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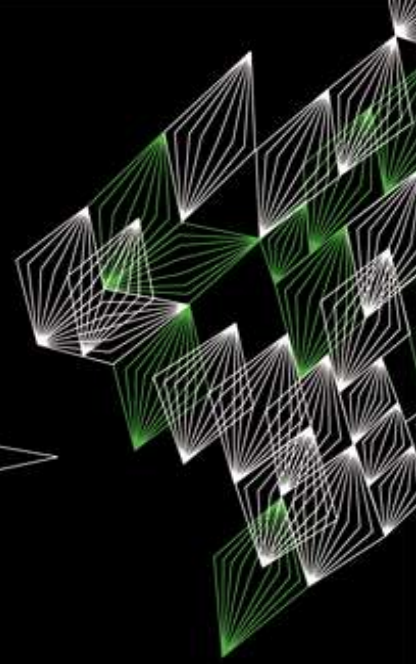


# Artificial Intelligence

Danilo Toapanta, Twente, 15.01.2021

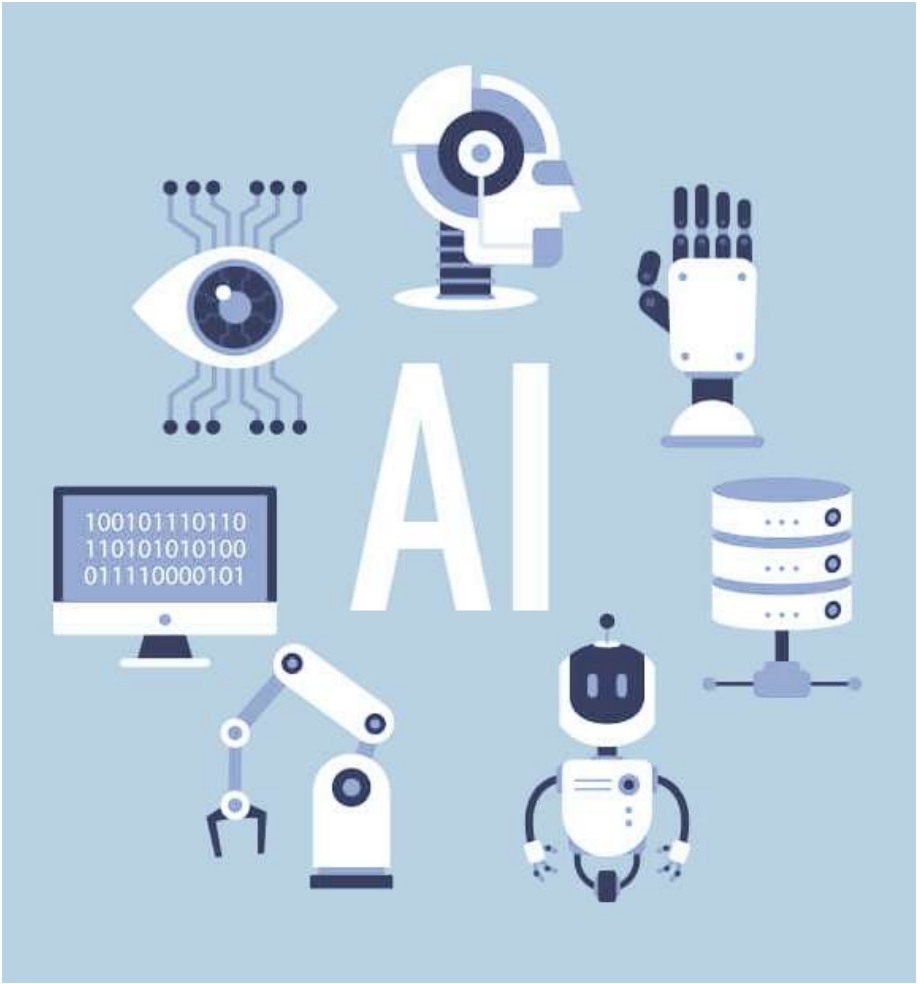
***In this presentation:***

- What is Artificial Intelligence?
- Impact of AI in the four Business hypothesis of the Twente I4.0 model
- An application case of AI
- Cost-benefit analysis based on application case

