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SOLUTIONS BASED ON ARTIFICIAL INTELLIGENCE

INNOVATION IN AUTOMATION OF COMPLEX TASKS

01

VALUABLE FOR YOUR BUSINESS?

- STAFF-RELATED EXPENSES ARE GROWING FASTER THAN YOUR PROFITS?
- HUMAN ERROR MAY CRITICALLY DAMAGE YOUR BUSINESS?
- SOME OF YOUR PROCESSES ARE ROUTINE, AND YOU KNOW HOW TO DO IT “CORRECTLY”?
- YOU NEED TO MAKE QUICK DECISIONS BASED ON A MULTITUDE OF PARAMETERS?
- YOUR BUSINESS IS CONNECTED WITH MANUFACTURING?
- YOUR GOALS ARE PERSONALIZED SERVICE AND HAVING MANY LOYAL CLIENTS?

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THE TIME FOR AI IS NOW

EARLIER: developers created algorithms reflecting the current (or already outdated) business requirement.

NOW: AI systems continuously learn and evolve using data. Algorithms are generated within the system and constantly adapt to changes due to new data.

AI DOES NOT REPLACE TRADITIONAL SYSTEMS, BUT EXPANDS THEIR CAPABILITIES

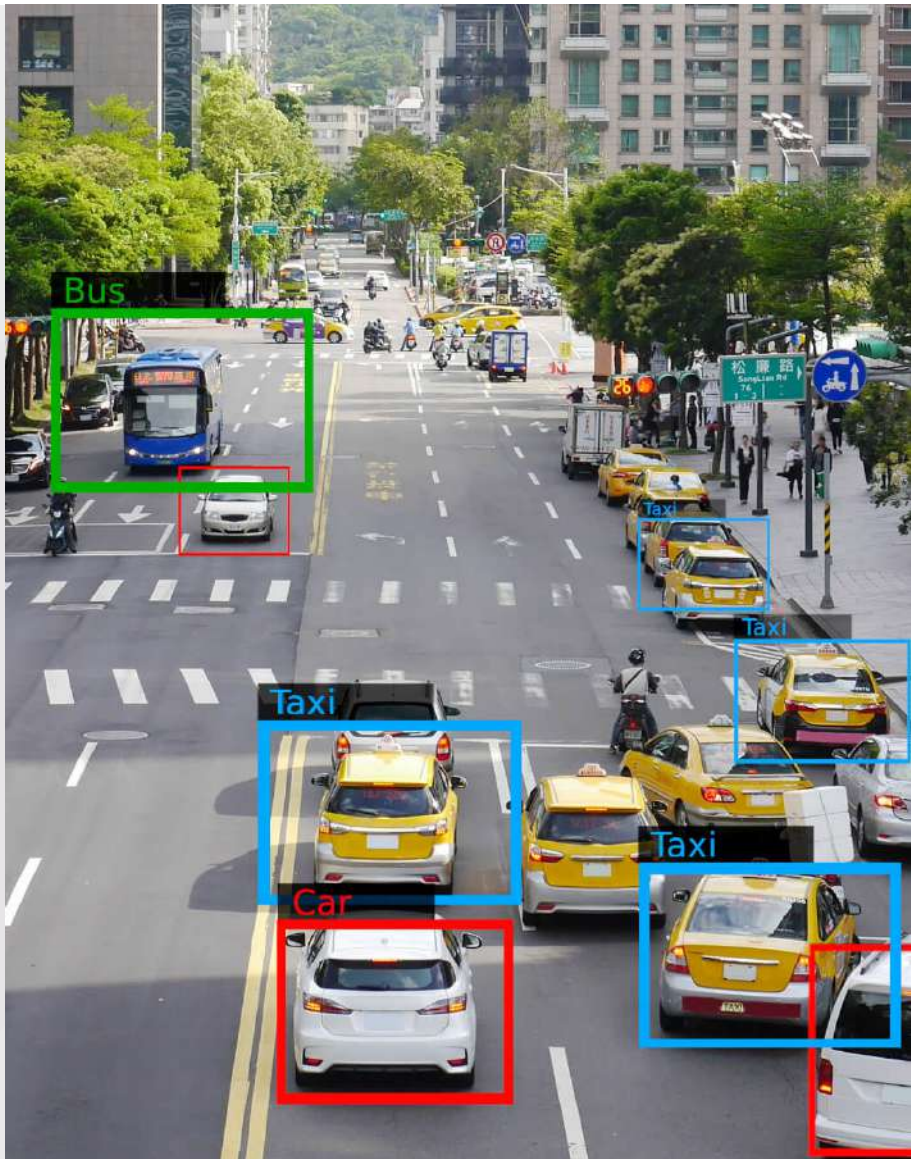
WHY?

