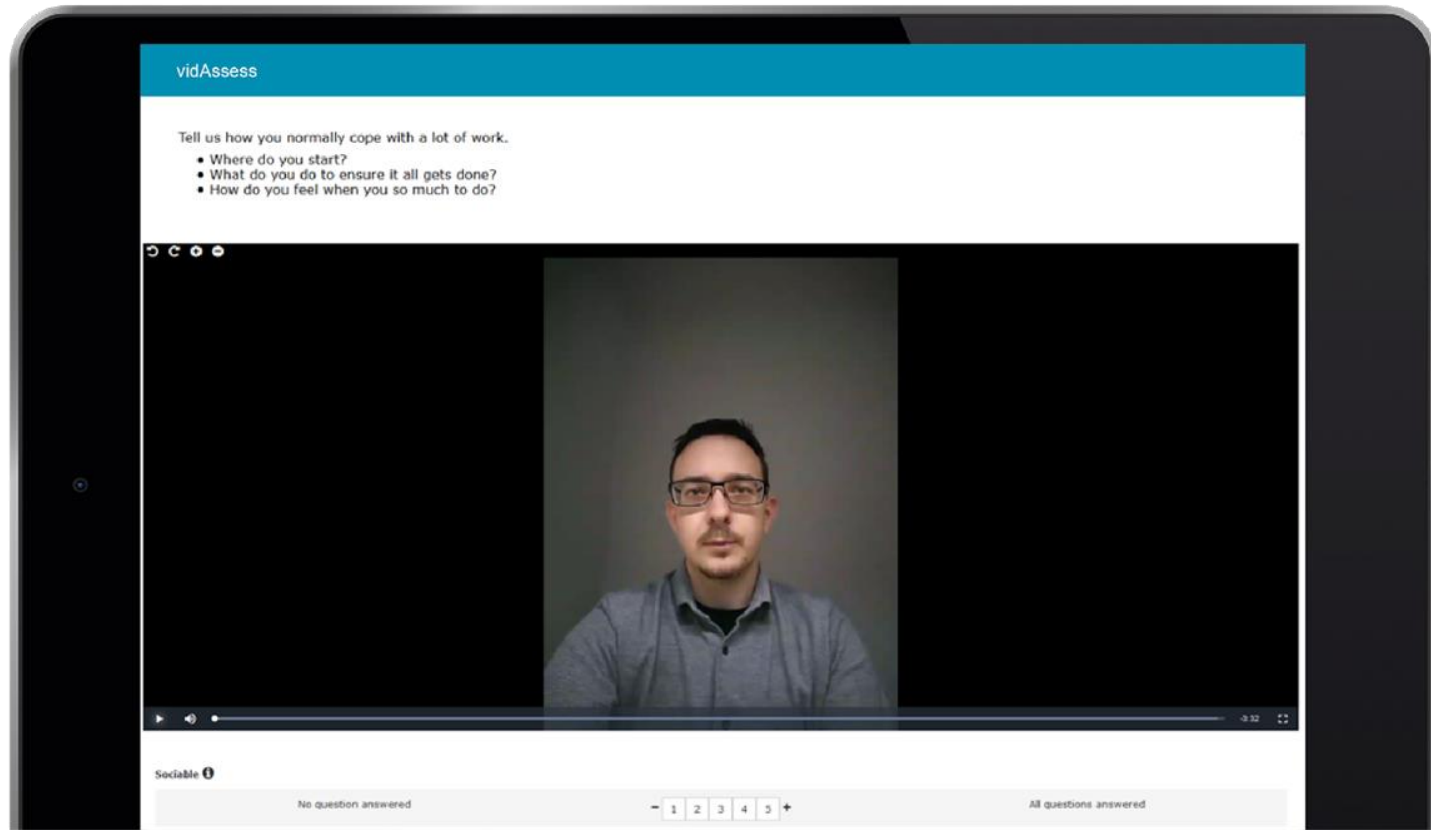
States, Traits, and Expression

- Disgusted = Arrogant ?
- Worried = Fearful ?
- Happy = Friendly ?

Would you hire this
joyful man?

KCNA KCNA / Reuters

What Humans See

vidAssess

Tell us how you normally cope with a lot of work.

- Where do you start?
- What do you do to ensure it all gets done?
- How do you feel when you so much to do?