## *Artificial intelligence allows computer systems perform tasks that otherwise would require human intervention.*

What is Artificial Intelligence (AI)?

| *Definition* |
| --- |
| • In literature: technology which enables a machine **simulate** human behaviour<br>• Belongs to the wide-ranging branch of **computer science**<br>• Study how **machines** interpret their surroundings and used them in their advantage to accomplish goals<br>• **Attempt** to imitate human rational thinking<br>• Is a **system** that thinks, operates and rationalize like human<br>• Currently, **no** formal definition of AI as the term intelligence is complex to describe |




Source: Bartneck et al. (2021)

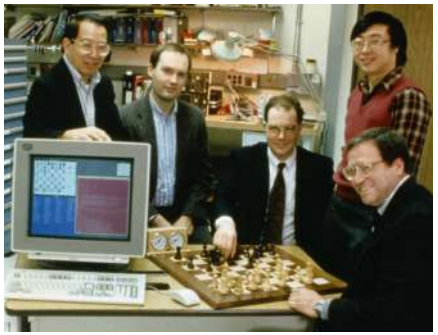
# *There is four narrow stages on the development of AI. Currently we are entering the third stage*

Understanding the types of AI classification

## *Reactive Machines*

Oldest form of AI and extremely limited capability

- No memory-based functionality
- Respond to limited set of inputs



## *Limited Memory*

Able to learn data and make decisions

- Use large amount of data to predict outcomes
- Current (2021) systems use this stage of AI

## *Theory of Mind*

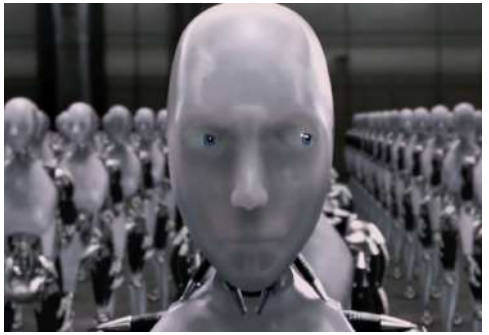
Next step of AI systems

- Understand emotions, beliefs, and thought processes
- Focus will be on how human‘s needs shape rational thinking