- Classic automation gave all it could: further expenses greatly outweigh benefits
- Human labor becomes more costly
- Technology is ready: computers, storage, cameras, networks, sensors, IoT
- The necessary knowledge has been acquired, it allows to solve practical tasks
- The competition in the market has grown more intense
- Expenses and revenues are disproportionate because of globalization

EXPERIENCE
COMPUTER VISION

03

- Paintings recognition using photos
- Identifying cameras used to take pictures (forensics)
- Face identification, tracking, and search in a database
- Detecting fake faces in photos and videos
- People identification and tracking using regular and wide-angle fisheye cameras
- Detecting damaged trees using aerial footage
- Counting customers and their waiting time at the cash register
- Detecting people coming in and out of polygonal areas on regular andwide-angle fisheye cameras



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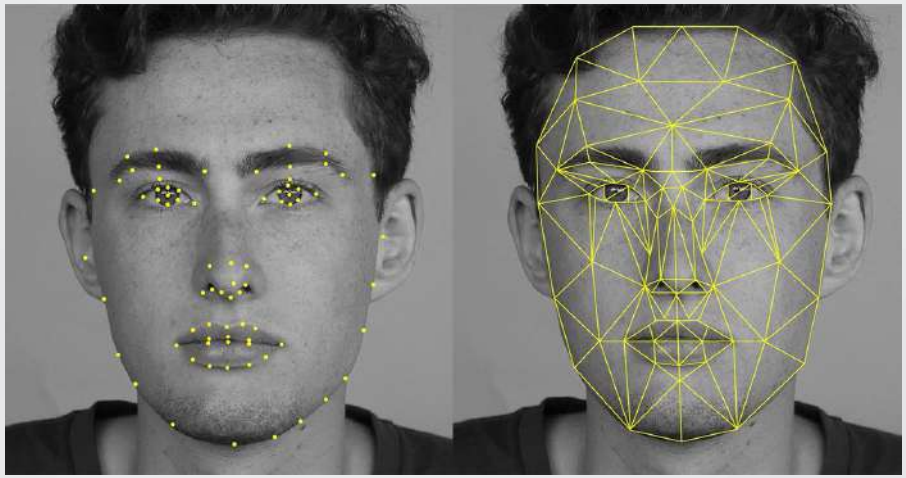
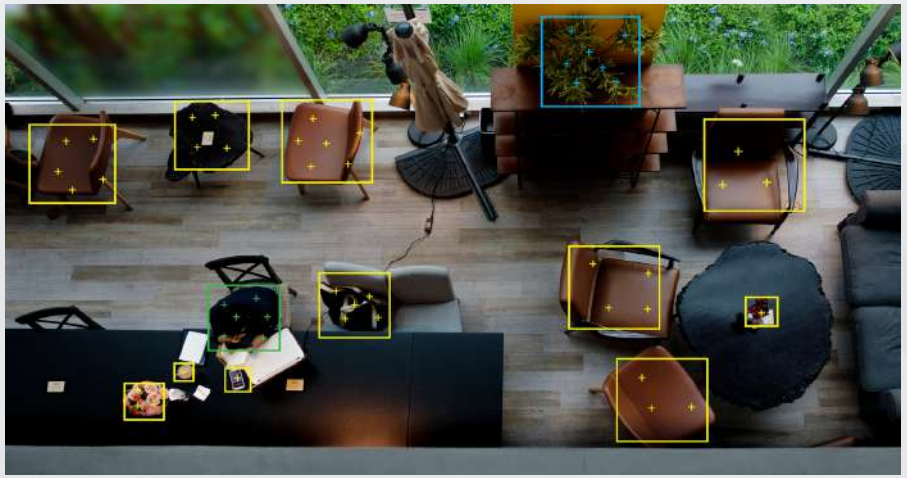
EXPERIENCE
COMPUTER VISION

04





- Searching for people in a retro photo archive
- Face identification, tracking, and search on Jetson Nano and Raspberry Pi platforms
- Detecting presence and absence of goods on a store shelf

- Detecting helmets on people's heads in the frame
- Counting people and other objects in the frame
- Detecting changes or absence thereof in the observed environment