Sociable ⓘ

| No question answered | − 1 2 3 4 5 + | All questions answered |

What AI Sees

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"82fcb242-4e31-412f-ad60-60db6087d98d",
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      "left": 816,
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      "height": 1122
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        "invisible": false,
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            "confidence": 1.0
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          {
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            "confidence": 0.51
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          {
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          {
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            "confidence": 0.11
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```
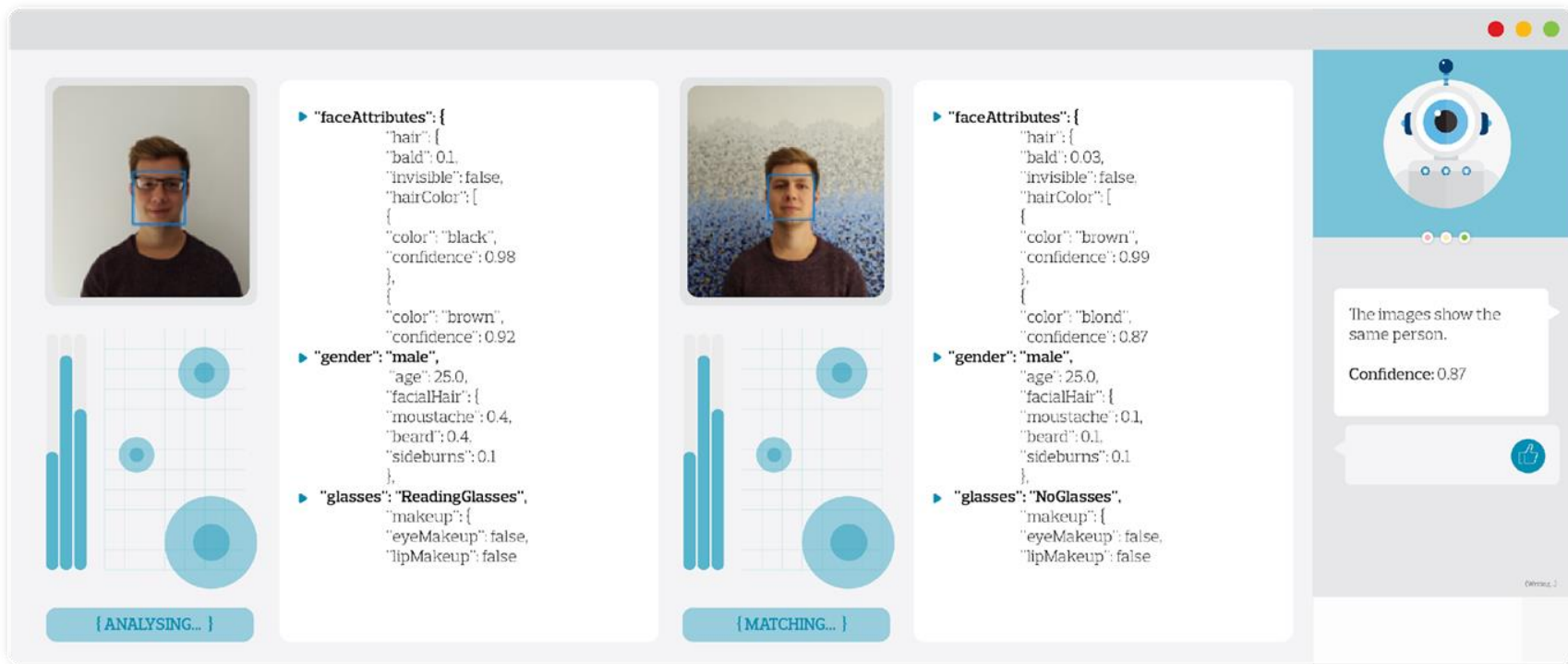
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    "happiness": 0.459,
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    "surprise": 0.001
  },
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```

```
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  "noise": {
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    "value": 0.0
  }
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    "y": 1523.0
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  "pupilRight": {
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    "y": 1516.5
  },
  "noseTip": {
    "x": 1364.3,
    "y": 1804.2
  },
  "mouthLeft": {
    "x": 1127.2,
```

```
    },
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  },
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  },
  "noseTip": {
    "x": 1364.3,
    "y": 1804.2
  },
  "mouthLeft": {
    "x": 1127.2,
```

How We Use That Information

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{ ANALYSING... }

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        "invisible": false,
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        {
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▶ "glasses": "NoGlasses",
        "makeup": {
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{ MATCHING... }

The images show the same person.

