

Knowledge Economy Society

CMQ
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15th International Scientific Conference of the College of Management
and Quality Sciences of the Krakow University of Economics

Knowledge Economy Society

Managing Innovations in the Region

Conference proceedings student's poster session
of the CMQ2023 conference

Edited by

Janusz Nesterak

Agata Niemczyk

Zofia Gródek-Szostak

Robert Szydło



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Introduction

Innovations are not so much a modern, but a common word in the 21st century, in the era of turbulent environmental changes. These changes trigger increasingly new and improved solutions implemented by a variety of organizations and institutions that contribute to the potential of regions. Each region not only brings together a greater/lesser number of enterprises and non-governmental organizations with numerous innovative solutions but also generates them itself. Innovations are classified in various ways, and various criteria are used to distinguish them. Among them, functional, object based (product), technological (process), organizational, marketing, and ecological innovations are mentioned.

Smart technology boosts innovative solutions. Artificial intelligence, machine learning, virtual/augmented reality are becoming the premises for innovative solutions in cities and many industries such as cosmetics, tourism, energy, and others. The topics described, find their place in the collection of posters presented to you. The book consists of works submitted by students for the student conference as part of the 15th International Scientific Conference CMQ2023 of the College of Management Sciences and Quality of the University of Economics in Krakow (part 1), as well as works carried out as part of workshops by students specializing in Controlling in the field of Accounting and Controlling (part 2).

Part 1 includes 16 posters covering topics such as:

- artificial intelligence and machine learning, for example: AI in Management – Research Trends; Machine Learning in the SKJ Project – Quality Control System,
- their use in general management areas, for example: Techniques of Managerial Control; Innovations in the Capital Environment,

but also more specific topics such as:

- smart city: Benefits and Effects Resulting from the Implementation of the Smart City Idea; New Technologies as an Opportunity for Urban Development – the "Smart City" Concept; Smart City: A Solution That Makes Life Easier for the Inhabitants of Krakow; Smart Solutions for Smart Cities; The Role of Geospatial Data in Modern City Management; Warsaw as a Smart City,
- logistics park: GLP Logistics Park in Poland,
- industry innovations: Role of Augmented Reality and Artificial Intelligence in Beauty and Cosmetic Market; Innovation Management in Tourism – the growing popularity of slow tourism; The application of Artificial Intelligence in a Decision Support System in the field of energy, district heating, and gas economy; Global Pandemic as a Driving Force for Technological Change – Assessment of the Impact of Remote Work on the Effectiveness of Employees in Poland,

also considering the role of sustainable development in business activities, for example: How Sustainability and Social Responsibility is Implemented in Cracow's Companies?

What is more, the collection of posters presented in part 2 consists of 17 unique posters prepared by a group of 45 ambitious students during workshops held from February to June 2023. The students, participants of the Controlling specialization in the field of Accounting and Controlling, prepared these posters as part of the courses "Information Tools in Controlling" and "Controlling Systems and Business Intelligence." The main goal of the project was to engage students with modern tools that are already available or will soon be available to professionals working in the controlling department. The main theme of the presentations was mainly artificial intelligence and various tools based on this technology, including the use of the GPT chat model. Students presented the possibilities of applying artificial intelligence in the context of artistic fields, recruitment processes, and the evolution of management methods and strategies. During the presentations, both the benefits of artificial intelligence development and the potential threats associated with it were emphasized. A large number of posters focused on the use of artificial intelligence in controlling processes. By discussing advanced tools and possibilities, students presented innovative perspectives that the development of artificial intelligence opens up for controlling department employees. The students' works contribute to the cognitive process and serve as a source of inspiration for future controllers who are looking for modern solutions to support their work efficiency. The joint presentation of posters took the form of a discussion session, during which students had the opportunity to discuss presented content. Students had the opportunity to present the content of their posters and engage in debates about them. Students also took additional action by recording audio presentations of their works. These recordings are an important addition to the visual side of the posters, enhancing the substantive value for the audience. Thanks to this means of communication, listeners were able to fully immerse in the discussed topics. The initiative undertaken by the students enriches their learning process, offering comprehensive and interactive presentations that allow for a deep understanding of the presented topics. Such a presentation meeting provides an important forum for the exchange of knowledge and reflections, enabling students to present their works and stimulating active discussion among participants.

The editors of the monograph hope that the content of the presented posters will not only provide cognitive value for current students, for whom this publication is intended but will also serve as an inspiration for developing research skills for future generations of students. The works presented on the posters aim not only to present important thematic aspects but also to encourage students to further deepen their knowledge and develop research skills. Drawing inspiration from these presentations, future generations of students can find inspiration for their own research, creative thinking, and exploration of new areas in the field of controlling.

The editors believe that the publication of this collection of posters will contribute to the creation of a dynamic academic environment conducive to the intellectual and research development of students.

*Janusz Nesterak
Agata Niemczyk
Zofia Gródek-Szostak
Robert Szydło*

Part 1.
Smart Technology
and Smart City

AI in management - research trends

AI DRIVERS

Dynamic changes in technology and society caused by the disruptive consequences of the Fourth Industrial Revolution - AI is one of the fundamental technology standing behind Revolution 4.0. Importance of using artificial intelligence for management sciences will continue to grow - along with the increasing involvement

RESEARCH GAP

The compilation of data from the Scopus database until 2022 on AI publications shows that there is a research gap in the description of the impact of AI on management sciences, especially on management issues in organizations. Analyzing the number of publications, it can be concluded that management sciences (about 12,000 publications) are far behind not only computer science (over 300,000), but also mathematics (120,000), medicine (40,000) or social sciences (25,000).

METHOD

On February 12, 2022, the following search was carried out in the Scopus database: TITLE-ABS-KEY (artificial AND intelligence) AND (EXCLUDE (PUBYEAR , 2022)) AND (LIMIT-TO (SUBJAREA , "BUSI")) In the titles, keywords and abstracts, the phrase artificial intelligence was searched. The search was limited to the field of Business Management and Accounting. Keywords analysis allowed to create thematic clusters for AI in management sciences.

THEMATIC CLUSTERS

CLUSTER 1. - TECHNOLOGIES

Considering technologies based on or related to artificial intelligence that are used in organizations, mention should be made of Machine Learning. Machine learning is one of the branches of artificial intelligence technology that describes techniques and mathematical formulas that enable a system (machine) to independently generate knowledge from experience (Bell, 2014). Machine learning algorithms detect patterns in input, learn from mistakes, and correct themselves (Canhoto and Clear, 2020).

CLUSTER 2. - PURPOSE OF USE

Collecting and properly analysing data (using technologies supported by AI) is necessary when it comes to proper optimization of processes in the organization. For example, Big Data can be a tool for analysing employee behaviour, using sensors or badges to track people while they work, move around the workspace, or spend time interacting with others or assigned to specific tasks (George et al., 2014).

CLUSTER 3. - RELATIONSHIPS

An important component of the management researchers' reflections on AI is the relationship between artificial intelligence and man. A review of the literature confirms that the Fourth Industrial Revolution brings with it profound changes in the characteristics of work and the requirements for individual employees (Jarosz et al., 2020). The new digital reality requires us to quickly adapt to the ever-changing technological reality and obtain a "digital trust". The challenge, especially in Poland, is considerable. Despite the increase in the "digital engagement" of the public during the Covid-19 pandemic, general digital skills regarding computer and Internet use (searching for information on the web, digital communication using online mail or instant messaging) remain at a low level in Poland compared to other European Union countries.

CLUSTER 4. - SUSTAINABLE DEVELOPMENT

The last separate thematic cluster is the trend related to sustainable development. Companies operating in the current economic and social conditions must face not only more and more extensive legal regulations related to environmental protection or ensuring employee rights, but also must face the expectations of consumers and other stakeholders in the field of sustainable development.

CONCLUSIONS

A bibliographic analysis of AI in management sciences for this paper has shown that this topic is a relatively new topic for management sciences but is developing at a rapid pace. During the bibliographic analysis, an agenda for the issue of AI in management sciences was also proposed, which consists of thematic clusters related to technologies based on AI and complementary to them, goals of using AI in organizations, human-AI relations and issues related to ethics and sustainable development. Velarde (2021) interviewing experts in the field of AI, argues that among the "ideal" SI trends appeared: ethics, data use, human-machine interaction, learning, along with a deep understanding of artificial intelligence in theory and practice, its regulation, explainability, reproducibility, trust, and security.

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Benefits and effects resulting from the implementation of the Smart City idea

INTRODUCTION

The beginnings of the smart city concept were noticed in the 1990s in the USA, when it first appeared in a scientific publication and was related to the theory of smart growth. A smart city is defined as one characterized by:

- competitive economy (smart economy),
- intelligent transport networks (smart mobility),
- sustainable use of resources (smart environment),
- high quality of life (smart living),
- high-quality social capital (smart people),
- intelligent public management (smart governance).

Smart City is a creative, sustainable city, resulting in improved quality of life, greater environmental friendliness, and stronger prospects for economic development.



Effects of the implementation of the Smart City idea in everyday life

Environment
Energy-use optimization,
Air-quality monitoring,
Waste-tracking

Health
Improved chronic-disease
treatment, Digital tools for a
better patient experience.

Jobs
E-career centers, Digital
hiring platforms, Digital
administrative processes

Safety
Traffic safety, Data-driven
policy, Optimized emergency
response

Time
Intelligent traffic
management, Dynamic
mobility options

Sociality
Applications that connect
neighbors or the public to
local government, Digital
platforms



PURPOSE OF THE POSTER

The purpose of the poster is to present the Smart City idea by pointing out the key features and benefits of its implementation. In view of technological progress attention was focused on impact and effects of using innovative solutions that fit into the idea of a Smart City in everyday life.

The polish example of Smart City → Poznań

Smart Living: pomocni-poznan.pl platform and Viva Senior platform.

Smart Economy: Technology and Industry Park, Plus One Coworking Space.

Smart Community: Poznań's Civic Budget, CYRYL Local Digital Repository Service.

Smart Mobility: Poznań's Smart Mobility plans are focused on a network of smart passenger information boards.

Smart Digital City: City Hall via a digital interface.

Smart Environment: The air quality index, the solar map, Stay Warm initiative.

Safety → Applications such as gunshot detection, smart monitoring, and home security systems can speed up the response of law enforcement.

Time → Smart-mobility applications can contribute to cut commuting times by 15 to 20 percent on average. Using digital signage or mobile apps to deliver real-time information about delays enables riders to adjust their routes.

Health → Remote patient monitoring systems that use digital devices to take important readings and then send them to doctors for assessment could potentially reduce the health burden in cities by more than 4 percent.

Environment → Using applications such as building-automation systems, and some mobility applications could combine to cut emissions by 10 to 15 percent.

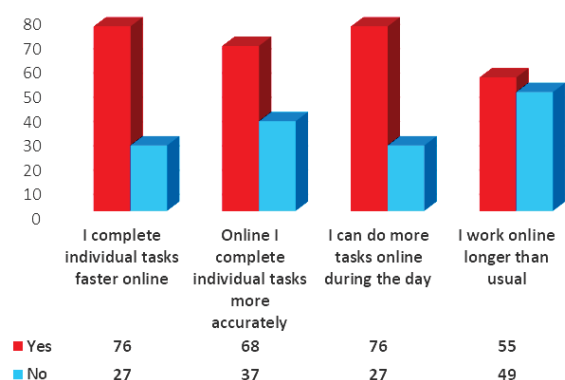
Sociality → Establishing channels communication between the public and local agencies could make city governments more responsive. Solutions, such as Digital platforms facilitate real-world interactions. Moreover, using these types of applications could increase the number of residents who feel connected to the local community.

Jobs → Creating E-career centers can have a positive impact by contributing to introduce more efficient mechanisms for hiring more unemployed and inactive people into the labour market. Data-driven formal education and online retraining programs can expand a city's pool of skills.