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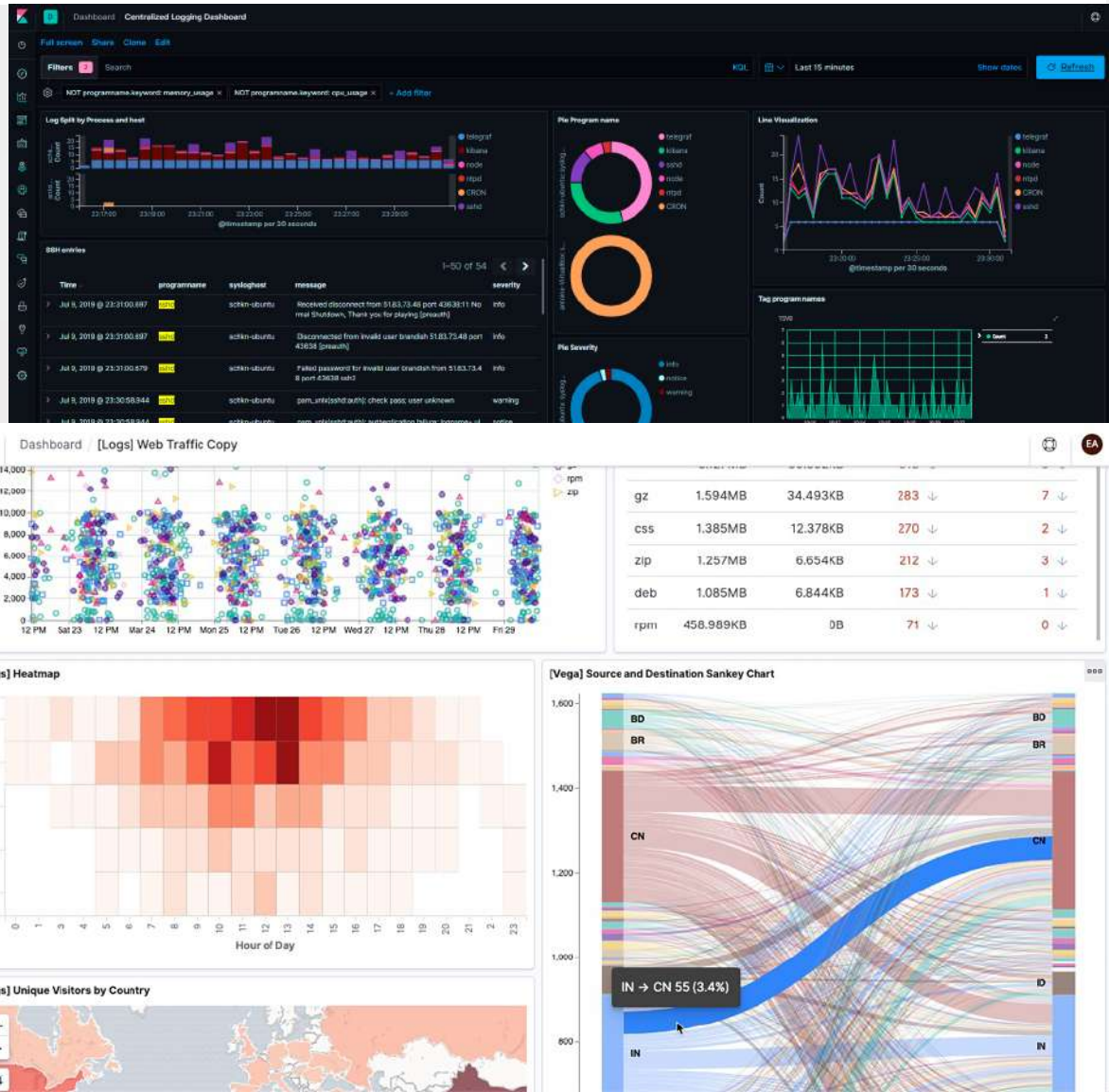
EXPERIENCE
DATA ANALYSIS

05

- Predicting cardiovascular diseases
- Predicting brain diseases (autism, ADHD) via MRI
- A customer’s market basket analysis
- Predicting the resource and spending of advertising budget
- Optimizing computing resources of a virtual data center
- Segmenting portal visitors for personalized offers