Confidence: 0.87

How We Use That Information

"faceAttributes": {
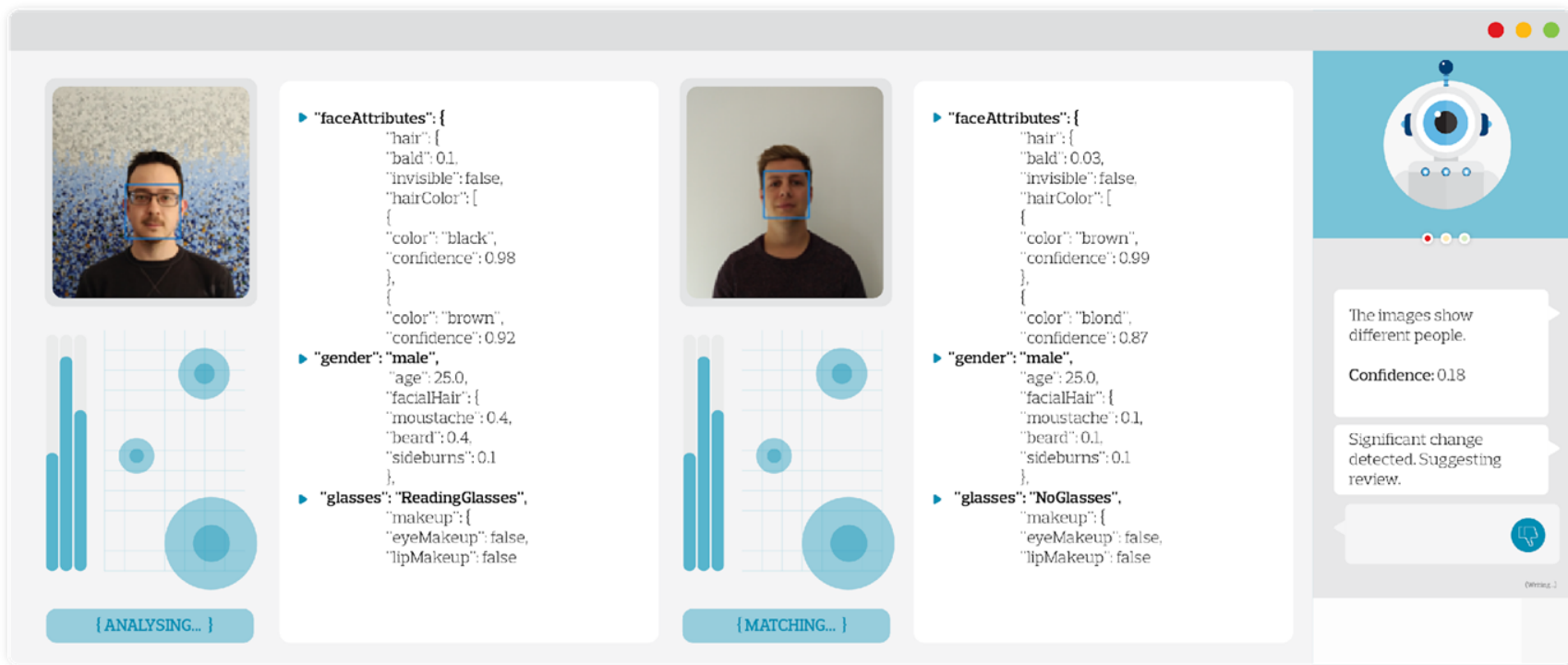   "hair": {
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"glasses": "ReadingGlasses",
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        "lipMakeup": true

{ ANALYSING... }

"faceAttributes": {
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        "invisible": false,
        "hairColor": [
        {
        "color": "black",
        "confidence": 0.98
        },
        {
        "color": "brown",
        "confidence": 0.92
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        "beard": 0.4,
        "sideburns": 0.1
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        "lipMakeup": false

{ MATCHING... }

The images show different people.

Confidence: 0.28

Significant change detected. Suggesting review.

(Writing...)

How We Use That Information

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{ ANALYSING... }

▶ "faceAttributes": {
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"sideburns": 0.1
},
▶ "glasses": "ReadingGlasses",
"makeup": {
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"lipMakeup": true

{ MATCHING... }

The images show the same person.

Confidence: 0.61

How We Use That Information

▶ "faceAttributes": {
  "hair": {
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    "invisible": false,
    "hairColor": [
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    },
    {
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    "confidence": 0.92
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    "sideburns": 0.1
    },
▶ "glasses": "ReadingGlasses",
    "makeup": {
    "eyeMakeup": false,
    "lipMakeup": false

{ ANALYSING... }

▶ "faceAttributes": {
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    },
    {
    "color": "blond",
    "confidence": 0.87
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    "facialHair": {
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    "sideburns": 0.1
    },
▶ "glasses": "NoGlasses",
    "makeup": {
    "eyeMakeup": false,
    "lipMakeup": false

{ MATCHING... }

The images show different people.

Confidence: 0.18

Significant change detected. Suggesting review.

(Writing...)

AI will change jobs

- Jobs will change
- If jobs change, so will the relevant constructs
- AI as buddy in every role

In 2030 Conversational AI will be the preferred user interface for standard psychometric instruments.

Aon Assessment Solutions, 2019

We tend to overestimate the impact of a new technology in the short-run, but we underestimate it in the long-run

Roy Amara
www.rationaloptimist.com/blog/amaras-law

Thanks!

Richard Justenhoven
Director Global Products
Aon Assessment Solutions
Richard.Justenhoven@aon.com