

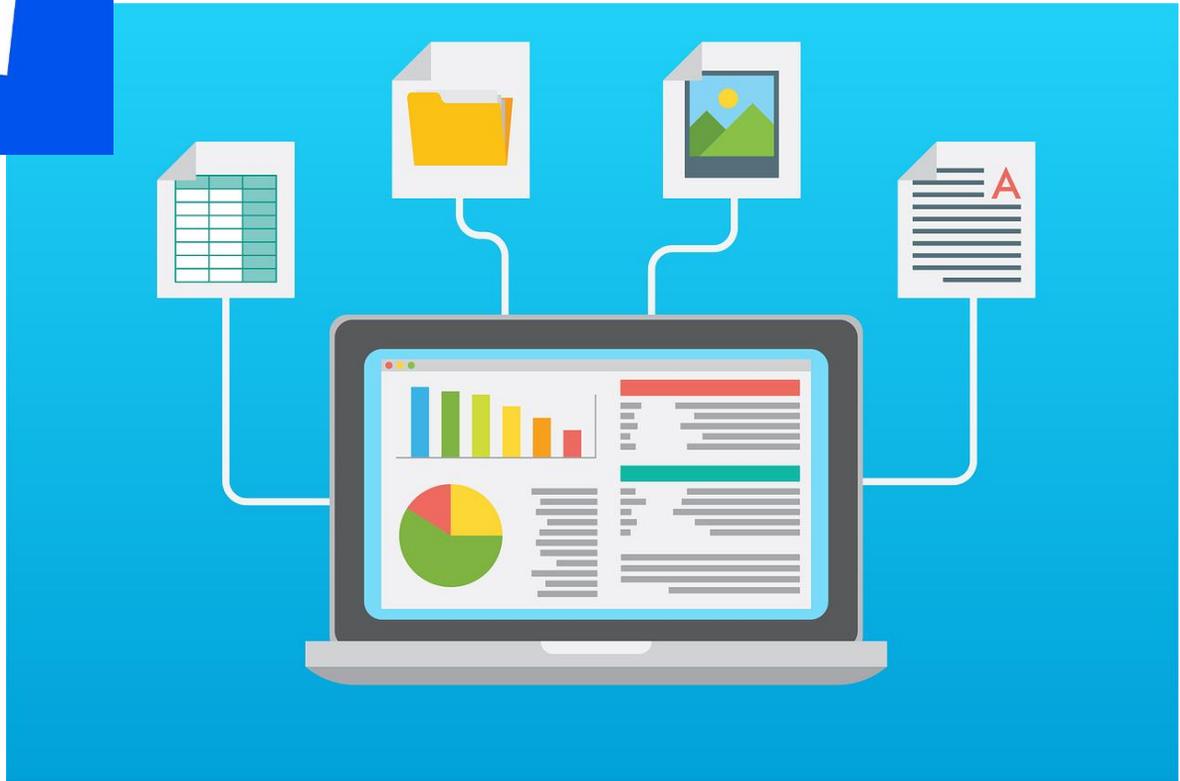
What are we quantifying?