## *Self-aware*

Final stage of AI

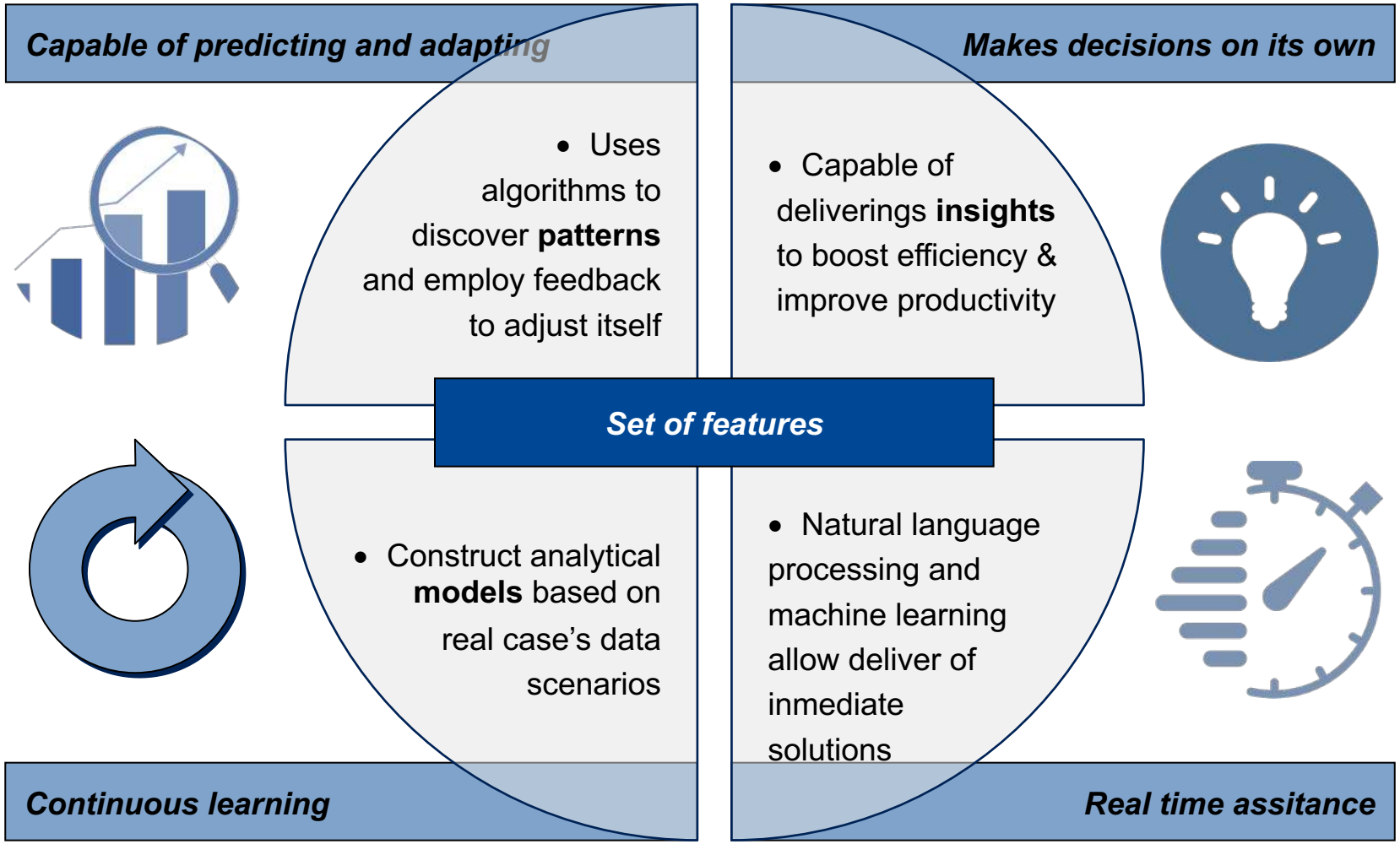
- System is aware of surroundings and have emotions, desires, and beliefs
- Only exits hypothetically



Source: Naveen J. (2019)

# *AI resolve problems by learning from data sets, predicting models and making decisions on a timely manner*

Traits of Artificial Inteligence




Source: Mohammed Z. (2018)

# *Applications of Artificial Intelligence reconfigure supply systems and foster digital markets.*

Implications of AI for Digital Market Places and Supply Chains

***Digital Market***

- Provides a **hyper-personalized** shopping experience.
- Foster customer segmentation which in turns **refine** marketing strategies
- Unlock actionable **data insights** by offering features like:
  - Chatbots, image-based search, inventory forecasting among others.

***Supply Chain***

- Automate processes to enhance logistics **reducing** wasted time on purchasing requests
- Uses **techniques** such as: data mining and neural networks to accelerate management of supplies
- Allows high consumer service levels at **lowest** possible cost

