## Main Deliverable

individual digital human **AI Report** on:
a real-life **machine learning use-case** of an existing **data product** solution.

*AI accommodates & exploits "complex" human behavior by means of automatized regulatory systems---like machine learning---that are mechanical, biological, physical and/or cognitive in nature.*

*The necessity for machine learning fall into 4 main categories:*

*When humans can't code rules for certain problems.*
*When you need to scale a solution to millions of cases.*
*When you can do it manually, but it's not cost-efficient.*
*When you have a massive dataset without obvious patterns.*

*A data product is any application or tool using data science combined with computing or statistical algorithms ---required by the AI-model--- that autonomously aids businesses (profit or non-profit) to provide a solution to a given societal or proprietary problem solely based on sampling data.*

*It comprises a human-centered interface, creating meaningful insights derived from data science principles & methodologies such as:*

- *Human Factors*
- *Predictive Analytics*
- *Descriptive Data Modeling*
- *Data Mining*
- *Machine Learning*
- *Risk Management*
- *Advanced statistics*
- *Predictive Modeling*
- *Natural Language Processing*

*"Digital Humans are technology's answer for how to bring chatbots and virtual assistants 'to life'.*

*They are the next logical step in fashioning these assistants to be more human for a deeper connection between our biological selves and our binary helpers."*

*David Roman • September 5, 2022*
*https://wearebrain.com/blog/innovation-and-transformation-strategy/digital-humans-the-faces-of-the-future/*

*The listed topics below offer a broader perspective on the human digital landscape, including the ethical, social, and cultural dimensions of technology and its impact on individuals and society.*

- *Digital Avatars*
- *Digital Humanism*
- *Digital Human Modeling*
- *Digital Human Rights*
- *Digital Humanities*
- *Digital Citizenship & Privacy*
- *Digital Empowerment*
- *Digital Twin of Humans*
- *Digital representation of anthropometric attributes*
- *Virtual humans & Avatars*
- *Embodied AI*
- *Social Robotics*
- *Multimodal AI*

*Digital humans include at least one of the following attributes*

- *Physical attributes*
  *anthropometric attributes, biomechanical attributes, eye movements, injurie*
- *Physiological attributes*
  *heart rate, muscle tension, brain electrophysiological signals, blink rates and timing*
- *Psychosocial attribute*
  *motivation, stress*
- *Mental attribute*
  *experience, skills, abilities, workload, intuitive bias*
- *Perceptual attribute*
  *auditory sensitivity, visual sensitivity, temperature sensitivity*
- *Emotional attributes*
  *anger, fear, sadness, shame*
- *Behavioral attribute*
  *observable interactions with real-world objects*

# Digital Human Use Case Report structure

## PART I
## Problem Selection, Definition & Motivation + Human in the Loop

- Define Artificial Intelligence (in your own words)
- Define the 5 main characteristics (features) of AI
- Defining Artificial Intelligence (in your own words)
- Make your own info graphic/knowledge-map that gives an accurate overview of the state-of-the-art AI (see e.g., https://www.nesta.org.uk/report/future-minds-and-machines/2-what-artificial-intelligence/)

## PART II
## Digital Human as a data product

- Defining Digital Human as a Conversational Agent (in your own words)
- What AI problem/use-case does it solve? / Is it a good fit?
- Designate the Capability Domain & Application Domain
- Description of Data Product Components & Techniques Involved
    - Describe the Graphical User-interface
    - Describe the Multimodal (audio-visual) Appearance / Look & Feel
    - Describe the AI-model in terms of its Agency and Architecture
    - Describe the learning algorithm (LM)
    - Describe how it is trained
    - Describe the parameters involved

## PART III
## Use Case Description & Application

- Give a short overview of the most popular Digital Human use cases + short description (in your own words)
- Find examples of
    - Assistance
    - Companionship
    - Conversational Exchange
    - Theory-of-Mind
    - Social Influencing
    -
- Describe, demonstrate, and analyse each of use-cases in terms of:
    - Prompt engineering techniques
    - Human-Computer Interaction (HCI) principles
    - Performance level / Accuracy
    - Parameter setting

## PART IVI
## Critical Reflection & Ethical Considerations

- Assess popularity / "ground-breaking" aspects
- Evaluate whether the AI data product solves the problem at hand
- Review potential issues & existing documentation in relation to the European AI-act