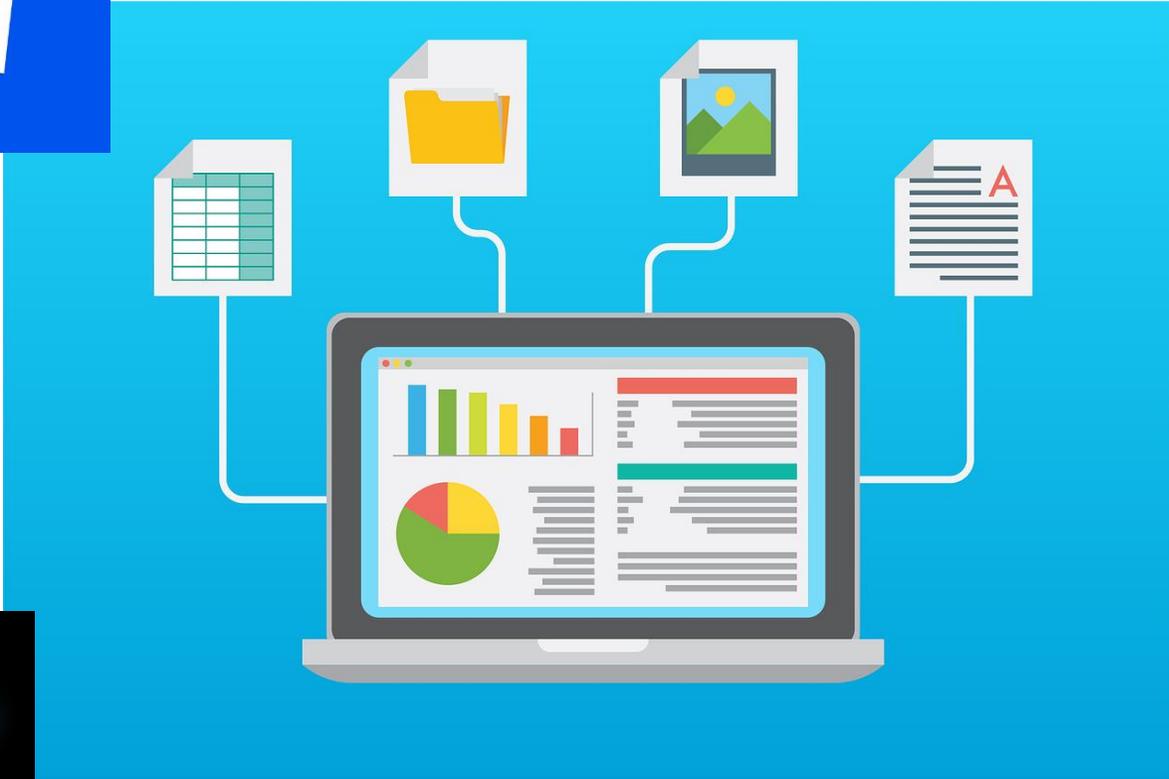
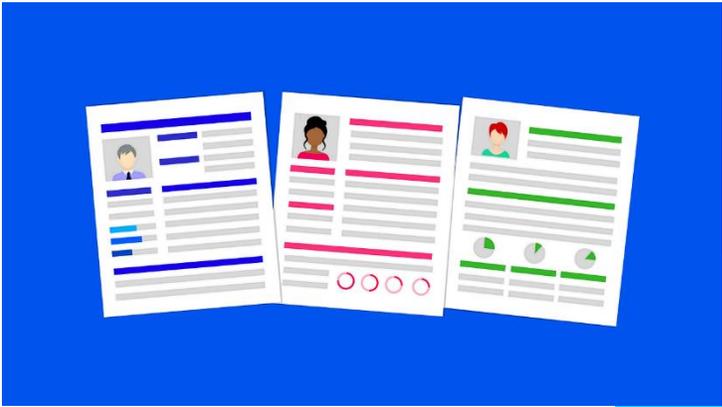
Evgeni Aizenberg / TU Delft, The Netherlands