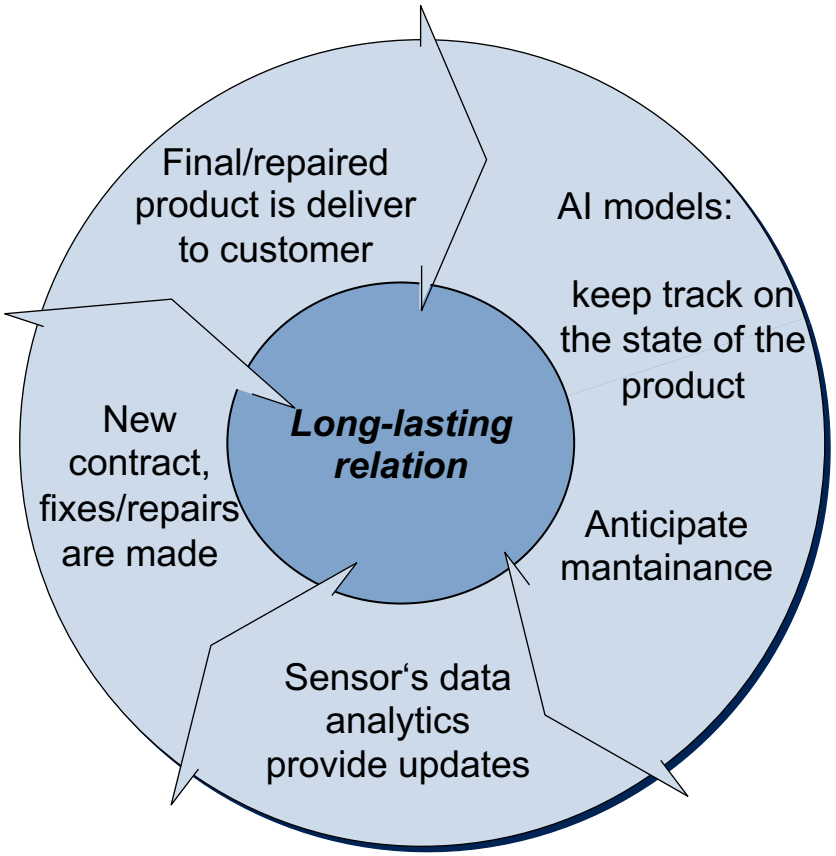
**IMPACT: 4**

A considerably effect is found. Emphasis in e-commerce and supply chain planning are two areas where AI excels and reduce costs.

Source: Toorajipour et al. (2021)

# *AI can predict, analyze and give insights on the status of a product. However, are companies really implementing life-cycle solutions?*

Implications of AI for life-cycle solution instead of finished products




**IMPACT: 2**

- Implementation of sensors highly dependable
- Some company’s business model relay on selling one-time payment products
- Sustain processing of data per each delivered product may not be feasible

1) Footnote

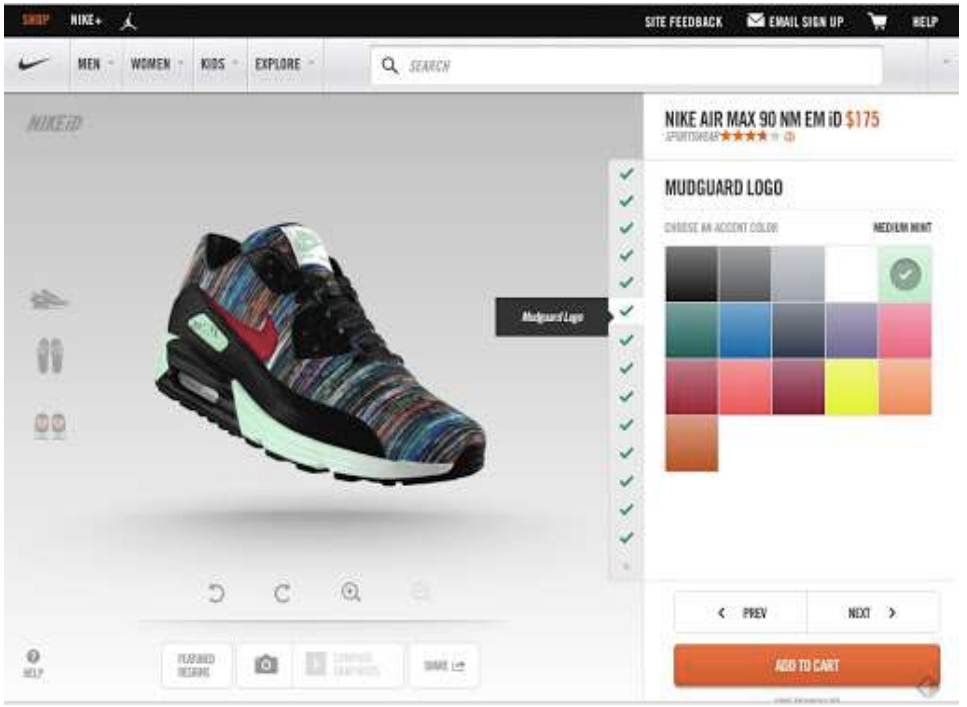
Source: UTIPS

# *A new era of personalization has started with the rise of AI. Providing customized solutions is the next point of differentiation for all the manufacturers*