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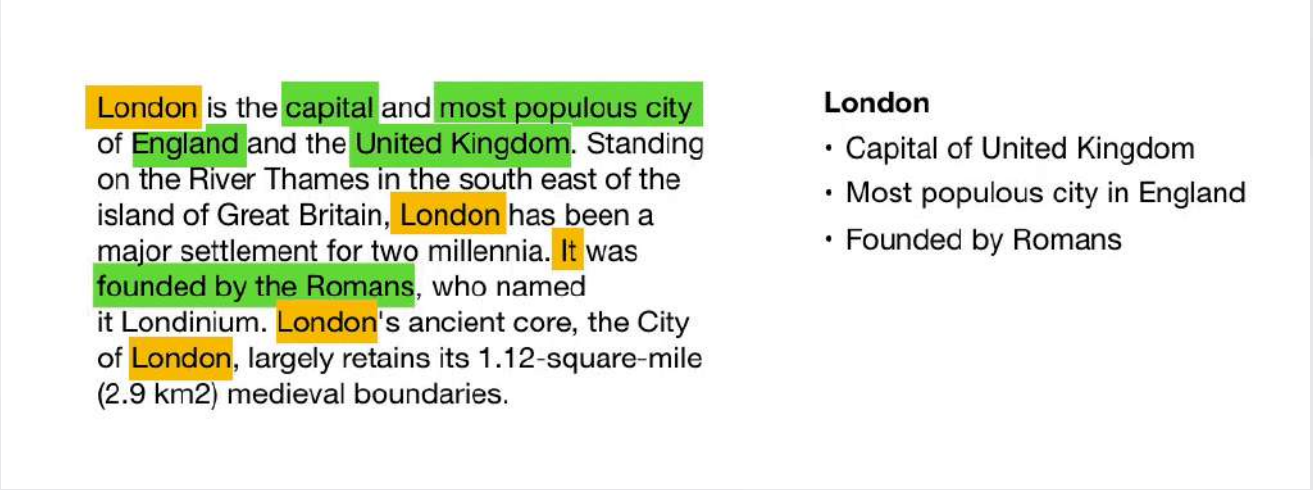
EXPERIENCE
NATURAL LANGUAGE PROCESSING

- Price analysis of goods in competitors' catalogs
- Smart search in reference documentation
- Extracting knowledge from semistructured PDF-documents
- Automatic interlinking of website materials
- Automatic tagging of website materials



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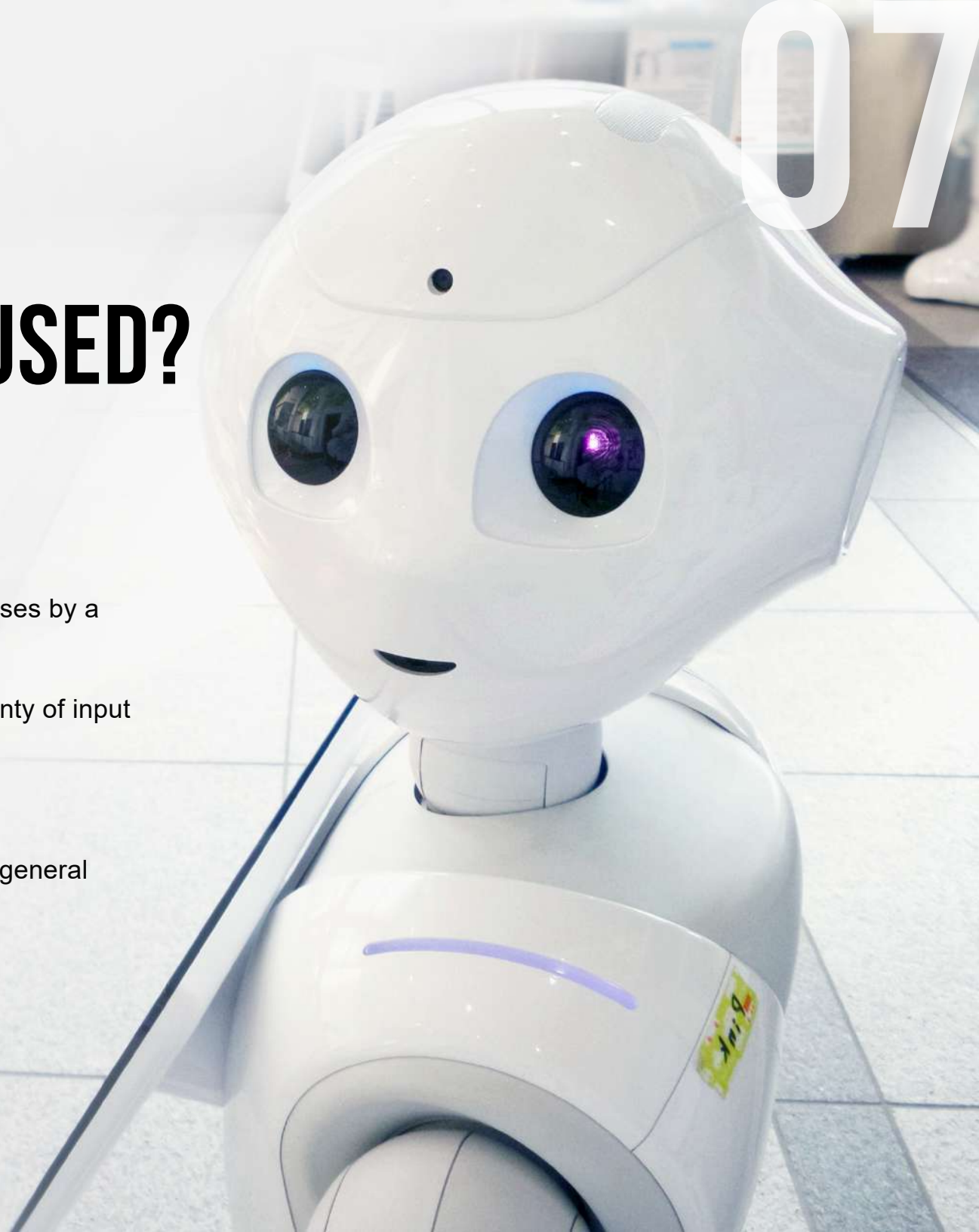
WHERE IS ARTIFICIAL INTELLIGENCE USED?