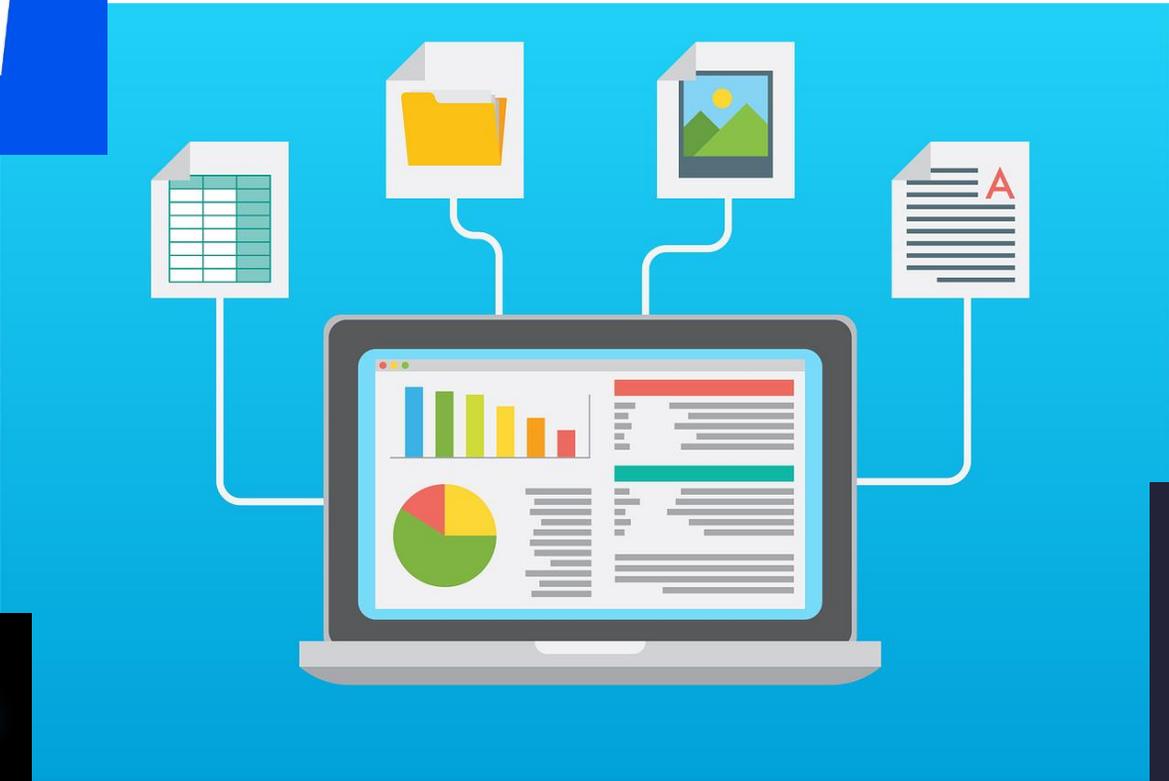
E.Aizenberg@tudelft.nl

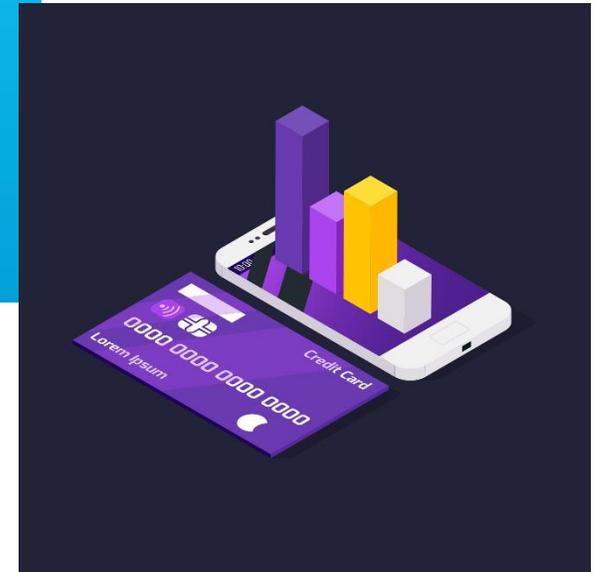
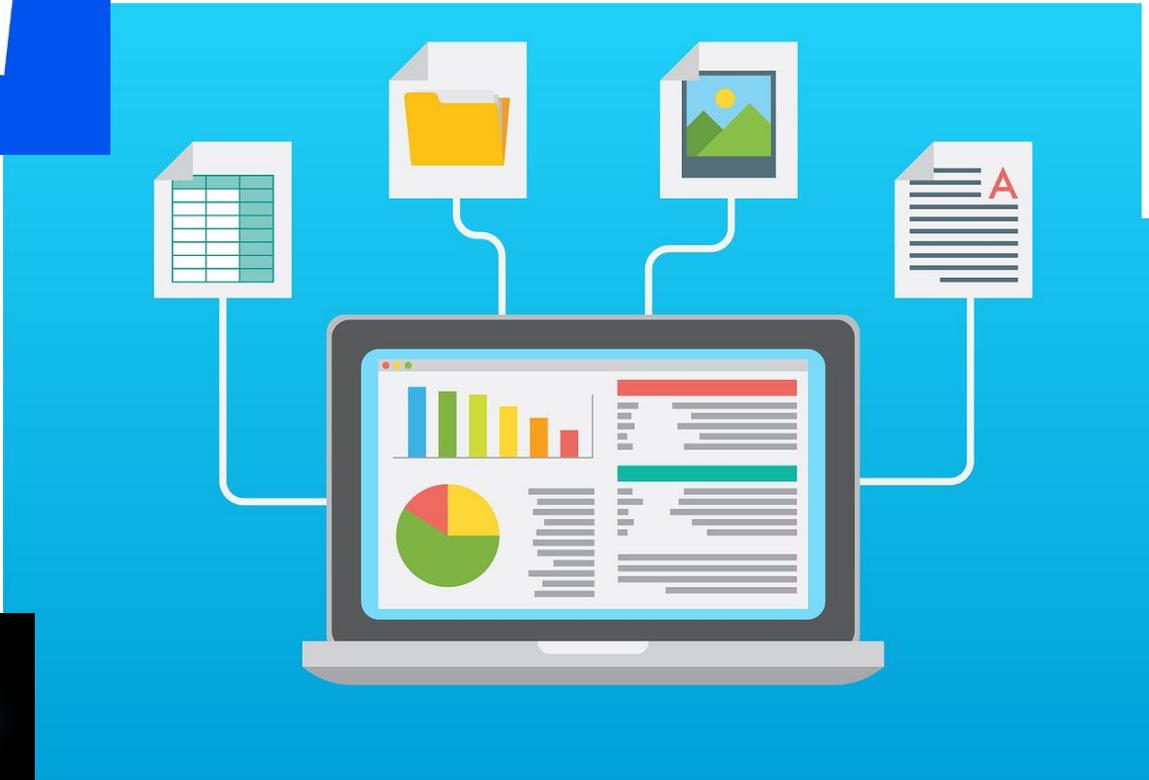
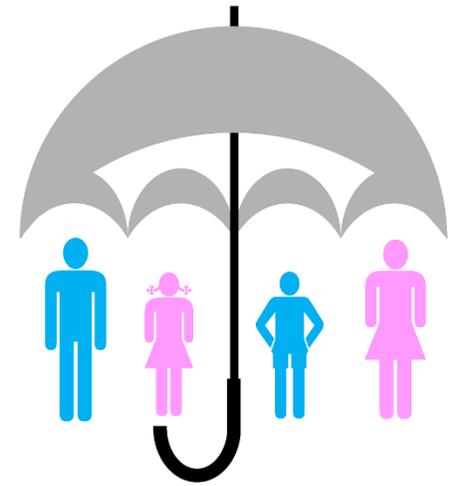
October 13, 2021





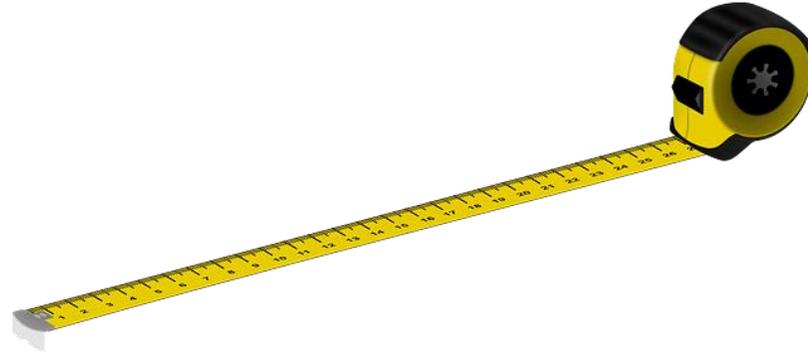






● Quantification is at the heart of AI

- AI algorithms rely on quantitative representations of concepts.