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Smart cities: Digital solutions for a more livable future, McKinsey Global Institute analysis (<https://www.mckinsey.com/capabilities/operations/our-insights/smart-cities-digital-solutions-for-a-more-livable-future>)
dostęp: 23.04.2023.
Smart City indicators: Six Fields of Action for Success (<https://www.eseconline.eu/press/smart-city-indicators>)
dostęp: 29.04.2023

Global pandemic as a driving force for technological change - assessment of the impact of remote work on the effectiveness of employees in Poland

The objective of this paper is to present the impact of remote work on employee effectiveness in Poland. The study verified the positive and negative aspects of remote work, as well as preferences for remote work in the future. The research should provide a better understanding of the gradual shift toward remote work and its integration into everyday life.



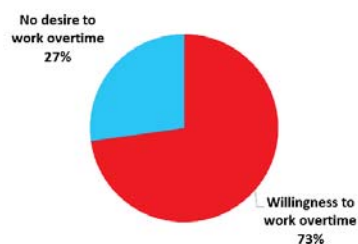
Source: Own study n= 104

The impact of the COVID-19 pandemic on technological progress in this decade has been significant. Political and economic circumstances have compelled organizations to adapt in order to remain operational in the job market and ensure fair competition.

During the height of the pandemic, the economy relied heavily on innovative technologies that improved efficiency not only in remote work but also in various aspects of society.

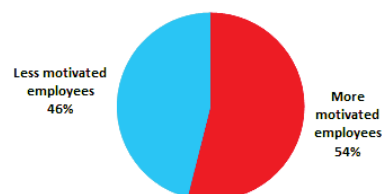
The pandemic has revealed that the world has progressed faster than anticipated, despite the challenges posed before it. It has highlighted areas where changes.

EMPLOYEES' WILLINGNESS TO WORK OVERTIME



Source: Own study n= 104

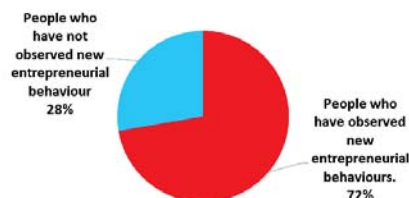
NUMBER OF EMPLOYEES MORE MOTIVATED DURING REMOTE WORK



Source: Own study n= 104

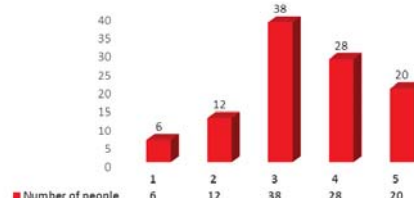
Source:

NUMBER OF PEOPLE WHO OBSERVED NEW ENTREPRENEURIAL BEHAVIOURS DURING THE PANDEMIC.



Source: Own study n= 104

SCALE FROM 1 (NEGATIVE) TO 5 (POSITIVE) HOW THE PANDEMIC AFFECTED PEOPLE'S ENTREPRENEURIAL BEHAVIOUR



Source: Own study n= 104

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GLP LOGISTICS PARK IN POLAND

NATALIA DZIĘGIEL
NATALIA LEPUTA
NATALIA ATANASOW ANCEW
ANNA MEUS

The aim of the study is to show the influence of GLP on economic environment and to present the impact it has on technology and the future of nature and logistics web in Poland.



A logistic park is a type of infrastructure facility designed to facilitate the storage, distribution, and transportation of goods. Logistic parks are typically large areas of land that are strategically located near transportation hubs such as ports, airports, highways, and rail terminals. They are designed to support the logistics activities of multiple companies by providing a range of services such as warehousing, transportation, and customs clearance.

Logistic parks can include various facilities, such as warehouses, loading docks, parking areas, and administrative offices. They are equipped with modern logistics technologies such as RFID (Radio-Frequency Identification) tracking, warehouse management systems, and automated material handling equipment. These features enable businesses to optimize their supply chain processes, reduce costs, and improve the speed and efficiency of their logistics operations.

Logistic parks play an essential role in facilitating international trade by providing a centralized location for cargo handling and transportation. They help to reduce congestion and delays in the supply chain by streamlining the movement of goods and providing integrated logistics services. Logistic parks are a crucial component of modern logistics infrastructure and are increasingly becoming an important part of global trade networks.

GLP begins construction of a new logistics park in Niepołomice, near Kraków – GLP Kraków III Logistics Centre. GLP has purchased nearly 12.4 hectares of land to build the park, which will total 55,000 SQM. Completion is scheduled for Q2 2024.

GLP's latest project will be located in Niepołomice at ul. Wimmera, in the immediate vicinity of the Kraków Technology Park. Due to the rapid growth in this part of the metropolitan area, the new park is well aligned with GLP's regional growth plans and complements its existing property portfolio. Once completed, the new facility will bring GLP's total footprint in the region to 250,000 SQM of advanced warehouse and production space.

GLP Kraków III Logistics Centre will be built in line with the BREEAM "Very Good" or higher certification requirements, to the high standard that all new GLP facilities stand out for. Its features will include a storage height of 12 m, reinforced flooring with a loading capacity of 7.5 t/SQM, additional daylight and a solar-ready rooftop. The project also includes landscaped areas and electric vehicle charging stations, and a dedicated rest area for lorry drivers.

Mirosław Maszoński, President of Maszoński Logistic, commented: "MCG EastBridge is another stage in our efforts to build awareness of businesses that make up Maszoński Logistic. We selected Kraków because we believe this market has vast logistics potential, given its access to Motorway A4, which is part of Pan-European Corridor III. The route also connects the port of Calais in France and the eastern borders of Kazakhstan, one of the most significant transit locations in Europe in recent times. The ability to conduct logistics operations from near Kraków is all the more important, given our company's growth and our plans in neighbouring countries."



[HTTPS://EU.GLP.COM/GLP-STARTS-CONSTRUCTION-OF-NEW-55000-SQM-LOGISTICS-PARK-IN-POLAND/](https://eu.glp.com/glp-starts-construction-of-new-55000-sqm-logistics-park-in-poland/)



HOW SUSTAINABILITY AND SOCIAL RESPONSIBILITY IS IMPLEMENTED IN CRACOW'S COMPANIES?

The European Union is implementing more and more demanding environmental laws. To apply EU environmental polices, non-financial reporting requirements are being imposed on expanding group of companies.

We will investigate involvement in CSR and ESG transformation by considering three Cracow's companies.

C o m a r c h	S e a n m e d	C o l u m b u s E n e r g y
<p>The enterprise had swiftly expanded into new markets and became one of the biggest providers of IT services in central Europe. As the leading company, the management set a goal to be a golden standard of transparency and sustainable development.</p> <p>As a result, they execute a variety of initiatives to help the local community and reduce their negative impact on climate. What deserves special recognition is the attention to details in their non-financial reports, especially in a part dedicated to their impact on the environment.</p> <p>Key Points:</p> <ul style="list-style-type: none"> - prime example of ecological accounting and reporting implementation - extensive details regarding environmental impact - one of the largest IT paid internship programs in Europe 	<p>Scanmed Group, one of Poland's largest private medical groups, has been practicing corporate social responsibility since its inception, and in 2012, published the first sustainable development report in the healthcare sector in Poland, based on the Global Reporting Initiative (GRI) guidelines.</p> <p>The COVID-19 pandemic has emphasized the role of CSR in regard to challenging circumstances, Scanmed's 2021 report highlights its efforts to adapt medical facilities and work practices to the pandemic while maintaining a high level of patient care.</p> <p>Key Points:</p> <ul style="list-style-type: none"> - adaptability to effectively adapt to changing circumstances - investment in areas like mental health - modern health technology and innovations, like telemedicine, to provide top-tier services to its patients 	<p>Care and technology are the main bullet points of Columbus Energy strategy. Their main ambition is to be a meaningful part of polish energy transformation.</p> <p>However, it is not only a company which provides sustainable solutions, but also it influences people's awareness by taking an active part in the Carbon Footprint Foundation. Their main objective is to achieve climate-neutrality by 2050.</p> <p>Key Points:</p> <ul style="list-style-type: none"> - collaboration with the Carbon Footprint Foundation to analyze carbon footprints and support environmental protection - engagement in international initiatives like the UN Global Compact and local projects for energy transformation - focus on innovation, industry, infrastructure, and climate action such as Perovskite cells

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Sprawozdanie z działalności Spółki Scanmed S.A. za okres od 1 października 2020 roku do 30 września 2021 roku, Kodeks Etyki Grupy Scanmed, Comarch CSR Raport 2021, Raport ESG Grupy Columbus za 2021, Raport Zrównoważonego Rozwoju ColumbusEnergy 2021, Raport roczny CarbonFootprint Foundation 2021

How Sustainability and Social Responsibility is Implemented in Cracow's Companies?

Maciej Gawlik, Wiktoria Zapał, Maksymilian Strychała, Karol Firek

Innovation management in tourism - the growing popularity of slow tourism

INTRODUCTION

Slow tourism is one of the emerging tourism trends that could help make the tourism industry more sustainable and viable in the years to come.

It provides a more environmentally friendly means of enjoying travel experiences, without being overtly sold to customers as a form of eco-tourism.

The aim of the poster is to present slow tourism as a innovation in tourism, its growing popularity as well as research results and recommendation for entrepreneurs planning to open a facility in line with the idea of slow tourism.

SLOW TOURISM BENEFITS

Environmental Benefits

Many of the problems associated with mass tourism are centered around environmental concerns. For example, an influx of tourists to an area will inevitably cause issues in terms of waste and the use of natural resources. Of course, the build-up of cars and services the airline industry provides also creates pollution. Slow tourism aims to reduce travelers' carbon footprint by slowing down the entire experience. This could mean a tourist uses train services to make their way to their destination, rather than relying on the speed of planes. It also means spending more time enjoying each activity, which can reduce carbon emissions associated with local travel.

Cultural Benefits

A fundamental part of the slow tourism concept involves slowing down and enjoying an area for what it offers. This can bring about several significant cultural benefits for the region because it means local businesses are not designed to cater to tourists looking for constant stimulation, and it helps to avoid situations where a location becomes known primarily as a tourist destination rather than a location where people live. In addition, slow travel can help to avoid situations where a location becomes overrun with cars, entertainment venues, and other offerings. This helps to avoid rapid cultural shifts, especially in smaller towns and cities.

THE ECO-CENTRIC CONSUMERS

This trend gained real traction during the pandemic as people became profoundly conscious of the fragility of the planet and its ecosystem. With more of the population forced to remain at home to battle a global pandemic, the shift in interest towards environmental issues escalated - further fueled by the changes rapidly seen when planes stopped flying, road traffic plummeted, and areas of intensive tourism began to naturally regenerate at speed. Consumers - particularly Millennials - increasingly say they want accommodation that embrace sustainability. The target customer base of slow tourism accommodation can be both the so-called eco-unaware as well as eco-terrorists.



- Appearance of the place and activities offered are essential factors when choosing a stay in slow tourism accommodation.
- Possibility of renting a bike free of charge is considered as the most attractive activity.
- Most of the respondents found it important to stay in a pet-friendly accommodation. They would appreciate the possibility of making a barbecue parties outside.
- Answers most willingly look for information on the websites of given facilities.

FUNCTIONALITY OF SLOW TOURISM ACCOMMODATION - RESEARCH RESULTS

RECOMMENDATION FOR ENTREPRENEURS



CONCLUSION

Consumers are increasingly beginning to feel the need to rest while respecting nature and the principles of sustainable development. Innovation, which is slow tourism, meets this goal. It will be one of the types of tourism that will develop in the future thanks to its diverse offer.

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MACHINE LEARNING IN THE SKJ PROJECT QUALITY CONTROL SYSTEM

Completed research work within the SKJ project

1. Development of a theoretical model for a solution

- Description of the application of machine learning in algorithm development
- Description of a use case for the developed concept
- Development of a data model

2. Automation of importing process definitions into the workflow engine

- Exploring the possibilities of modeling BPMN processes
- Exploring the possibilities of importing processes from external systems
- Exploring the possibilities of importing processes from Enterprise Architect

3. Designing an engine for generating modules based on containerization

- Analyzing the possibilities of automatically generating a system composed of microservices
- Generating ready-made objects in the cloud
- Developing a solution that allows the installation of the system in a runtime environment

4. Investigating modules as cloud-deployed microservices

- Developing an algorithm for generating applications from microservices
- Developing a list of programming modifications for the generated solution
- Conducting research on a solution that generates UML schemas

5. Local virtualization

- Selecting a configurable solution for a specific set of functional points
- Exploring load balancing and clustering configurations of nodes
- Developing assumptions for a script to launch the environment

In the SKJ project, the focus was on six key machine learning algorithms:

- | | | |
|-------------------|----------------------|-----------------------------|
| 1. Regression | 3. Clustering | 5. Process Mining |
| 2. Decision Trees | 4. Association Rules | 6. Dimensionality Reduction |

Results and Conclusions

The conducted work and tests have shown that Docker technology is a useful solution that allows for the quick preparation of applications consisting of multiple internal services (including applications like MySQL, Apache). Therefore, it can be used for efficient software development and integration of remote teams. It also serves as the basis for local virtualization, which has many advantages.