- Image, sound, movement recognition
- Mimicking human expert behavior
- Controlling the correct execution of processes by a human actor
- Decision-making support for tasks with plenty of input data
- Predicting future states of a system
- Transition from observing the particular to general values



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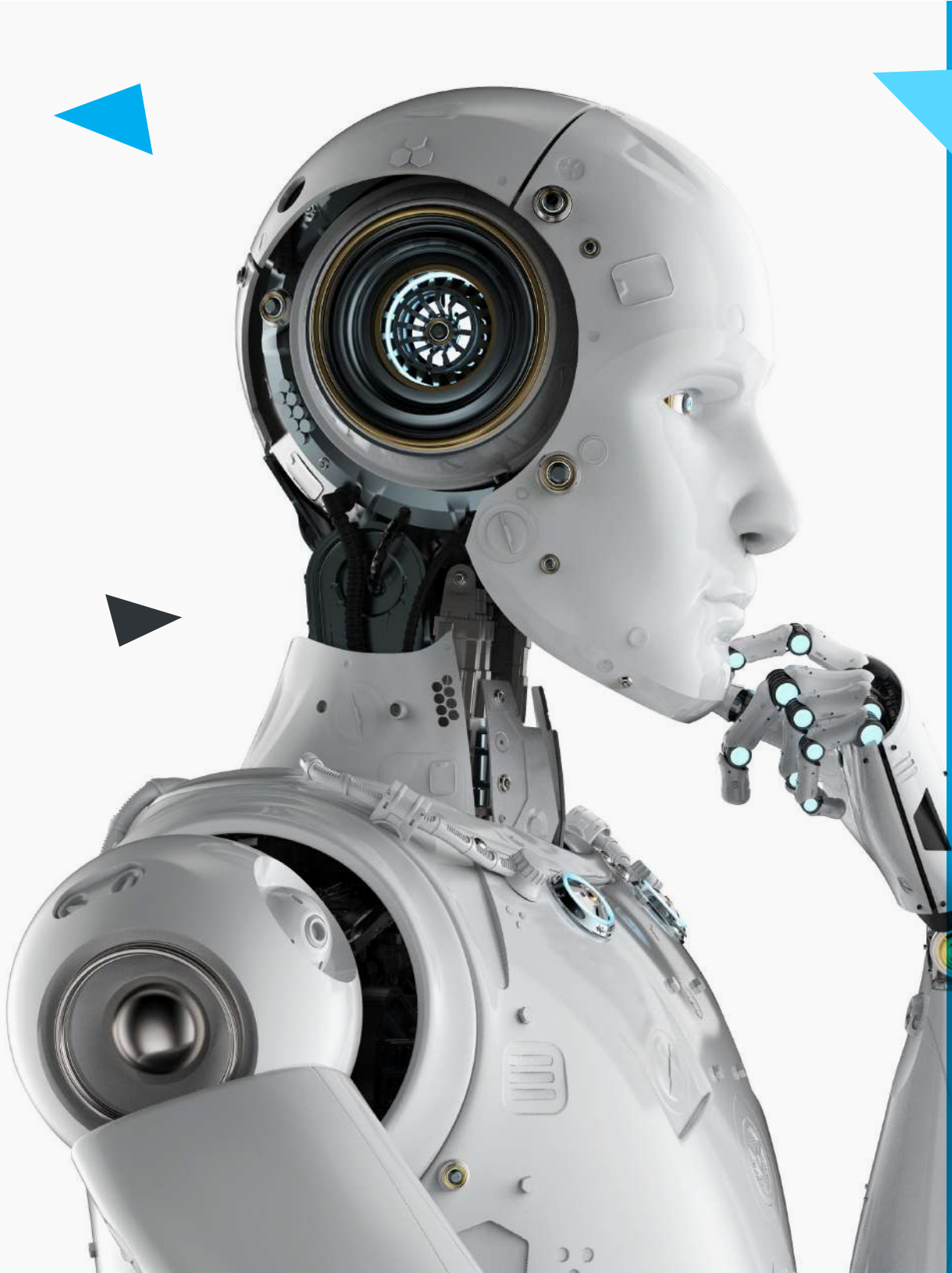