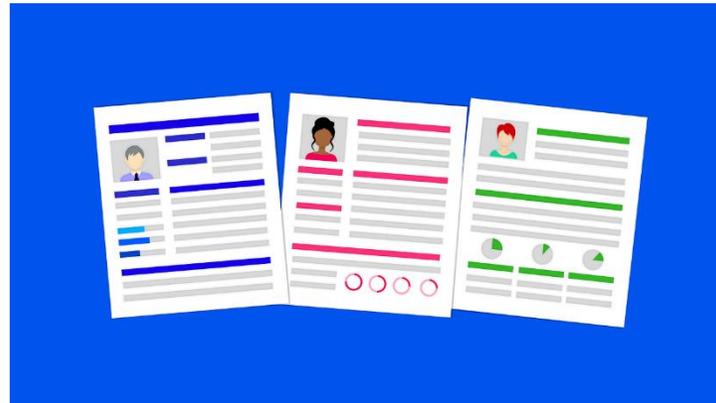
- Validity of the algorithm depends on the validity of these quantifications.

What is quantifiable?

- Little consensus on universal definition of measurement and what sorts of things are measurable¹.
- So, at minimum, it's not self-evident that quantification is unquestionably valid.
- Common sense check:
Quantification should capture the contextual meaning of the concept being quantified.

● What is quantifiable?

- Let's explore the question more contextually and focus on meanings.
- Can numbers capture the contextual meaning of a concept, e.g. job competence?



OBJECTIVE OR BIASED

On the questionable use of Artificial Intelligence for job applications

<https://web.br.de/interaktiv/ki-bewerbung/en/>

Journalistic video about the use of AI in hiring:

<https://youtu.be/8QEK7B9GUhM>

Quantifying competence

- *“numerical ratings are useful in representing occurrences of simple and discrete behaviors that manifest themselves consistently across individuals, contexts, and time and where the correspondence between the assignment of ratings and the observed behaviors is more obvious”* ([Delandshere and Petrosky, 1998: 23](#))

- Implicit assumptions:
 - Contextual meaning can be reduced to consistent, discrete behaviors.
 - There exists a true performance value to be measured.
 - Variations in measurements across time and contexts are measurement errors
-> noise.

Quantifying competence

- Contextual meaning can be reduced to consistent, discrete behaviors.
- There exists a true performance value to be measured.
- Variations in measurements across time and contexts are measurement errors
-> noise.



- **Context 1:** Ability to run a certain distance in a set amount of time.

Quantifying competence

- Contextual meaning can be reduced to consistent, discrete behaviors.
- There exists a true performance value to be measured.
- Variations in measurements across time and contexts are measurement errors
-> noise.



▪ **Context 2:** Teamwork in childcare.

- Meaning not reducible to consistent, discrete behavior. It is shaped through social and cultural interaction.
- There is no one singular 'correct' expression of teamwork.
- On the contrary, variations are the unique aspects a person brings to the job.

Quantifying the unquantifiable

- Redefines the very nature and meaning of the concept.
- Circular thinking: concept defined by the model that quantifies it.
So, competence is what the algorithm says competence is.
- Eliminates room for diversity of expression and constructive debate on meanings, conceptions.

 Violation of people's autonomy over self-representation!

Autonomy over self-representation

- Your ability to choose what and how you communicate about yourself to others.
- Acting as a direct representative of yourself.
- Key aspect of human dignity.