Implications of AI in (mass) customised products

- ***What AI can offer:***

- Analyse and predict customers' likings at an individual level
- Contribute to understand, learn and recommend possible designs. Typical AI powered tools:
  - Face detection, Smart Crop, Image Enhance, Text Recognition
- Tailor marketing content to specific audiences
- Guide purchasing decisions
- Provide tailored content and offer best value product



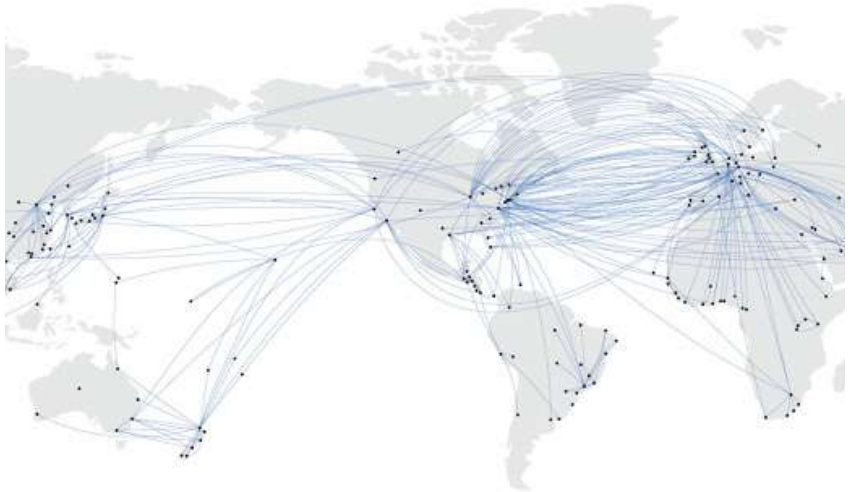

**IMPACT: 4**

- AI will enhance customer shopping experience
- Companies encouraged to be transparent when manipulating consumer data

Source: Garg A, (2020)

# leveraging advances in AI, prediction markets, and blockchain platforms facilitate cooperation around the globe, thus eliminating stagnant classical chains

Impact of AI in decentral collaboration networks



**IMPACT: 4**

1. Ubiquitous smart technologies facilitate data sharing through blockchain platforms
2. New intermediaries with AI practices eliminate the need of centralized data analytics
3. Shared value is distributed thus overcoming geographic barriers and reducing time
4. Models are updated with true to real life conditions by Step 1.
5. Collaboration is achieved by enhancing learning mechanism

Source: Harris et al. (2019)

# *Key phases on digital processing and contribution of Artificial Intelligence for object detection*

Application case: Image processing and AI, general concept

**Image restoration**

- Reduce, noise, pixel binding, camera misfocus and other corruptions

**Color image processing**

- Color spaces (RGB) are workout

**Image compression and decompresion**

- allow for changing the size and resolution of an image

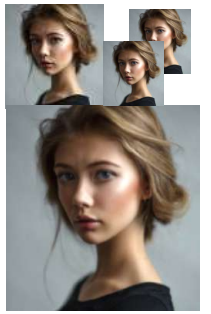


**Image enhancement**

- Prepare digital file to be manipulated

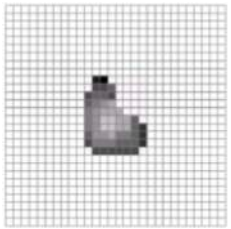
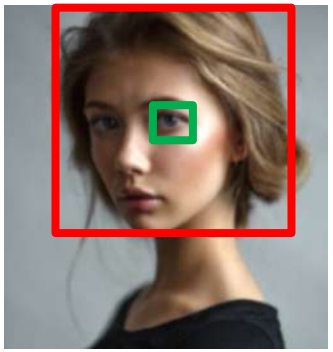


**Image recognition AI**

Clasification and identification of features
- Object detection, recognition and segmentation