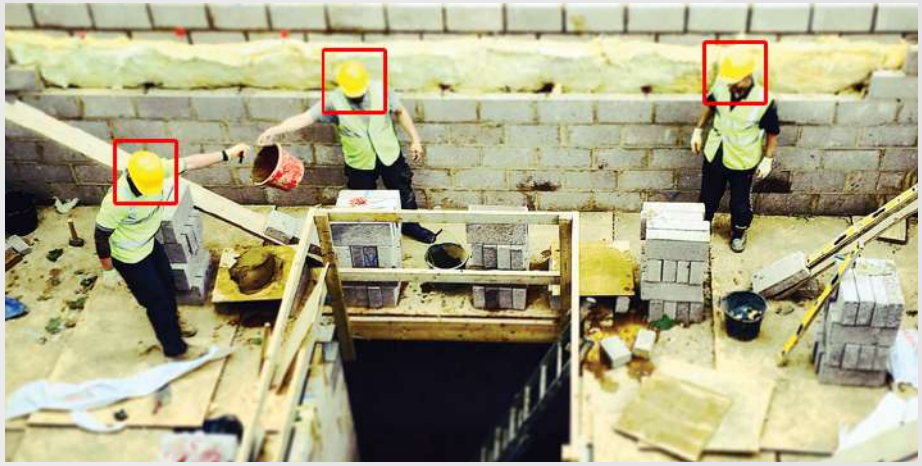
HOW AI WORKS

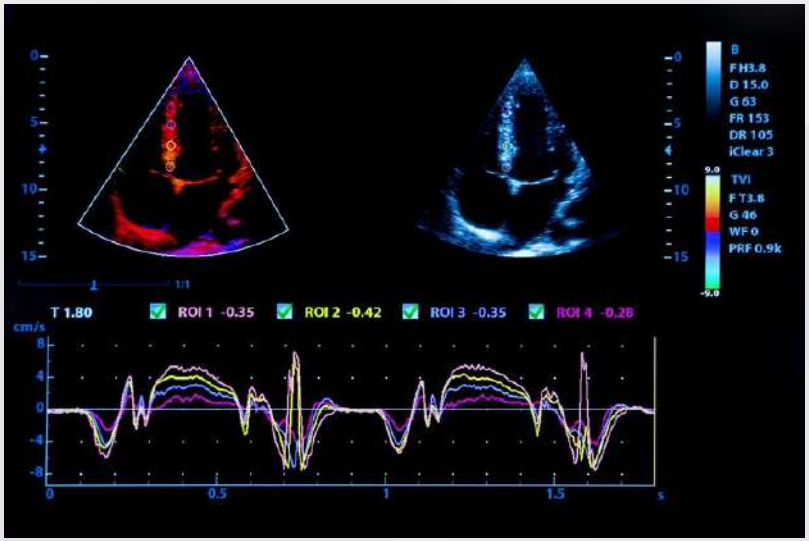
MIMICS HUMAN MIND, if a solution is based on thinking processes

USES SUPERHUMAN CAPABILITIES, which allows to act faster and more efficiently, to go beyond human ability

EXAMPLE
SENSORY PERCEPTION

- We use computer vision to check if people at the sites wear hard hats, if there are enough goods on the shelves, and if the dishes are clean
- We analyze noises in a heart or lungs via an electronic stethoscope to detect likely issues
- We analyze vibrations in mechanical parts to predict malfunction





HOW AI WORKS:

MIMICS HUMAN MIND

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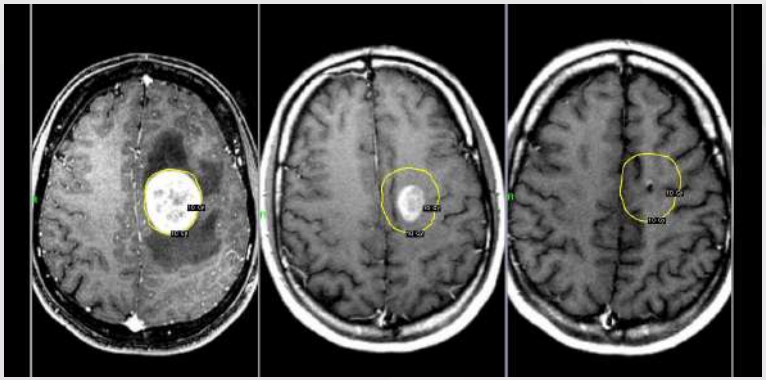
EXAMPLE
MIMICKING HUMAN EXPERT BEHAVIOR

- We train a system to distinguish damaged trees from healthy ones via learning a methodology used by an expert
- We define the quality of wall plastering via visual examination



- We look at an MRI and define the presence of a tumor

HOW AI WORKS:

MIMICS HUMAN MIND, IF A SOLUTION IS BASED ON THINKING PROCESSES

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EXAMPLE
CONTROLLING CORRECT PROCESS EXECUTION

A car enters a special area for decontamination. Our machine learning system uses computer vision, an accelerometer, a gyroscope, and an ultrasound distance sensor to evaluate the quality of applying a disinfectant to the car body by an employee.

Based on the obtained data the system makes the decision on how well the car has been decontaminated.

HOW AI WORKS:

MIMICS HUMAN MIND, IF A SOLUTION IS BASED ON THINKING PROCESSES

USES SUPERHUMAN CAPABILITIES, WHICH ALLOWS TO ACT FASTER AND MORE EFFICIENTLY, TO GO BEYOND HUMAN ABILITY

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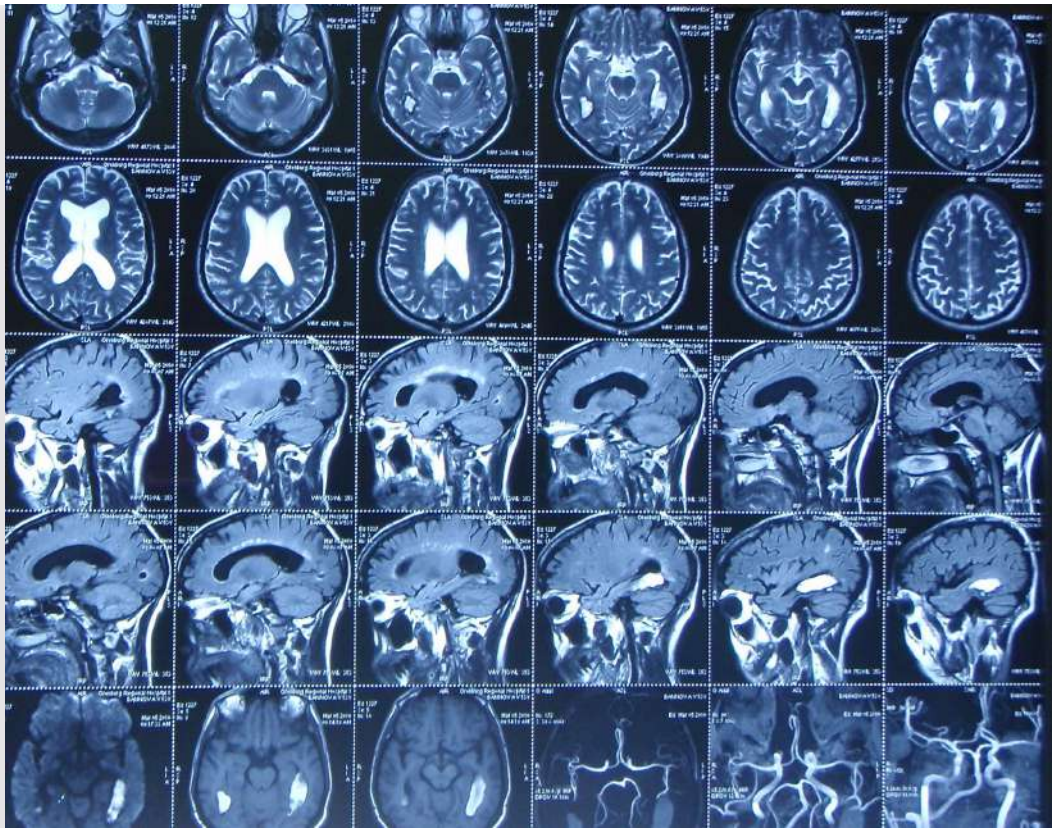
EXAMPLE

SUPPORT OF DECISION-MAKING FOR TASKS WITH PLENTY OF INPUT DATA

The task is to define the likelihood of autism using fMRI images.