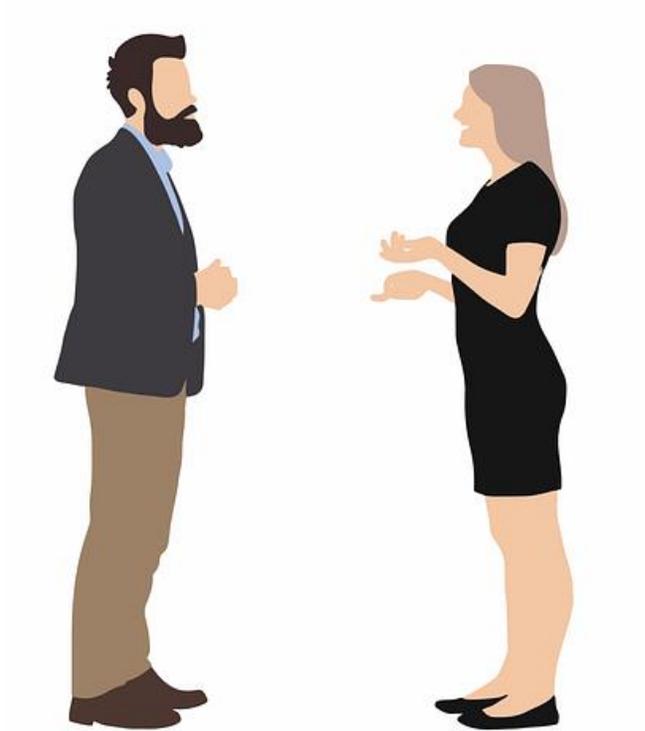
- In human-to-human conversation, each person acts as a direct representative of themselves.
- Meanings are co-shaped and negotiated.



“What is your vision of healthy and productive teamwork?”

“We had a few tense months of going the extra mile for each other during the pandemic. This has evolved my view of teamwork ...”







- Construction of representation and meaning are primarily done by the AI.
- Quantification force fits the person into rigid scoring categories.



● Interactive exercise (10 min)

- Let's split into groups of 3-4 people.

<https://surfdrive.surf.nl/files/index.php/s/kLQHo1vo9RPSGkY>

Closing remarks

- Validity of quantification is not self-evident.
- The choice to quantify can have profound socio-ethical impact.
- Contextual meanings must be investigated and aligned among stakeholders, designers, developers.
- Identifying non-quantifiable vs. quantifiable characteristics informs distribution of tasks between humans and AI.

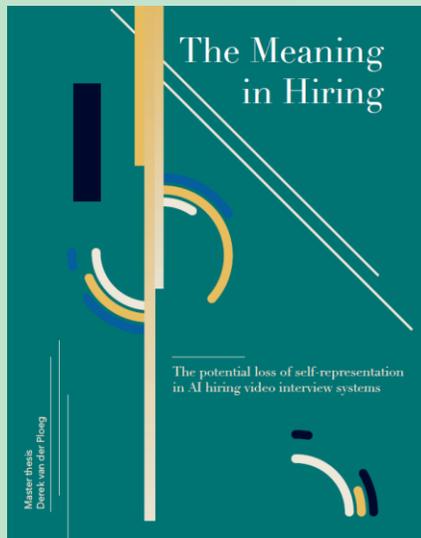
More on autonomy over self-representation



Empowering Academic Graduate Job Search

MSc project by Jeroen ter Haar Romenij:

<https://www.tudelft.nl/en/2020/aitech/empowering-job-seekers-with-effective-self-representation/>



The Meaning in Hiring

MSc project by Derek van der Ploeg:

<http://resolver.tudelft.nl/uuid:98459ea5-fc0a-498e-a6d9-0615b938442a>

Food for thought



Tal E, "[Measurement in Science](#)", The Stanford Encyclopedia of Philosophy (Fall 2020 Edition), Edward N. Zalta (ed.).

Delandshere G and Petrosky AR (1998) [Assessment of Complex Performances: Limitations of Key Measurement Assumptions](#). Educational Researcher 27(2).

Govaerts M and Van der Vleuten CP (2013) [Validity in work-based assessment: Expanding our horizons](#). Medical Education 47(12): 1164–1174.

Lantolf JP and Frawley W (1988) [Proficiency: Understanding the Construct](#). Studies in Second Language Acquisition 10(2). Cambridge University Press: 181–195.

Let's design *together!*



Illustration credits

In order of appearance:

Image by Mudassar Iqbal from Pixabay

Image by Coffee Bean from Pixabay

Image by Gerd Altmann from Pixabay

Image by Megan Rexazin from Pixabay

Image by Tumisu from Pixabay

Image by Clker-Free-Vector-Images from Pixabay

Image by Yvette W from Pixabay

Image by sorbetto via Getty Images

Image by frimages from iStock.com