Example Algorithm – Process Mining

Process mining is a set of methods and tools used to build process models, verify them, and expand them based on data from event logs commonly available in modern information systems. These logs describe the actual flow of business processes.



Example of a solution supporting process exploration (ProM)

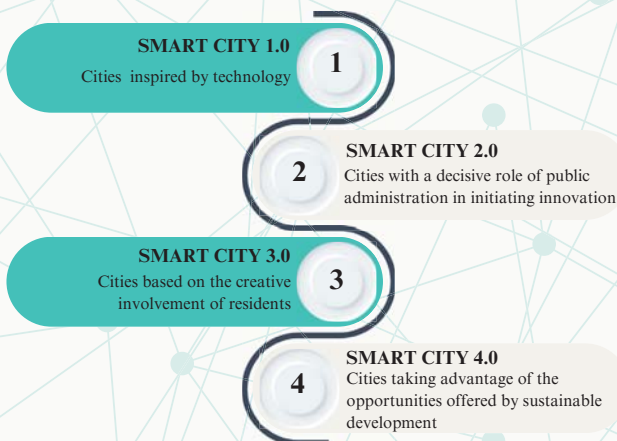
New technologies as an opportunity for urban development – the “Smart City” concept

Nowadays, there is a lot of talk about new technologies. Everything around us is getting more and more modern. For several years, entire urban agglomerations have also benefited from the development of technology and the "smart" concept.

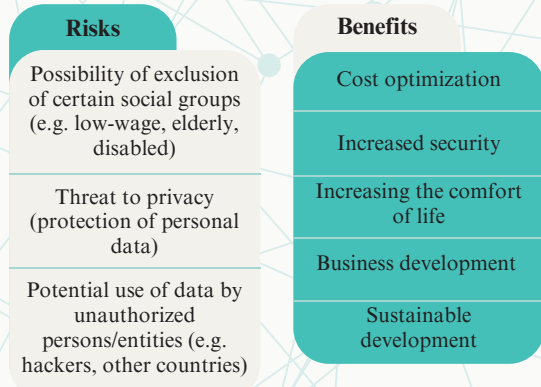
The purpose of the poster is to present the concept of a smart city as a tool for urban development, taking into account its types, main areas of application as well as the benefits and risks of its use.

A smart city is a place where traditional networks and services are made more efficient with the use of digital solutions for the benefit of its inhabitants and business.

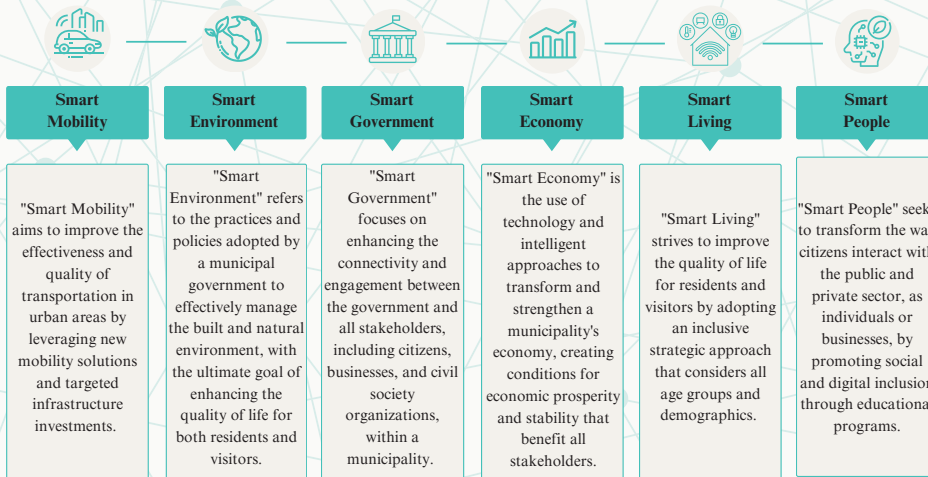
SMART CITY GENERATIONS



BENEFITS AND RISKS OF APPLYING THE CONCEPT IN PRACTICE



MAIN AREAS OF SMART CITY



THE MOST INTERESTING EXAMPLES OF SMART CITIES

- Medellin, Colombia** - Streamlining Communications with an Intelligent Communications System (SIMM)
- Masdar, United Arab Emirates** - ecological city in the desert
- Kashiwanoha, Japan** - ICT technologies helping to improve the quality of health of Japanese people
- South Korea** - Public wifi “Kkachion”, Barrier-free Service, Pure 365 App Service and D.N.A.-based smart city
- Poland** - remote monitoring system for measuring water consumption, E-administration

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ROLE OF AUGMENTED REALITY AND ARTIFICIAL INTELLIGENCE IN BEAUTY AND COSMETIC MARKET



Augmented Reality (AR) can be defined as an indirect or direct view of the real world that has been augmented by computer generating additional information. The main role in this innovative technology is interactivity and 3D recording, where real and virtual objects are combined.



Artificial Intelligence (AI) is a technology that involves creating machines that have intelligence to perform tasks to relieve human labor. The developed innovation creates systems to think and understand how a person might perceive it and as a result, the goal is to make the right decision, all this happens after image recognition, video recognition or natural language processing.

According to the 2021 research, the size of the global AI in beauty industry market was valued at US\$ 2.70 Billion. The compound annual growth rate (CAGR) is expected to reach almost 20% rate in the next 20 years.

AI and AR are already being used by key beauty market companies (e.g. L'Oréal, The Estee Lauder Companies, Procter & Gamble Co.), mainly in their functional areas such as management or marketing. What is more, through the last few years world's largest cosmetic companies launched AI/AR-based beauty devices and apps as a products addressed directly to individual clients.



Examples of AI/AR beauty products:



Virtual try on apps – allowing consumers to try on multiple colors of makeup product (e.g. lipsticks, foundations, eyeshadows or even hair dyes). Smartphone applications use AR in facial tracking, lighting estimation and makeover rendering allowing customers to see the realistic image of the product used on them. Virtual try-on imitates not only lifelike colors but also textures of cosmetics.

Personalization apps – customization is possible by using AI. Algorithms aggregate and utilize customer data on their current and previous choices along with information about existing trends. Apps can recommend relevant products based on algorithm outcome. It could help shorten customers' research and increase their satisfaction.

"Printing" devices - they are enabling users to create a specific look or product with chosen or personalized attributes. For example – nail polish printer user AI models to create perfect manicure, brow printer allows to create perfect brows directly on the skin.

AR and AI allow companies to provide personalized services and create strong customer experiences.

The implementation of advanced technology also allows customers to spend more time connecting with a brand, either in-store or on the brand's website, through interactive virtual experiences that speak to the modern-day consumer.

According to the Forrester study

77% of consumers have chosen or paid more for personalized service

Gen Z is a large driving force in this. Compared to Millennials and Baby Boomers, Gen Z is much more willing to use personalized digital brand experiences to understand their skin health and virtually try-on beauty products before purchase.

Data from leading AI/AR tech provider in beauty has now shown that Estée Lauder saw a 2.5 times higher conversion rate using its Lip Virtual Try-on and found that its iMatch Virtual Shade Expert increased the brand's customer loyalty. Similarly, e.l.f. Cosmetics gained a 200% higher conversion rate from online consumers using its virtual try-on technology. As a consequence there may be a shift from a mass production to a customized products strategy.



What are the other advantages for companies using AI and AR in beauty:

Learn what humans notice attractive using facial analysis, analyzing facial symmetry, and complexion and skin evenness.

Gain insight into in-store customers using visual acceptance. Retailers can gain insight in real-time on what customers checked out, picked up, and didn't buy to enrich the traditional metrics of what was bought and returned.

Understand the mood, patterns, and options of a consumer using facial recognition. Use AI and machine learning to suggest the right product and facilitate women to use makeup step-by-step based on the shape of their face.

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SMART CITY

A SOLUTION THAT MAKES LIFE EASIER FOR THE INHABITANTS OF KRAKOW

The objective of the poster is to present the activities of Krakow as a smart city that improve the lives of the inhabitants of this city.



WHAT IS A SMART CITY?

Smart city is characterized by:

- smart economy
- smart environment
- smart mobility
- smart living
- smart governance
- smart people

A smart city is a city whose investments in human and social capital as well as traditional (transport) and modern (ICT) communication infrastructure drive sustainable economic growth and high quality of life, with wise management of natural resources through participatory management.

POCKET PARKS

Krakow creates new green recreation places for residents, so far 30 pocket parks have been created in Krakow. The goal is for the number of these parks to increase to 70 by 2030.



AIR POLLUTION



A challenge for Krakow is air pollution. The application "Powietrze Kraków 2.0" was created for the residents, thanks to which they can check the current state of air quality based on measurements from 8 measuring stations. In the application, it is also possible to send a report on burning garbage or in the event of noticing suspicious smoke from the chimney. In addition, in Krakow you can find LED boards displaying current information about air pollution.



SMART STREET LIGHTING

Smart street lighting is an innovative way to regulate the intensity of light in street lamps, depending on weather conditions, traffic volume or other external lighting. With such technology, it will be possible to save electricity and reduce CO2 emissions.



SMART BUS SHELTERS

Krakow residents can track the location of buses and trams in real time on multimedia screens in bus shelters. On the Digital Citylight AMS screens, you can observe the public transport that runs to and from a given stop. To see a map of moving public transport vehicles, just press the "see more" button at the stop. This way, anyone at the bus stop can see where their bus is; how far it is to the stop where the passenger is waiting; whether the bus is late or has already left the stop. This information allows them to verify and possibly change the itinerary. With given screens, there is also the option of free charging and internet connection.



TRAFFIC MANAGEMENT

In Krakow, traffic is organized in such a way that on large alleys and streets there is a lane exclusively for urban transport, which allows public transport to move as timely as possible, according to the schedule of traffic. In addition, all districts of the city have cameras to track traffic jams in some areas. This allows us to adjust the time at which the green light is turned on in some problem areas. Krakow created the best way to organize traffic in the central part of the city by developing one-way traffic, which makes it possible to organize parking spaces in the city center for residents.



The above initiatives are examples of smart city solutions that Krakow introduces to improve the functioning of the city and the lives of its residents. Thanks to the implementation of such solutions, Krakow was ranked 79th out of 141 classified cities around the world in the latest IMD Smart City Index (SCI) ranking from 2023.

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Smart solutions for Smart Cities

The Smart City concept assumes the use of e.g. information and communications technologies in order to achieve sustainable development, improve socio-economic and ecological aspects of life, and ensure a high quality of life for residents. Here are some examples of implementing the idea of Smart City in cities of Poland.

The purpose of this poster is to present the idea of a Smart City and to analyze the undertaken initiatives arising from this idea.



Source: <https://ceo.com.pl/ekspansja-paczkomatow-inpost-na-rynku-kanadyjskim-33576>

"Paczkomaty" are self-service machines that allow you to collect and send parcels at any time convenient for you. They are open 24 hours a day, 7 days a week. After receiving the notification that the parcel has been placed in the locker by the courier, the customer has 48 hours to collect it. Otherwise, the package will be returned to the sender. However, it is possible to extend the pick-up time by another 24 hours via the mobile application. This solution benefits not only customers who do not have to wait for the courier at the address indicated by them to enable him to deliver the parcel, but also the courier company, which instead of delivering each package to a different address, delivers them all to one point, which significantly improves, speeds up and reduces the cost of the delivery process. What's more, this form of delivery is more environmentally friendly (the carbon footprint of each package delivered via "Paczkomat" is 75% lower than in the case of traditional home delivery).