Manual processing of fMRI is complicated by the amount of material for analysis. AI analyzes fMRI sessions of many people, in which it searches for dependencies and patterns characteristic of brain disease.

> ** fMRI is a dynamic model of brain activity described via blood flow.*



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VALUE

The value of machine learning ideas is in its ability to allow you to continuously learn based on data, analyze the present, and predict the future.

This powerful set of algorithms and models is used in all industries to improve processes and understand patterns and anomalies in data.

REVENUES

- Cut expenses, fines, errors, defects, and malfunction
- Hasten transaction processing, increase workforce productivity
- Ease requirements for staff and the number of people in production

COMPETITIVE EDGE

- ✓ PERSONALIZATION
- ✓ LOYALTY
- ✓ IMPRESSION FROM USE
- ✓ FREEING CREATIVE ENERGY
- ✓ RIDDING OF MUNDANITY

KEY FIELDS WHERE AI SOLUTIONS WORK BEST

14

SYSTEMS

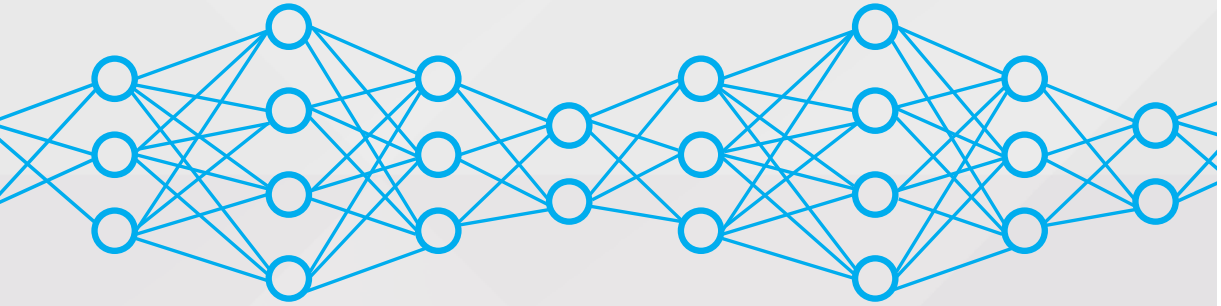
- Implement human-like behavior in a program
- Augmented interaction with the environment: computer vision and audition, other sensors
- Learning instead of programming
- Acting based on historically correct behavior defined by big data

PEOPLE

- Reduce the risk of human error influence
- Boost people's work efficiency
- Decrease people's involvement in tedious tasks
- Interaction with systems as intelligent agents

APPROACHES TO TASKS

There are several methods of solving tasks using AI, in reality a combination of several methods is required.



NEURAL NETWORKS

The main method of solving most complex tasks is neural networks, which imitate the behavior of neurons in a biological brain.

A neural network learns on examples to solve a task. Proper learning is the key to successful solutions.

OTHER METHODS

- ✓ CLASSIFICATION
- ✓ RULE INDUCTION
- ✓ CLUSTERIZATION
- ✓ REGRESSION
- ✓ ENSEMBLES
- ✓ DIMENSIONALITY REDUCTION
- ✓ BAYESIAN INFERENCE

HOW WE WORK

01
Introductory meeting

02
Find tasks with maximum returns

03
Make proposals to solve the chosen tasks

04
Choose a task for a pilot project

05
Start the 1-to-3-month-long pilot project, solve the chosen task

06
Implement the solution into production and replace a business process

07
Move on to the next task

TIME FRAMES AND COSTS

01 IDENTIFICATION AND CONSULTING

1-3 WEEKS

free

02 PILOT PROJECT

2 WEEKS - 3 MONTHS

from $5000 for unique tasks, negotiable for broadly applicate tasks

03 IMPLEMENTATION PROJECT

depends on the complexity of a business process being automated

ABOUT US

STARTED IN 2005

AI TEAM WAS ASSEMBLED IN APRIL, 2017 (INCLUDES PHD'S, MASTERS)

MORE THAN 10 PROJECTS

MORE THAN 10 COMPETITIONS (PRIZES)

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- Contact us via email: **info@bitworks.software**
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