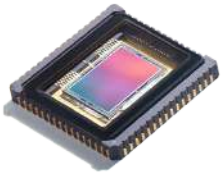


**Morphological processing**

- describes the shapes and structures of the objects in an image

**Image acquisition**

- Data from a sensor converted into entity in a digital file



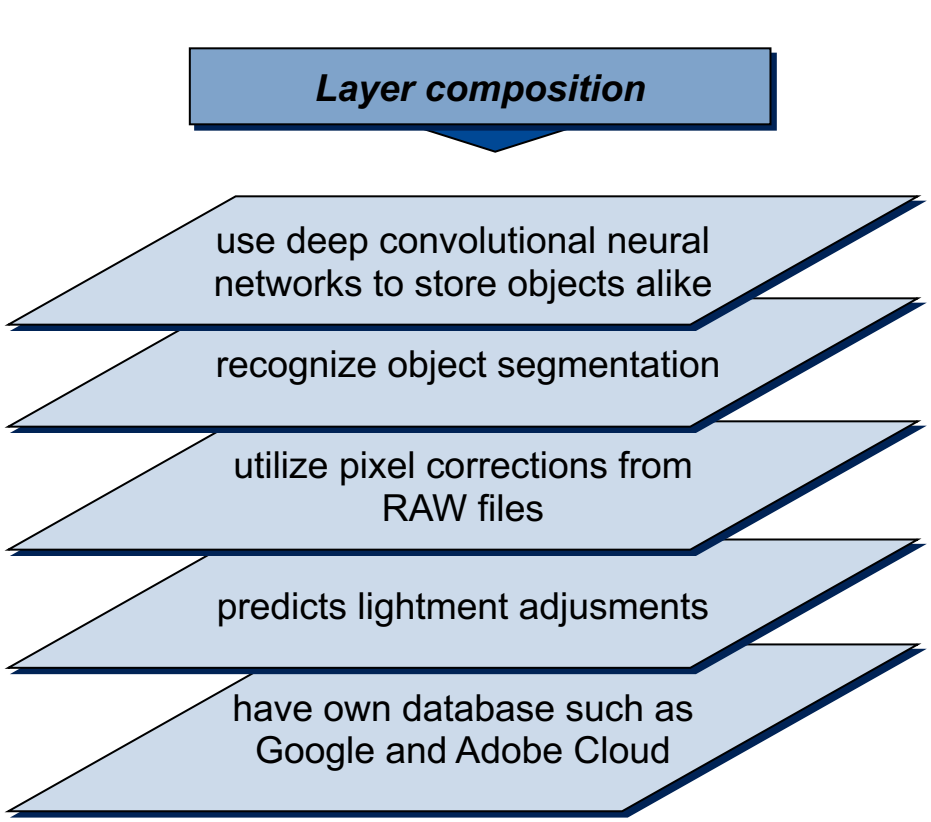
**Representation**

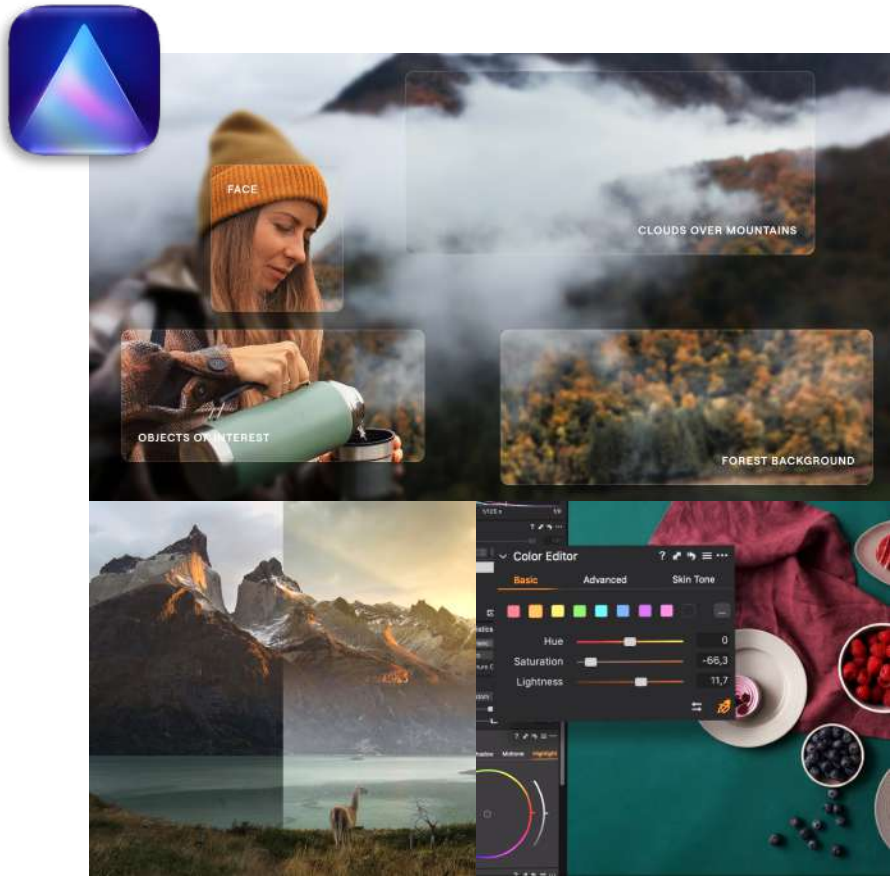
- Processed data: picture ready to be displayed