The Dynamic Passenger Information System provides passengers with real-time information about the current times of arrival and departure of vehicles from stops in the form of information displayed on special electronic boards. This is possible thanks to microprocessor controllers that determine the location of the vehicle and dedicated radio modems enabling the transfer of information to the IT system, with which trams and buses are equipped. Information about deviations from the timetable is particularly important in the case of heavy traffic during rush hours, when timetables usually do not reflect the actual situation and are not consistent with the moment of arrival of the vehicle at the bus stop. On the information boards located at stops, we can find information such as: line number, direction - destination stop, departure (arrival) time, today's date, current time, carrier's name, as well as messages about failures, route changes or replacement vehicles.



Source: <https://smartcitydisplays.com/pl/portfolio-item/najwiekszy-system-informacji-pasazerskiej-w-polsce-dziala/>



Source: <https://koszalin.budzet-obywatelski.org/projekt/3651>

SmartPass also known as a smart pedestrian crossing. It helps pedestrians with safety when crossing the street or road, and drivers with immediate information on the presence of pedestrians at the crossing. At the moment when the pedestrian is detected in the crossing area the SmartPass system is activated by motion sensors. At the same time, synchronized LED lights start pulsating toward the driver at the same frequency and a voice message informing is sent towards the pedestrian. After leaving the crossing area by the pedestrian, SmartPass deactivates light and voice signals. It is confirmed that the use of SmartPass on pedestrian crossings led to the following: cars reduced their speed, a number of collisions dropped, number of drivers who let pedestrians pass the crossing rose and awaiting time-related to pedestrians who wanted to cross the crossing got shorter.

Due to the increasing number of vehicles on the roads, cities are increasingly in need of efficient and effective parking management systems. Smart parking system provides drivers with real-time information about the current available or unavailable certain spaces for use by vehicles. Sensors mounted in parking spaces detect the presence of a vehicle. The occupancy data is transmitted to the transmitter, which transfers it to headquarters, e.g. Traffic Control Center. The information is read from the central unit, e.g. an electronic parking information board or a mobile application. The driver reads the message and parks efficiently in the free parking space. This solution not only reduces traffic but also makes it easier for drivers to navigate in crowded streets and parking.



Source: <https://www.buildings.com/parking-structures/article/10196140/smart-parking-in-the-smart-city-how-your-buildings-can-profit>

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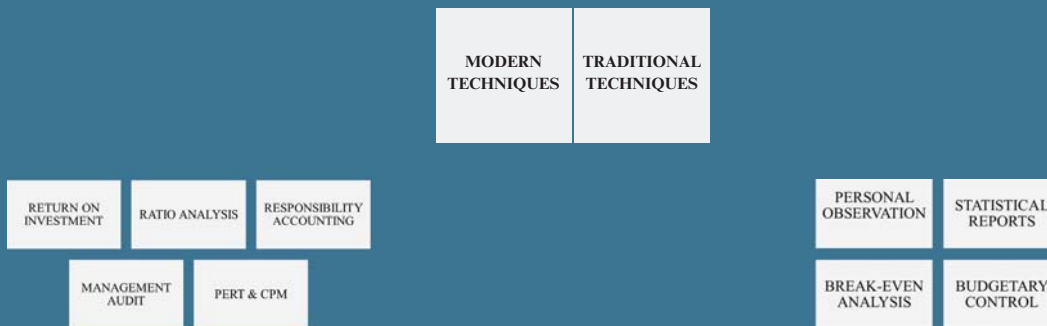
TECHNIQUES OF MANAGERIAL CONTROL

Controlling refers to the process of managing and regulating various aspects of an organization, system, or individual behavior to ensure that they are consistent with established goals and objectives. It involves the establishment of standards and criteria for measuring performance, the identification of deviations from these standards, and the implementation of corrective measures to ensure that objectives are met.

Managerial control is a crucial function of management that involves overseeing organizational activities. It involves measuring actual performance against predetermined standards and goals, and taking corrective action when there are discrepancies. In essence, control serves to regulate and ensure that the organization is moving towards its objectives.

The aim of the poster is to define controlling, and also list and describe traditional and modern techniques of managerial control.

Managerial control techniques can be broadly classified into two categories::



Return on investment

Return on Investment (ROI) is a vital technique used for measuring whether or not invested capital has been utilized effectively to generate a reasonable amount of return. It provides a basis for measuring the overall performance of an organization, as well as that of its individual departments or divisions.

Ratio analysis

Organizations typically use a range of ratios, which can be classified into several categories, including liquidity ratios, solvency ratios, profitability ratios, and turnover ratios. These ratios help organizations to measure and analyze various aspects of their financial performance.

Responsibility accounting

Responsibility accounting is an accounting system that sets up different sections, divisions, and departments of an organization as "responsibility centers." The head of each center is accountable for achieving the set targets. Responsibility centers can be categorized into cost centers, revenue centers, profit centers, and investment centers. This system allows for the efficient management and control of an organization's resources by holding individuals accountable for specific areas of responsibility.

Management audit

Management audit is a structured and comprehensive evaluation of an organization's overall management performance. Its main objective is to assess the effectiveness and efficiency of the management and identify areas for improvement in order to enhance its performance in future periods.

PERT&CPM

PERT and CPM are network techniques used in planning and controlling projects. They aid in performing management functions such as planning, scheduling, and implementing time-bound projects with diverse and interrelated activities. These techniques deal with factors such as time scheduling and resource allocation for these activities.

Sources:

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Personal observation

The most traditional method of control is personal observation, which allows managers to collect first-hand information about employee performance. This method also creates psychological pressure on employees to perform well, as they know they are being watched. However, personal observation is time-consuming and not suitable for all types of jobs.

Statistical reports

Statistical reports provide managers with an analysis of data and information, including averages, percentages, ratios, and correlations. This helps managers to understand the organization's performance in different areas. When presented in forms such as charts, graphs, and tables, statistical reports enable managers to read and compare the information easily with previous periods and benchmarks.

Break-even analysis

Breakeven analysis is a managerial technique that examines the connection between costs, volume, and profits. It provides insights into the probable profits and losses at different levels of activity while analyzing the overall position. The breakeven point is the sales volume at which there is no profit or loss. It can be calculated using the formula:
 Breakeven point = Fixed Costs / (Selling price per unit – Variable costs per unit)

Budgetary control

Budgetary control refers to a managerial control technique where all necessary operations are carried out by planning and executing budgets in advance. Actual results are then compared against budgetary standards to monitor performance.

The application of Artificial Intelligence in a Decision Support System in the Field of Energy, District Heating, and Gas Economy

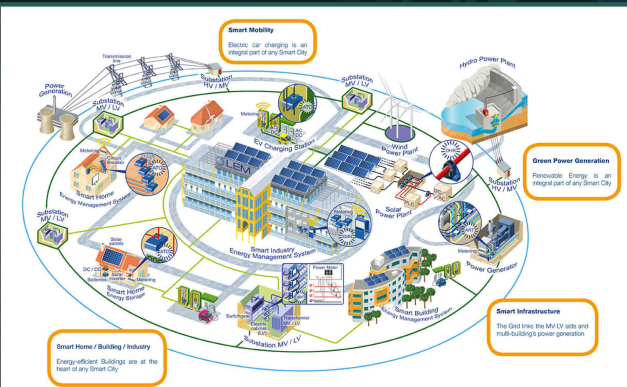
PROJECT RESULTS

As a result of the project, a modern solution was developed - an expert system equipped with an analytical engine for advanced data processing. The solution supports your decisions in the area of energy, heat and gas resources. The research project produced a prototype. Based on the planned research and its results, technologies have been developed to meet the needs of the target group. Thanks to the project Teamsoft is currently introducing new products as a result of the implementation of R&D work.

Contemporary technologies used in the implemented project include:

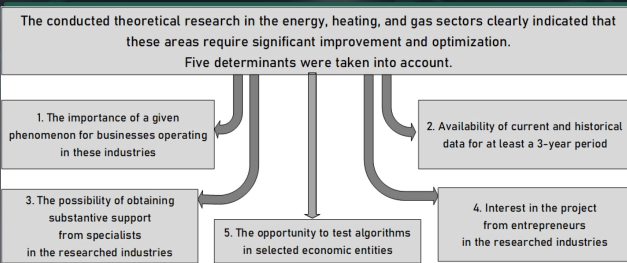
- Machine learning
- WebService
- Expert system
- Qualitative research
- Experimental studies
- Action Research
- Artificial neural networks
- Regression analysis
- Decision trees
- Association rules
- Reduction in dimensions
- Universal Design

One of the promising directions for the development of artificial intelligence methods in the field of energy development is intelligent power systems - Smart Grids



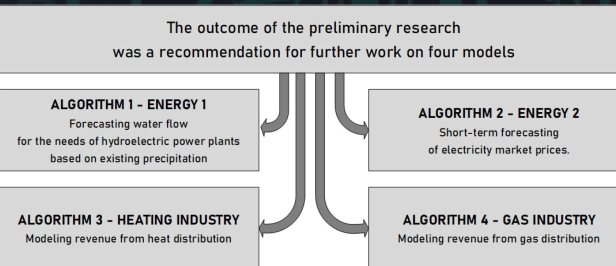
Source: The Smart Grid: How automation empowers the future of Electricity (2017), <https://blog.phoenixcontact.com/marketing-sea/2017/04/smart-grids-how-automation-empowers-the-future-of-electricity/> (date: 2023/05/20)

The idea of the Smart Grid is based on the concept of improving the standard power grid. Currently, such systems consist of several large power generators that supply energy through the transmission network to numerous consumers. The main issues include significant energy losses during long-distance transmission, large disparities between peak and normal power consumption, and the inability of the grid to react quickly to unforeseen situations. The Smart Grid will facilitate communication among all elements of the enhanced power grid, incorporate small energy source, and enable smoothing of the electricity demand curve. Such an approach will increase energy delivery efficiency and reduce costs.



Artificial intelligence can be used in the energy sector to address three different types of problems:

- Modeling
- Prediction and planning (optimization)
- Process control



THE ROLE OF GEOSPATIAL DATA IN MODERN CITY MANAGEMENT

Introduction

The quality of available geospatial data is increasing while the cost of acquiring it is decreasing, which implies tremendous potential for utilizing this information. Modern city management is not possible without access to vast resources of interconnected information. In this case, spatial data plays a crucial role, serving as an informational framework for the development of various types of ICT systems for any city.

City Location

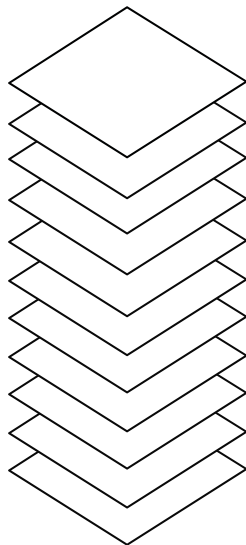
Spatial relationships within a city and its surroundings affect economic and social processes. They determine population flows, impact comfort levels, shape the city's image, and build local communities. Additionally, they attract or deter investors and tourists from visiting.

Geospatial Relationships

The terrain, transportation network, distribution of buildings and green areas, as well as the location of education, healthcare, cultural, or sports facilities, affect both the residents' quality of life and the urban economy. City residents have increasingly high expectations regarding their quality of life, and utilizing geoinformation technology is necessary to meet these expectations.

Participation

The use of modern technologies enables social geoparticipation, a process in which residents actively participate in matters important to them, share their experiences and opinions, and develop a common plan of action through online surveys, interactive maps, online consultations, municipal SMS bulletins, and real-time reporting.



Types of geospatial data include:

- address data, including street names and address locations,
- data on city boundaries, districts, units, plots and cadastral divisions,
- data on the scope of boundaries of police stations, tax offices, courts, prosecutor's offices, fire stations,
- data on settlements, parks, rivers and other physiological objects,
- topographic data on the basic parameters of road and railway routes,
- location data and basic parameters of bus, railway, airport, port and waterway terminals,
- location and basic parameters of other structures such as bridges, viaducts, flood embankments, masts,
- information on land coverage: water, vegetation, buildings, grassy terrain, sandy terrain,
- information on land use, soil and geological data,
- local development planz,
- location of tourist attractions and national heritage sites,
- location of important economic objects such as company and institutional headquarters,
- location of medical facilities,
- location of educational and scientific institutions,
- distribution and specification of sensors and video monitoring cameras,
- location of business facilities such as restaurants, shops, supermarkets, wholesalers, industrial plants.