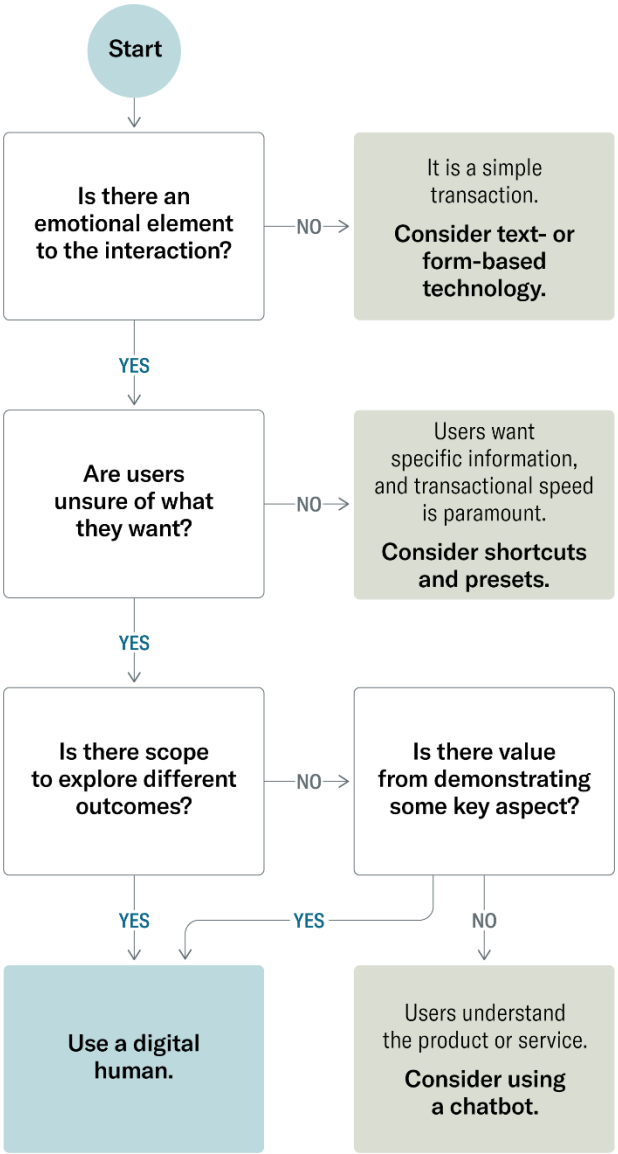
## Studied Literature

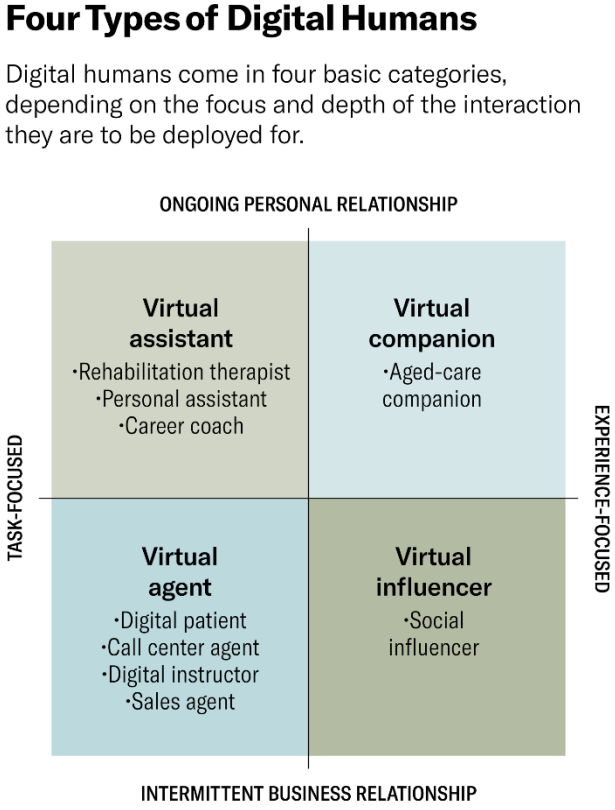
- Select 3 review articles, describe in your own words their relevance
- Provide an APA-style overview of the sources used to write your AI-report

# APPENDIX A: When Should You Deploy Digital Humans?

Not every use case is suitable for deploying a digital human solution. Customers typically prefer traditional user interfaces, chatbots, or voice-only assistants like Siri or Alexa for quick transactions. However, when it comes to conveying complex instructions or explaining product features, digital humans can be a superior option.

This is exemplified by the success of YouTube instruction videos, which outperform text-based guides. When individuals are searching for clothes online, however, they may find it beneficial to see the outfit on a digital human who resembles them. This allows them to gauge how the items complement each other and whether the overall look aligns with their personal style. In such situations, employing a digital human can enhance customer engagement, facilitate successful purchases, and decrease the chances of product returns.




Bron: Harvard Business Review (April 2023): AI with a Human Face. The case for—*and against*—digital employees by Mike Seymour, Dan Lovallo, Kai Riemer, Alan R. Dennis, and Lingyao (Ivy) Yuan
https://hbr.org/2023/03/ai-with-a-human-face

# APPENDIX B: Examples of commercial Use Cases

- A Real Conversation with a Digital Human:
  *Interaction with the "digital assistant" is via the front-end that animates the avatar and its lip synchronization.*
  https://www.reply.com/en/artificial-intelligence/the-digital-humans-revolution

- Emphatic AI Health assistant
  *Maya is a revolutionary digital human assistant, providing the healthcare sector with a scalable, always-on and empathetic way to serve patients.*
  *https://www.digitalhumans.com/case-studies/maya-md*

- Digital Einstein
  *Digital Einstein is a lovingly recreated version of his namesake, using cutting-edge CGI and animation to "clone" him down to the most subtle movements. As an AI, he can recount tales of his life and core works, give you a daily science quiz or tell you one of his favorite jokes. As always, he's here to teach, inspire and engage.*
  *https://www.digitalhumans.com/case-studies/digital-einstein*

- Communication for retail self-service
  *A native German speaker, Selena is designed to be the first digital service avatar representing the values of Deutsche Telekom's customer service agents – in how she looks, talks and interacts. But more than that, she's a highly competent and autonomous assistant, able to assist customers 24/7.*
  *She helps customers in real time to check and improve the performance of their WiFi network, she gives recommendations tailored to the customer's personal situation, and can even help users find a package that best suits their needs*
  *https://www.digitalhumans.com/case-studies/deutsche-telekom*

# APPENDIX C: BOOKS