Source: Yatsenko M. (2020)

# *Luminar$_{AI}$ offers enthusiactics and profesionals photographers a simplistic workflow to edit pictures*

Application case: Luminar$_{AI}$ “The first image editor fully powered by artificial intelligence“




Source: Skylum (2021)

# *The time it takes for a professional to edit one picture is considerably faster using Artificial Intelligence*

Application case: Diference between editing with programs wihout AI and Luminar$_{AI}$


## *Editing before AI*

- More than one layer is necesary
- Time consuming, submasking necesary
  - Usually, editor will define end product
  - No correction because takes too long for final version
- Editings are usefull only for one project
  - Learnigs die with the editor
- Conditions for shoting should be aproximate to perfection otherwhise hard time in postproduction

## *Editing with Luminar$_{AI}$*

- One click solution
- Deliver client product in less time
  - Use time saved providing custamization according with client‘s feedback
- More time to work on other projects
- Editings can be shared for future projects
  - Optmize AI engine for future pictures
- Lack of equipment e.g: lights, backgrounds, defusers, can be solved in editing

Source: CaptureOne (2019)

# *Using AI in a professional shot session increase revenues for an advertisment company in fashion phootography*

Cost-benefit Analysis: AI in a profesional shot session


## *Considerations*

- Less time on postproduction, more time for working on new projects
- Assitance of AI tools, less equipment required e.g. lights
- Licence for editting program paid back after one month

**Data for cost-benefit analysis**

| *Without Luminar* | | | | | *With Luminar* | | | |
|---|---|---|---|---|---|---|---|---|
| **Variable Costs** | | | | | **Variable Costs** | | | |
| Hour paid | | | 32,5 | | Hour paid | | | 32,5 |
| Avg time fashion shooting session | 2 | | 65 | | Avg time fashion shooting session | 2 | | 65 |
| Avg number of shottings | 4 | | 260 | | Avg number of shottings | 8 | | 520 |
| Avg posproduction time | 17 | | 552,5 | | Avg posproduction time | 13 | | 422,5 |
| Total Variable costs | | | 2437,5 | | Total Variable costs | | | 2827,5 |
| **Fixed Cost** | | | | | **Fixed Cost** | | | |
| rent studio/month | | | 1200 | | rent studio/month | | | 1200 |
| Equipment | | | | | Equipment | | | |
| Reflector | 75 | | | | Reflector | 75 | | |
| Lenses | 200 | | | | Lenses | 200 | | |
| Lights | 320 | | | | Lights | 230 | | |
| Stands | 312 | | | | Stands | 312 | | |
| Tripods | 70 | | | | Tripods | 70 | | |
| | | | 977 | | | | | 887 |
| Total fixed costs | | | 2177 | | Total fixed costs | | | 2087 |
| | | | | | Luminar Licence/year | | | 329 |
| Returns | | | 260,5 | | Returns | | | 713,08 |

Source: Salary Explorer (2019)

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