Examples of usage:

- searching for optimal areas for investment,
- supporting spatial planning,
- creating efficient systems for managing urban properties,
- supporting crisis management processes,
- supporting tourist traffic management.

Conclusion

In conclusion, geospatial data is a critical component of modern city management. The efficient analysis and visualization of this data provide the necessary spatial knowledge for making informed decisions. This knowledge is essential for the optimal management of a city, providing a better quality of life for its inhabitants and ensuring the city's economic growth.

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Warsaw as a Smart City

In these times of rapid technological progress, many cities in Poland are introducing modern technological solutions. Warsaw is a perfect example of the so-called Smart City, i.e. a city that pays attention to issues such as cost reduction, improvement of systems and processes or improvement of living conditions.

The purpose of the poster is to present the Smart City concept by showing its essence, elements, as well as indicating the advantages and disadvantages of such a solution.

In Poland, you can find cities that can be boldly called Smart Cities. Among them is the capital of Poland, **Warsaw**.

Smart City can be defined as a city that is managed using advanced information and communication technologies, i.e. ICT technology. Such a city uses the potential of its inhabitants by combining their knowledge with technology. Thanks to this, it can work productively, raise the level and quality of life, and prepare better for lurking threats.



Examples of Smart City in Warsaw

Veturilo	bicycle stations, allowing of self-service rental of city bikes
moBILET, jakdojade	mobile apps which facilitate transport by buying a ticket or planning a route
Panek, Traficar	car-sharing, which consists in renting a car for minutes
Miejskie Centrum Kontaktu Warszawa 19115	modern system that allows you to deal with matters online 24/7
Warszawski Budżet Obywatelski	program, which involves the urban community in the city's activities by enabling residents to advance their own ideas, the best of which are implemented

You can distinguish such **elements** of Smart City as:

- smart mobility, i.e. intelligent transport and logistics systems,
- competitive economy, i.e. one that supports innovation, modernizes products and services,
- increasing the importance of renewable energy sources, economical use of resources,
- social tolerance, involvement of human capital,
- high standard of living characterized by safety and health in the city.

Smart City **benefits**:

- improving transport through continuous data analysis,
- increasing the level of security, e.g. through the use of monitoring,
- participation of residents in solving current problems.

Smart City **barriers**:

- aging of the population and decrease in the population of a city,
- ubiquitous unemployment,
- lack of innovation in the economy,
- areas with prevailing poverty and deprivation.

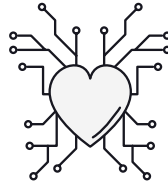


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Part 2.
Artificial intelligence
in controlling

INTRODUCTION

AI technologies in the field of image generation have been developed for many years, but it is only in recent years that a breakthrough has been made that has transformed the rather unusual and grotesque attempts of art systems into solutions that can easily compete with artists with decades of practice. With new technology, many questions have arisen about the meaning of art, the value of artists' work, and the spectre of millions of people losing their jobs globally in the coming years.



CAN AI ART REPLACE ARTISTS?

Creative expression and uniqueness are fundamental parts of artistry, which an algorithm can never simulate. Machines learn from data sets and recreate images, however they can not get emotional.

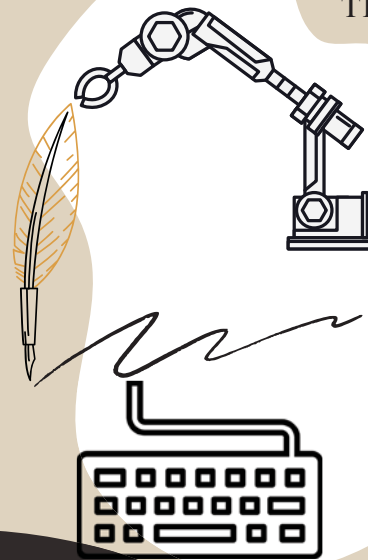
It is possible to use image-creating tools after inputting a few words of description like "a piece of work" for example "van Gogh style". Therefore, AI must be created by human.

A PORTRAIT OF EDMOND DE BELAMY

In 2018 there was an auction of painting created by AI. It was a portrait of nonexistent man named Edmond de Belamy.

A piece of work that was put to the bid at auction house was eventually sold for 430,000 dollars.

The painting was formed by Obvious art. artistic collective.



TENTH SYMPHONY OF LUDWIG VAN BEETHOVEN

Ludwig van Beethoven has never finished tenth symphony. The German composer and pianist left notes. It was decided to draw up AI system that could complete Beethoven work.

AI was trained in 10 thousands of pieces of music containing 2 millions of tunes and uncompleted notes from the creation The Symphony. To the system was also implemented composers that was a source of inspiration for Beethoven for instance Johann Sebastian Bach.



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ARTIFICIAL INTELLIGENCE IN CONTROLLING

Artificial intelligence is considered one of the key technologies for the future competitiveness of companies and the development of the controlling department.

The aim of the poster is to describe the possible impact of AI on the controlling area in the future.

What is artificial intelligence?

AI includes several methods designed to mimic human intelligence. Thanks to AI, computers can perceive and understand facts and learn from feedback, thereby improving their ability to perceive and understand contexts. Artificial intelligence, using various methods, including machine learning, generates knowledge based on existing data, which is constantly improved.

Impact of the AI on the controlling

- Assistance in forecasting key indicators
- More efficient planning
- More precise monitoring of current activity
- Improving the early warning system

Applications of AI in business

Digital assistants similar to Google Assistant, Siri or Alexa can make the controller's work easier, as it requires a quick response time. Business software such as Unit4 Prevero or GMDH Shell already uses artificial neural networks to determine forecast values.

Does this mean that controllers must evolve into data scientists?

As for now, this thesis is not true. Even if the introduction and use of AI applications undoubtedly requires knowledge in the field of data science, a business understanding of the controller area is necessary to meaningfully interpret the results and their use in many different issues related to business management.



GMDH Shell - professional neural network software

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ARTIFICIAL INTELLIGENCE - THE WAY TO A NEW MANAGEMENT STYLE

AI has the potential to revolutionize the way organizations approach management and decision-making by leveraging advanced algorithms and machine learning techniques.

Will AI turn out to be as groundbreaking for management as the first IT systems?

How management looks like before information systems?

Before the advent of information systems, management was done through manual processes and paper-based records. Communication between employees, departments, and management was primarily face-to-face or through written memos or letters.

Data was stored in physical files and records, which had to be manually updated and maintained. This made it difficult to track and analyze data, as it required a lot of time and effort to go through physical records.

Management decisions were often based on intuition and past experience, rather than data analysis. This made it difficult to make informed decisions, as there was limited access to accurate and up-to-date information.

How have information systems changed the way of management?

Information systems have revolutionized the way companies manage in many ways. Here are some of the key changes that information systems have brought about:

- **Improved data management:** With information systems, companies can store and manage vast amounts of data in digital form, making it easy to access, update and analyze. This led to more informed decision-making and better planning.
- **Automation of processes:** Information systems have automated many routine tasks, such as data entry, inventory management and order processing. This has helped companies reduce errors, save time and cut costs.
- **Enhanced communication:** Information systems have made it easier for employees to communicate and collaborate with each other, regardless of their physical location. It affected better teamwork and more efficient workflows.
- **Improved customer service:** Information systems have enabled companies to respond more quickly and effectively to customer needs, by providing real-time access to customer data and allowing for faster processing of orders and requests.
- **Greater efficiency:** By streamlining processes, automating routine tasks and providing real-time data, information systems have made companies more efficient and productive, reducing costs and increasing profitability.

Examples of using artificial intelligence in management.

Artificial intelligence is increasingly influencing how business works. This applies not only to production processes or logistics, but also to team building and the role of a leader in the company.

- **Online shopping and advertising**

Artificial intelligence is widely used to provide personalized recommendations when shopping online, e.g. based on search and purchase history or other online behavior. It is extremely important in commerce when it comes to product optimization, resource planning, logistics, etc.

- **Internet search**

Search engines learn from massive amounts of user-provided data to provide relevant search results.

- **Digital assistants**

Smartphones use AI to deliver the most accurate and personalized products possible - virtual assistants answer questions, give recommendations and help organize daily activities have become ubiquitous.

- **Smart buildings, cities and infrastructure**

Smart thermostats learn from our behavior to save energy, and in smart cities, AI could regulate traffic.

- **Cybersecurity**

AI systems can help identify and combat cyber attacks and other cyber threats based on continuous data input, pattern recognition and attack tracking.

- **Fighting disinformation**

Artificial intelligence can also detect fake news and disinformation by checking social media information, searching for disturbing words and identifying reliable online sources.

- **Recruitment and hiring**

AI can analyze job applications and resumes, identify top candidates, and even conduct initial interviews, saving time and improving the quality of hires.

- **Administration and public services**

Using a wide range of data and pattern recognition, AI can provide early warning of natural disasters and enable effective preparedness and mitigation.

- **Transport**

Artificial intelligence could improve the safety, speed and efficiency of rail traffic by minimizing wheel friction, maximizing speed and enabling autonomous driving.

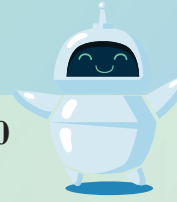
- **Industrial production**

Artificial intelligence can help European manufacturers increase efficiency and bring factories back to Europe by using robots in production, optimizing sales funnels or predicting the need for machine service and failures in smart factories in time.

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Artificial Intelligence in Industry 4.0



Analysis of AI applied in industry 4,0 which can be used as data in the controlling process

The role of Artificial Intelligence in Industry 4. 0

Industry 4.0

Industry 4.0 otherwise called "Forth industry revolution" together with Economy and Digitization, shapes everyday life. The term industry 4.0 means improving efficiency by integrating machines and systems and introducing changes in the production process.

This term was used for the first time during the international Hannover Messe fair in 2011, when the project developed by the German government was presented. Changes resulting from the presented theory appeared in 2013, when a report of specialists analyzing various sectors of the economy in Germany was published. The report included tips for improving efficiency. The proposed solution is the use of machines that autonomously exchange production information.

Controlling with the use of Artificial Intelligence in Industry 4.0

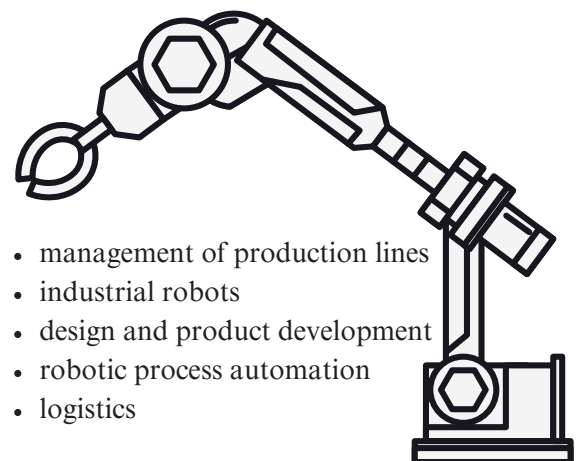
According to managers, by 2025 the first fully automated smart factories will start operating. In order to take full advantage of the possibilities of artificial intelligence, it is necessary to have the right amount of data. This, in turn, is connected with controlling, which is also based on the study of all available data. Therefore, after the introduction of artificial intelligence in industrial processes, controlling may become even easier in calculating indicators and appropriate management. Already at this point, in 30% of production companies, artificial intelligence has significantly reduced the number of failures and downtimes of machines. This is due to the reaction at the right moment. Artificial intelligence is able to capture the perfect moment. Unfortunately, humans cannot do this.

IoT and AI

The Internet of Things is one of the elements of Industry 4.0 ensures an optimal flow of information with the IT department and with other devices involved in the process. In the IoT concept, objects inform each other and people who manage them about problems or faults.

Artificial intelligence is referred to as the simulation of human intelligence by computer systems or machines. As the ability to think and act like people and the ability to learn and solve problems. The use of artificial intelligence in machines gives them the ability to make independent decisions.

Examples of AI applications in industry:



- management of production lines
- industrial robots
- design and product development
- robotic process automation
- logistics

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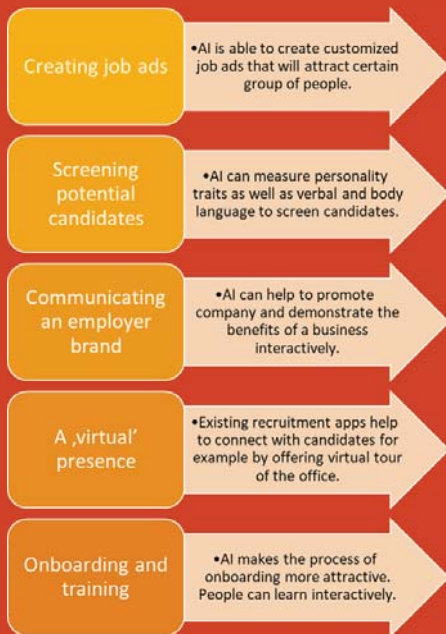
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ARTIFICIAL INTELLIGENCE IN RECRUITMENT PROCESS

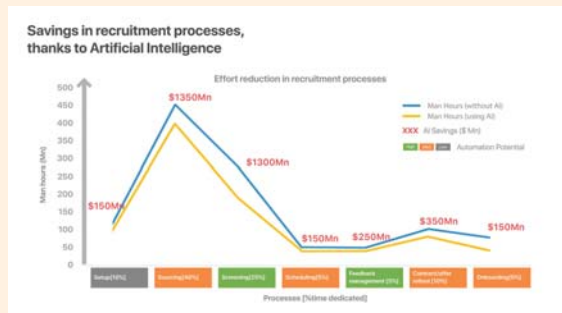
The aim of this poster is to show the impact of artificial intelligence on recruitment process.

Currently, the potential of artificial intelligence in the aspect of HR is manifested in repetitive tasks, such as reviewing CVs, as well as in chatbots originating in real reality. AI in configuration is not human, but it saves time by automating some processes and analyzing data. Thanks to this, the recruiter can focus more on building good relationships with candidates and good cooperation with the business.

HOW ARTIFICIAL INTELLIGENCE MAY IMPROVE RECRUITMENT PROCESS



Source: The advantages and drawbacks of using AI in recruitment, MRL, website: <https://www.mrlcg.com/>, 18 Feb, 2022



Source: Nitika Goel, Director, Zinnov, Siddharth Jhawar, Consultant, Zinnov, Staying relevant in the age of AI, 04 Apr, website: <https://zinnov.com/>, 04 Apr, 2018

95% About 95% of HR professionals think that AI could help with the application process for candidates

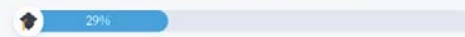
Source: Beata Stefanowicz, AI Recruitment Statistics: What Is the Future of Hiring?, website: <https://www.tidio.com/>, 05 Jan, 2023

If you got the job, would you be okay with being onboarded by AI?

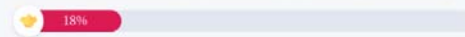
Yes, but only partly, I would still like to have some contact with other employees during my onboarding process



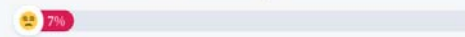
Yes, AI can teach me all I need to know about the workplace



No, I want to get to know the people in the company during my onboarding



No, I would be offended to be onboarded by AI



Source: Beata Stefanowicz, AI Recruitment Statistics: What Is the Future of Hiring?, website: <https://www.tidio.com/>, 05 Jan, 2023

BENEFITS



Time saving

Avoiding unconscious bias

Improved data processing

Reducing employee turnover

DRAWBACKS



Dependency on certain keywords

Issues with accuracy and reliability

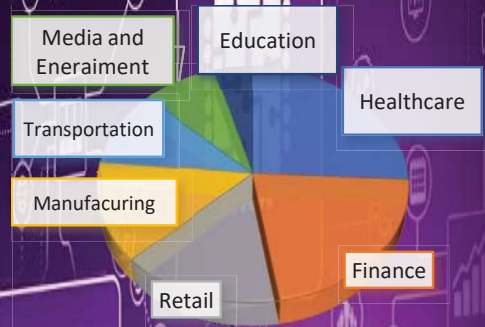
Lacks nuance of human judgement

Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. This is another amazing invention of mankind. But what is it for and why is it being developed?

The objective of the poster is to show where and how artificial intelligence is used and the forecasts of its development

Artificial intelligence (AI) is being used in a variety of industries and applications. Here are some main examples of how AI is being used and the approximate percentage of usage in each industry:

1. Healthcare: AI is being used for medical imaging and diagnostics, drug discovery, and personalized medicine. It is estimated that 30% of the healthcare industry is currently using AI.
2. Finance: AI is being used for fraud detection, risk management, and trading. It is estimated that 25% of the finance industry is currently using AI.
3. Retail: AI is being used for inventory management, personalized marketing, and chatbots for customer service. It is estimated that 18% of the retail industry is currently using AI.
4. Manufacturing: AI is being used for predictive maintenance, quality control, and supply chain optimization. It is estimated that 16% of the manufacturing industry is currently using AI.
5. Transportation: AI is being used for autonomous vehicles, traffic management, and predictive maintenance for fleets. It is estimated that 12% of the transportation industry is currently using AI.
6. Media and Entertainment: AI is being used for content creation, recommendation engines, and personalized advertising. It is estimated that 10% of the media and entertainment industry is currently using AI.
7. Education: AI is being used for personalized learning, grading, and tutoring. It is estimated that 5% of the education industry is currently using AI.



Reasons why people develop artificial intelligence

Cost savings:
AI can help reduce costs by automating tasks and reducing the need for human labor. For example, AI algorithms can optimize supply chain management, reducing waste and saving money.

Accuracy:
AI can process large amounts of data quickly and accurately, reducing the risk of human error. For example, AI algorithms can analyze medical images and help diagnose diseases more accurately than humans.

Improved decision-making:
AI can analyze data and provide insights to support better decision-making. For example, AI algorithms can analyze financial data and help identify investment opportunities.

Innovation:
AI can help businesses and organizations create new products and services, leading to innovation and competitive advantage. For example, AI-powered virtual assistants can provide personalized recommendations and improve customer experiences.

Addressing complex problems:
AI can help solve complex problems that are difficult or impossible for humans to solve alone. For example, AI algorithms can help identify potential drug candidates for diseases that currently have no cure.

Efficiency:
AI can automate many tasks that are currently done by humans, resulting in increased efficiency and productivity. For example, chatbots can handle customer service inquiries, freeing up human customer service representatives to focus on more complex

The expected development of artificial intelligence in numbers

In 2018, only 10% of enterprises used AI. (Source: Gartner)

By 2020, it is estimated that more than 40% of data science tasks will be automated, resulting in increased AI usage. (Source: Gartner)

By 2021, the number of companies implementing AI is predicted to grow by 50%. (Source: Forrester)

By 2022, the percentage of companies using AI is expected to increase to 80%. (Source: Narrative Science)

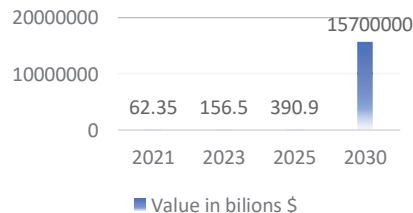
By 2023, it is expected that AI will be used by more than 95% of customer interactions with enterprises. (Source: Gartner)

By 2025, 95% of business leaders believe that AI will have a positive impact on their industry. (Source: PwC)

In the same year, 74% of executives believed that AI would be fundamental to their business success

By 2030, AI is expected to contribute \$15.7 trillion to the global economy.

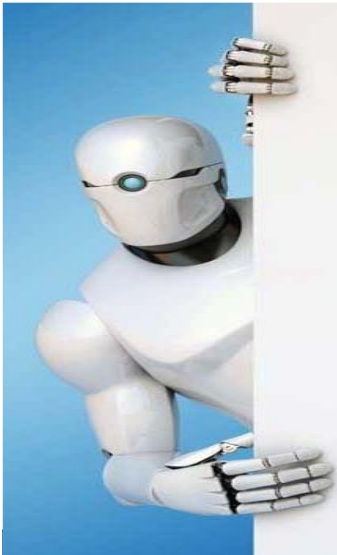
VALUE OF AI



Conclusion

Artificial intelligence is an inseparable element of the development of civilization and humanity. Already used in a large percentage in various industries, it is gaining more and more momentum when it comes to development and improvement. Looking at the statistics, probably sooner or later each of us will come into contact with AI, so we should familiarize ourselves with the new technology so that we will be ready for what it will bring.

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Artificial Intelligence: The Future of Intelligent Computing

AI technologies enable machines to simulate human intelligence, such as learning, reasoning and problem-solving, and perform a wide range of tasks autonomously.

Artificial intelligence is not perfect and cannot fully replace the human mind.

Introduction:

Artificial Intelligence (AI) is an advanced technology that allows machines to mimic human intelligence, such as learning, reasoning, and problem-solving. With its vast potential to transform industries and improve our lives, AI is rapidly becoming a critical tool in various fields, including healthcare, finance, transportation, and entertainment.

History:

AI technology has been in development since the 1950s, with significant advancements made in the last decade. Today, AI is being used to develop intelligent robots, chatbots, and virtual assistants, among other things.

Types of AI:

There are two main types of AI: Narrow or Weak AI and General or Strong AI. Narrow AI refers to systems designed to perform specific tasks, such as facial recognition or voice assistants. On the other hand, General AI is an advanced form of AI that can perform any intellectual task that a human can.

Applications:

AI technology is being used in various fields, including healthcare, finance, transportation, and entertainment. Some of the key applications of AI include:

Healthcare: AI is being used to develop intelligent diagnostic systems, medical robots, and personalized healthcare solutions.

Finance: AI is being used to detect fraud, identify investment opportunities, and analyze financial data.

Transportation: AI is being used to develop autonomous vehicles, optimize routes, and reduce congestion.

Entertainment: AI is being used to personalize recommendations and create intelligent gaming systems.

Challenges:

AI technology also poses some significant challenges, including:

Ethical considerations: AI systems can be programmed with biases, leading to discrimination and unequal treatment.

Job displacement: AI has the potential to automate many jobs, leading to job displacement and unemployment.

Security concerns: AI systems can be hacked, leading to security breaches and privacy concerns.

Conclusion:

AI is a rapidly evolving technology that has the potential to transform industries and improve our lives. However, its development and deployment must be carefully managed to ensure that it benefits humanity and is not used to harm it.

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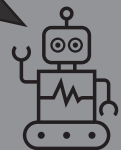
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EVOLUTION OF CONTROL SYSTEMS WITH ARTIFICIAL INTELLIGENCE

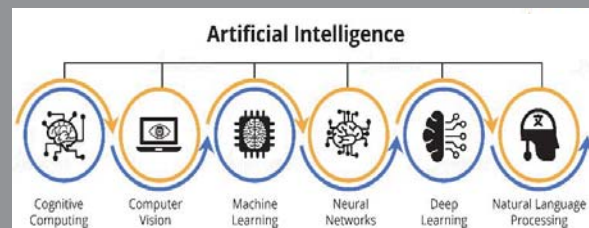
Control systems with Artificial Intelligence (AI) refer to systems that use machine learning algorithms to control and optimize processes in various fields, including manufacturing, transportation, healthcare, and finance. Artificial intelligence is used to control and optimize financial systems, such as trading algorithms and risk management systems. These systems use machine learning algorithms to analyze market data and make decisions about trades and risk management.

The purpose of the poster is to present the evaluation of control systems using artificial intelligence. These systems will play a crucial role in optimizing complex systems, improving efficiency, and reducing costs in various industries.

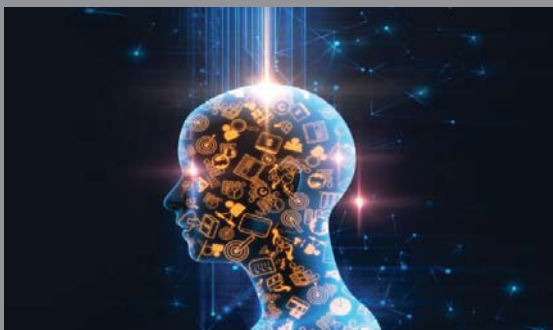


The evolution of control systems with Artificial Intelligence (AI) has been significant in recent years, leading to the development of more intelligent, efficient, and effective control systems. Here are some key ways in which control systems have evolved with the use of Artificial Intelligence:

- ➔ **DATA PROCESSING AND ANALYSIS:** With the use of AI, control systems are now able to process and analyze large amounts of data quickly and accurately. This allows controllers to identify patterns and trends that may not be immediately apparent, and make more informed decisions.
- ➔ **AUTOMATION:** AI has enabled control systems to automate routine tasks, such as data entry or report generation, freeing up controllers to focus on more complex tasks. This also helps to reduce the potential for human error in controlling processes.
- ➔ **PREDICTIVE ANALYTICS:** AI has enabled control systems to use predictive analytics, allowing controllers to anticipate potential issues and take proactive steps to address them. This can help to prevent problems before they occur, reducing the risk of negative impacts.



- ➔ **OPTIMIZATION:** AI can optimize control systems by identifying areas where processes can be streamlined or improved. This can lead to greater efficiency and cost savings for organizations.
- ➔ **LEARNING AND ADAPTATION:** AI can enable control systems to learn and adapt to changing circumstances, improving their performance over time. This allows control systems to become more intelligent and effective as they gain more experience.



The evolution of control systems with AI has led to more efficient and effective controlling processes, allowing organizations to better manage risk, improve compliance, and optimize their operations.

There are potential challenges and risks associated with control systems with AI. One concern is the potential for unintended consequences or harmful behavior if the AI system is not designed with appropriate safety mechanisms. Another concern is the ethical implications of having control systems that can make decisions autonomously, without human oversight.



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If ChatGPT can write a poster about itself?



The purpose of the research is to explore the question: "If ChatGPT can write a poster about itself, what would it look like?"



What is ChatGPT?

ChatGPT is a large language model trained by OpenAI that can generate coherent and diverse text on a wide range of topics.

Advantages .

Artificial intelligence (AI) is transforming our world in many ways, from improving healthcare and transportation to creating new opportunities for businesses and individuals. However, as with any new technology, AI also poses challenges and risks that need to be addressed.

Disadvantages.

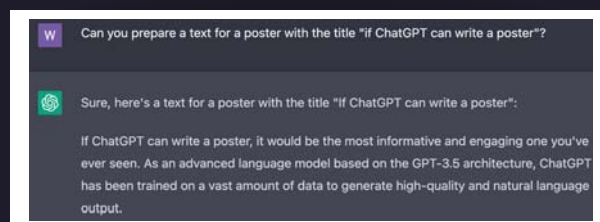
One of the main concerns about AI is its potential to replace human workers and exacerbate existing inequalities. While AI can automate repetitive and mundane tasks, it also requires specialized skills to develop, maintain, and operate. This means that some jobs will become obsolete, while others will require new skills and training.

Challenges.

Another challenge of AI is its potential to reinforce biases and discrimination. AI systems are only as good as the data they are trained on, and if the data contains biases or reflects historical discrimination, the AI system will replicate and amplify these biases. This can have serious consequences, especially in high-stakes domains such as criminal justice or hiring.

What we can do about it?

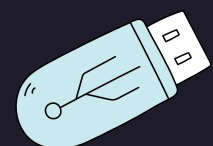
To mitigate these risks, we need to ensure that AI is developed and deployed in a responsible and ethical manner. This requires collaboration between industry, academia, policymakers, and civil society to define and uphold ethical standards, as well as investing in education and training to prepare individuals for the changing job market.



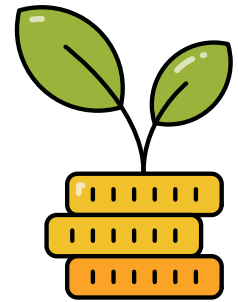
As we can see from this example, ChatGPT is capable of producing high-quality and insightful content on complex topics such as AI and its societal impact. While it's still up to humans to define the ethical and moral boundaries of AI, ChatGPT can be a useful tool for generating ideas, sparking conversations, and exploring different perspectives.



The poster was fully prepared using ChatGPT response for question "Can you prepare a text for a poster with the title "if ChatGPT can write a poster"



IMPACT OF ESG STANDARDS ON COMPANY MANAGEMENT



Business challenges:

Adapting to the new rules of functioning might be seen as a challenge for the companies. It means the need for changes at the legal level, but it also requires a meticulous assessment of the company's impact on its environment. Defining measurable goals leading to sustainable and responsible development is expected as well.

KLAUDIA WOLAS
NATALIA WOLAS
MARTA SCHABIKOWSKA

THESE ARE THE FACTS

Rapidly increasing importance of ecological conditions in the global economy has the ecological strategy within the functioning of an enterprise a real phenomenon.

Companies around the world are expected to grow responsibly and sustainably. It is more than only a result of thrust from lawmakers, investors and creditors, banks, lenders, but also employees and consumers themselves. ESG standards are the way to change course towards more responsible business.

The climate-risk has become more and more important recently. Reducing the effects of climate change, and at the same time the need to adapt economies and enterprises to them is a key element of strategic management.

Regulations:

- The European Green Deal
- Sustainable Development Goals (SDGs)
- The Paris Agreement
- The Corporate Sustainability Reporting Directive (CSRD)

The EU's strategic priorities and related regulations will have a significant impact on business in the near future - imposing new obligations on companies in the field of sustainable development, or extending existing ones.

		
ENVIRONMENTAL	SOCIAL	GOVERNANCE
<ul style="list-style-type: none"> Carbon footprint Recycling processes Energy efficiency Water management Greenhouse gas emissions Biological diversity Decarbonization 	<ul style="list-style-type: none"> Human rights Working conditions Inclusion & diversity Impact on local communities Wage equality Supplier/vendor practices Data privacy 	<ul style="list-style-type: none"> Ethical standards & corporate behaviour Stakeholder engagement Executive compensation Compliance Corruption and fraud prevention ESG disclosures Transparent communications

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OPPORTUNITIES AND RISKS OF ARTIFICIAL INTELLIGENCE

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Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision.

The problem presented will highlight the importance of artificial intelligence in everyday life. Its advantages and disadvantages, as well as the opportunities it provides and the dangers to humans from new inventions



MACHINE LEARNING

Virtual Personal Assistant

Applications of artificial intelligence in everyday life

Autonomous cars

Equipped with various sensors, radars and cameras, they are capable of detecting situations on the road and reacting to traffic participants. Israeli startup Mobileye has developed systems that detect objects on the road using machine learning. It is thus responsible for the "eyes" of the car.

Voice assistants

Microsoft's Cortana, Apple's Siri, Google Assistant and Amazon's Alexa are the four major players in the voice assistant market, which are putting their products not only in smartphones, but also in refrigerators, cars and living room speakers.

10 industries where artificial intelligence is present:

1. agriculture
2. Call centers
3. energy and mining
4. healthcare
5. intellectual property
6. IT service management
7. manufacturing
8. technical support
9. retail
10. transportation

Simulation Modelling

Threats and challenges of artificial intelligence

Dependence on technology: As society becomes increasingly reliant on AI, there is a risk of becoming too dependent on technology, and losing important skills and knowledge.

Lack of empathy and creativity: AI lacks human empathy and creativity, which could limit its ability to understand and respond to complex human needs and emotions.

Artificial intelligence has the potential to highly affect privacy rights and data protection. It can be used in facial recognition equipment or to track and profile people online. In addition, artificial intelligence makes it possible to combine information that a person has provided into new data, which can lead to results that a person would not expect

The use of artificial intelligence is expected to eliminate a large number of jobs. Although artificial intelligence is also likely to create better job opportunities, education and training will play a key role in preventing long-term unemployment and providing a skilled workforce. According to estimates of European Parliament Think Tank 14% of jobs in OECD countries can be highly automated, and another 32% could face major changes.

Underutilization of artificial intelligence capabilities is considered a major threat because missed opportunities can mean a loss of competitive advantage over other parts of the world and worse opportunities for citizens.

Overutilization can also be problematic: investing in AI applications that prove to be useless, or applying AI to tasks for which it is not suited, such as explaining complex social problems.

Barriers to the development of AI research in Poland:

INSTITUTIONAL BARRIERS

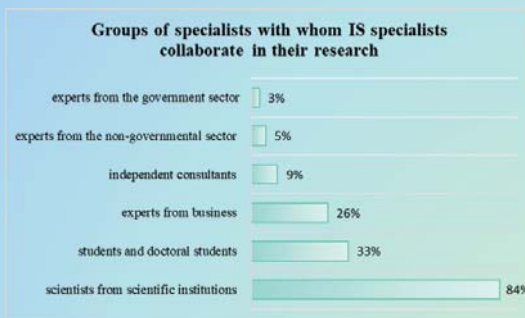
LIMITED COOPERATION OF SCIENTISTS, LACK OF EMPLOYMENT ELASTICITY, TENNESS OF ADMINISTRATIVE DUTIES, OVERLOAD OF TEACHING DUTIES, LACK OF INSTITUTIONAL COOPERATION WITH BUSINESS, LOW MOBILITY OF RESEARCHERS, LACK OF A DEDICATED ARTIFICIAL INTELLIGENCE DEVELOPMENT CENTER

FINANCIAL BARRIERS

LOW LEVEL OF REMUNERATION, LOW LEVEL OF SCIENCE FUNDING

INFRASTRUCTURE BARRIERS

LACK OF EQUIPMENT, LIMITED ACCESS TO DATA



Benefits of artificial intelligence

Artificial intelligence can help people by improving health care, making cars and other transportation systems safer, and making products and services more customized, cheaper and more durable. It can make it easier to access information, education and training, which has become especially important in the era of the coronavirus pandemic, when the need for distance education has increased. Artificial intelligence can also make workplaces safer, as robots can be used for dangerous tasks, and new jobs will be created as AI-based industries grow and change.

11-37% Estimated increase in labor productivity by 2035 associated with artificial intelligence (European Parliament Think Tank, 2020)

With artificial intelligence, human errors are reduced. Machines are more accurate and less susceptible to external errors.

AI supports many sectors and industries. It can be used e.g. in medicine, aviation, transportation, etc. Artificial intelligence optimizes to the maximum

In such a way that the machine takes full advantage of performance, being able to perform several tasks at the same time, skipping unnecessary functions

Cost savings: AI can reduce costs by automating tasks that would otherwise require human labor, and by improving efficiency and productivity.

Artificial intelligence applied to public services can reduce costs and offer new opportunities for public transportation, education, energy and waste management, as well as improve the sustainability of products

61% of Europeans look favorably on artificial intelligence and robots, but 88% say these technologies need careful management (Eurobarometer 2017, EU-28)

Polish scientists published almost 14,000 scientific papers on AI topics in science and technology between 2010 and 2021. Thus, they produced about 1.2 percent of the publications on these topics worldwide. The largest number of papers were published by researchers affiliated with technical universities, such as the AGH University of Science and Technology (1,358), Warsaw University of Technology (1,292), Wrocław University of Technology (1,256) and Silesian University of Technology (1,144). Works by scientists from these institutions accounted for 27 percent of all SI publications in science and technology prepared in Poland.

Advantages:

- Good at detail-oriented jobs;
- Reduced time for data-heavy tasks;
- Delivers consistent results; and
- AI-powered virtual agents are always available.

Dominates global funding of AI startups



Natural Language Processing

Disadvantages:

- Expensive;
- Requires deep technical expertise;
- Limited supply of qualified workers to build AI tools;
- Only knows what it's been shown; and
- Lack of ability to generalize from one task to another.

In summary, artificial intelligence can bring many benefits, such as process automation, learning and data analysis, but there are also some disadvantages, such as the cost of creation and maintenance, lack of empathy and understanding, security and privacy, and the risk of job losses. It is important to consider all the advantages and disadvantages of artificial intelligence when deciding whether to use it, so that you can effectively realize its potential, but also minimize the risk of negative effects.

It is also worth noting that artificial intelligence is still under development and its capabilities are likely to increase in the future. Therefore, it is necessary to be open to new opportunities and constantly evolve to be able to fully exploit the potential of artificial intelligence.

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Machine Learning



The most important informations about artificial intelligence in business.

Poster's purpose is to define the AI, show practical activities, advantages & disadvantages

INTRODUCTION

Nowadays, artificial intelligence in business no longer surprises anyone. More and more companies are finding out about the positive impact. It improves business operations, among others, thanks to speech and image recognition mechanisms, as well as helping in optimal data processing.

AI DEFINITION

Artificial Intelligence (AI) is a field of computer science and technology that deals with the creation of systems and programs that mimic human intelligence. In general, artificial intelligence refers to the ability of computers and machines to make decisions, solve problems, and perform tasks that normally require human intelligence.

CONS

- lack of information transparency,
- manipulating customer preferences,
- negative impact on jobs,
- disinformation,
- loss of control,
- completing commonsense tasks in the real world.

EXAMPLES IN PRACTICE

1. Smart assistants (Siri & Alexa).
2. Helpdesk chatbots.
3. Face recognition technology (Facebook).
4. Personalized recommendations across platforms (Amazon & Netflix).

EXAMPLES OF PRODUCTS & SERVICES USING AI

- Twitter
- Roomba vacuum cleaner
- Robots as financial advisers
- KenSci's Risk Prediction Platform
- Company - Burberry

PROS

- automation of business processes,
- data analysis to gain business insight,
- engaging employees and customers,
- smarter business operation,
- ensuring Cybersecurity,
- focusing on the potential market.

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Pros and cons of ChatGPT

The purpose of this study was to determine whether ChatGPT is a tool that is useful in various aspects of life i.e. daily duties, work, or research papers. We want to reach the conclusion in which areas usage of ChatGPT is helpful and when it could be dangerous to use it.



The most important advantage of GPTChat is its accessibility because all we need is any device with access to the network to be able to use the chat that will answer the questions asked about the issue we are interested in. In the case of not extensive problems, ChatGPT copes with them perfectly and allows you to save a lot of time, which affects the effectiveness of learning. In addition, it can be said that this application is a kind of adaptive information source. If we show that a problem is still not understandable to us, we may encounter an answer that will be written in a simpler language or will be explained in a practical example.

The biggest disadvantage of chatGPT is that it does not always have a full understanding of complex questions. The lack of understanding of emotions and the loss of human contact can also be problematic. Relying on chatting with artificial intelligence can also cause people to lose their critical thinking.



In the case of everyday duties, we can count on help in automating simple activities. It can also be helpful when creating your daily schedule and in activities related to cooking. According to many Internet users, AI can provide a recipe from our products, which in most cases has good nutritional values and taste. However, the use of GPT chat in everyday life can lead to the loss of creative thinking and interpersonal relationships that are very important for people, because ChatGpt itself is not able to understand human emotions or provide any entertainment due to its lack of understanding of the sense of humor.



If we want to talk about advantages at work, we can see great potential for automating the download of the data we need or creating simple applications that will improve work or even be able to replace people in certain positions. AI chat, combined with the information that online stores have about their customers, can significantly improve the product recommendation system. The big danger is that we can't be sure about the correct operation of GPT chat, which can lead to costly mistakes. An important factor to take into account is also the fact that the customer is not necessarily understood correctly, which can lead to poorly rated customer service.

Conclusion

To sum up, the use of GPT Chat can be helpful in various aspects of life only when we take into account its shortcomings or potential errors in its answers related to more advanced questions. It should also be remembered that the use of this device does not replace interpersonal relationships. However, it should be taken into account that GPT Chat is now in version 3.5 and in the coming months an improved version numbered 4.0 is to be made available for free use, which is to be characterized by a much wider possibility of understanding the problems presented to it. So at this point we must be careful if we use this tool because it carries many dangers but in the case of further development of this technology we can be sure that it will be an irreplaceable help in many aspects of our lives

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THE FUTURE OF CONTROLLING AND THE ROLE OF THE CONTROLLER IN THE AGE OF ARTIFICIAL INTELLIGENCE

In today's world, artificial intelligence (AI) is revolutionizing various fields. Controlling is no exception, and with the development of AI, the future of the controller's profession seems increasingly automated.

Benefits:

Automation of repetitive tasks: One of the primary benefits of AI in controlling is automation. AI algorithms can be used to automate repetitive tasks such as data collection and analysis, freeing up controllers to focus on more strategic tasks.

Improved accuracy and efficiency: AI algorithms can process vast amounts of data much faster and more accurately than humans, leading to more efficient and accurate financial reporting and forecasting.

Better decision making: AI algorithms can analyze data from multiple sources and provide insights that can aid controllers in making better business decisions. This can lead to better risk management, increased profitability, and improved overall performance.

The introduction of AI in controlling offers many potential benefits, but it also presents several challenges that must be addressed. Controllers must be prepared to adapt to these changes and work collaboratively with AI systems to ensure that the technology is used effectively to achieve the desired outcomes.

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- Artificial Intelligence and the Future of Finance*, Deloitte 2021
- The Future of Work in Financial Services*, PwC 2021
- How AI is changing the face of accounting and finance*, TechRepublic 2021
- The Future of Accounting Jobs: Preparing for an AI World*, Forbes 2019

The objective of this project is to highlight the potential impact of artificial intelligence on the field of controlling and the role of controllers. The project aims to inform and educate about the benefits and challenges of introducing AI in controlling. The poster also aims to encourage controllers to embrace the potential of AI and to prepare for the changes that this technology may bring to the profession.

Challenges:

New skills and knowledge: The introduction of AI in controlling will require controllers to learn new skills and knowledge. They will need to be able to understand and interpret the outputs of AI algorithms and use these insights to make informed decisions.

Infrastructure changes: Implementing AI in controlling may require significant changes to the system infrastructure, such as new hardware and software systems, which can be expensive and time-consuming.

Potential for errors: AI algorithms are only as accurate as the data they are trained on, and they can introduce errors if the data is incorrect or biased. It is important for controllers to have a good understanding of the data and how the algorithms are working to ensure the accuracy of the results.



Aleksandra Szaniawska
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The use of artificial intelligence in the work of the controller

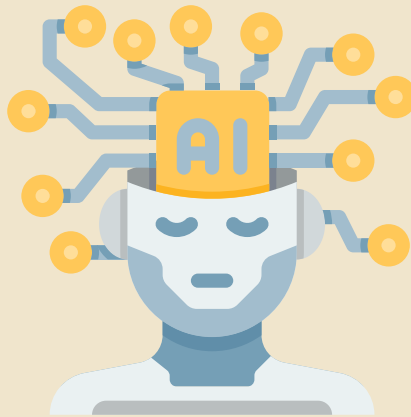
Nowadays, artificial intelligence is becoming more and more popular and has an increasing impact on our lives. Its purpose is to make people's lives easier and to help them perform often repetitive tasks. Today, advances in technology have allowed artificial intelligence to be applied to increasingly important and complex processes. Controllers are also making use of it, as its use is intended to speed up their work and relieve the burden of performing primitive, repetitive tasks.

The purpose of the poster is to present the use of artificial intelligence in the controller's work. In addition, both the advantages and disadvantages of its use were presented.

AI can be used to optimize inventory management and control by analyzing sales data, demand forecasts, and other relevant factors to determine optimal inventory levels and reorder points. This can help companies reduce inventory costs and improve supply chain efficiency.

AI is very frequently applied in financial reporting and accounting to automatically analyse large volumes of financial data and identify patterns or trends that would be difficult for a human to detect.

AI is an irreplaceable tool for monitoring the risk factors and generating alerts when potential risks are identified. This can help controllers and risk managers quickly identify and respond to potential threats to the company's financial health.



Maersk, a Danish shipping company, uses AI to optimize its shipping routes and reduce fuel consumption. The company uses machine learning algorithms to analyze weather patterns, vessel speed, and fuel consumption data to determine the most efficient routes for its ships.

Famous clothing brand H&M uses AI to optimize its inventory management. The company uses machine learning algorithms to analyze sales data, demand forecasts, and other factors to determine optimal inventory levels and replenishment schedules.

Deloitte uses AI to automate some of its audit tasks. The company uses machine learning algorithms to analyze financial data and identify potential anomalies or areas of concern, which can then be further investigated by human auditors.

Increased accuracy

Better insights

Real-time monitoring

PROS

Facilitates Faster Decision-Making

Cost savings

Diminishes Human Error

Implementation and training costs

Security risks, as with any technology, there is always the potential for security breaches

Lack of transparency in some cases

CONS

Enormous need for data

Lacking creativity

Creating unemployment

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THREATS OF AI FOR THE FINANCIAL CONTROLLER

The most important threats of AI for the Financial Controller:

1. **Job loss:** As AI systems become more prevalent in finance, there is a risk that some financial controller jobs may become automated, leading to job loss.
2. **Reduced autonomy:** AI systems can sometimes replace human decision-making, leaving financial controllers with less autonomy in their roles and potentially reducing the ability to use human judgment and intuition.
3. **Bias:** AI systems can be biased, either because of the data they are trained on or because of the algorithms used to make decisions. This can lead to unfair treatment of certain groups or individuals, which can have legal and reputational consequences for financial controllers.
4. **Cybersecurity risks:** AI systems can be vulnerable to cyber-attacks, which can compromise sensitive financial data and put financial controllers and their organizations at risk.
5. **Lack of transparency:** AI systems can be very complex and difficult to understand, which can make it challenging for financial controllers to ensure that the systems are working as intended and that they are not making errors.
6. **Compliance risks:** Financial controllers are responsible for ensuring that their organizations comply with applicable laws and regulations. If AI systems are used to make decisions, it can be difficult to ensure that the systems are compliant with all relevant regulations.
7. **Cost:** Developing and implementing AI systems can be expensive, which may be a barrier for smaller organizations or those with limited budgets.



Will AI replace Humans in scope of Financial Controlling?

AI can assist with certain tasks in financial controlling, but it is unlikely to fully replace human beings in this role due to the complexity of the responsibilities involved. Financial controllers require a range of skills, including decision-making, communication, and leadership, which are difficult to replicate with AI. Moreover, financial controllers must take ethical and regulatory considerations into account when making decisions, and AI can only assist in these tasks. Ultimately, the financial controller is responsible for the outcomes and making the final decision.

Resources:


"The Future of Employment: How Susceptible Are Jobs to Computerisation?" by Carl Benedikt Frey and Michael A. Osborne, published in *Technological Forecasting and Social Change* in 2017, discusses the potential impact of automation on various types of jobs, including those in finance.

"The Unavoidable Risks of AI for Financial Services" by Charles Delingpole, published in *Forbes* in 2019, discusses the potential risks of AI in finance, including bias and cybersecurity.

"Artificial Intelligence in Financial Services: Regulatory and Supervisory Challenges" by the Financial Stability Board, published in 2017, discusses the potential regulatory and compliance risks associated with AI in finance.

ChatGPT – <https://chat.openai.com/chat>

UNLEASHING THE POTENTIAL OF ARTIFICIAL INTELLIGENCE IN ACADEMICS: ADVANCEMENTS AND APPLICATIONS



AI has the potential to overcome educational barriers by providing more equitable access to education and can help create a more inclusive and equitable education system.

The aim of the poster is to show how AI can support students and teachers.




Transforming Education with AI: Personalized Learning Experiences

Artificial Intelligence has the potential to transform education by creating personalized learning experiences that are tailored to individual students' strengths and weaknesses. AI-powered algorithms can analyze student data, including past performance and learning style, to recommend personalized course content, pacing, and instructional strategies. This approach can help students learn more efficiently and effectively, and make education more engaging and enjoyable.

The Role of AI in Academia

Administrative tasks such as scheduling, grading, and organizing class materials can be time-consuming and tedious for educators. With AI, however, these tasks can be automated, freeing up valuable time and resources for teachers to focus on other areas of instruction. AI-powered tools can also improve communication between educators and students, making it easier to provide feedback and track progress.



AI-Enabled Research: Accelerating Discoveries in Academics

AI is transforming the research landscape by enabling faster and more accurate data analysis, and providing researchers with new tools for experimentation and hypothesis testing. For example, AI-powered algorithms can analyze large data sets to identify patterns and insights that might otherwise go unnoticed. AI can also simulate experiments, allowing researchers to test hypotheses in silico before performing physical experiments.

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