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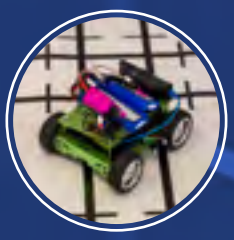

ARTIFICIAL INTELLIGENCE
STAKEHOLDER DAY AND EXHIBIT

JUNE 15-16, 2021

artificial intelligence coalition

INNOVATION AT WORK

digital success programme

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Prof. dr. László Palkovics

Minister
Ministry for Innovation and Technology

Dear Reader,

Just as man has so far formed value from matter, so in the new millennium the knowledge values extracted from data have become at least as important. We all need to recognize that the world has changed. This is why, in addition to resource-based strategies, strategies focusing on skills and capacity have emerged. We live in times when digital solutions can help us to manage our daily lives as smoothly as possible during the coronavirus outbreak.

The potential of artificial intelligence has never been more relevant. Artificial intelligence-based applications and solutions are both engines of prevention and economic restart, with great benefits for example in speeding up vaccine developments, predicting when and where outbreak will occur or contact tracing.

The Government of Hungary has successfully recognized the potential of digitalisation and artificial intelligence, as well as the challenges they pose. That is why we announced Hungary's Artificial Intelligence Strategy in 2020 September. The Strategy contains crucial programme principles for the future of Hungary – thanks to the Artificial Intelligence Coalition for their work.

One of the key objectives of the Strategy is to set Hungary's data economy in motion. This can be enhanced by digital state governance, through the more efficient use of data produced within the professional and political operation of the state. Digital modernisation is not only beneficial for the state but it responds to long-existing expectations of citizens as well. Our current services that are

mostly rigid, reactive and preventive in nature can be replaced by personalised and proactive procedures.

The introduction of data-driven applications has a crucial impact on global growth. A telling indicator of this is that the value of the European data economy may increase to EUR 1054 billion by 2025, which is equivalent in size to the entire EU budget for the next seven years. It is also revealing that EU data economy may represent 6.3% of the overall EU GDP in 5 years.

The Artificial Intelligence Coalition has now become an attractive professional platform, as evidenced by its 317 members and over 1000 experts, including the most prominent representatives of the corporate, research, academic and governmental sectors. We can be proud of this national cooperation, where immense intellectual capital has been coupled with great dynamism right from the beginning.

PROF. DR. LÁSZLÓ PALKOVICS
Minister, Ministry for Innovation and Technology

Roland Jakab
President
AI Coalition

Dear Reader,

Hungary's Artificial Intelligence Strategy 2030, created jointly by the AI Coalition and the Ministry for Innovation and Technology, was set up to ensure that the Hungarian economy and society can reap the benefits of technology that is present now in all parts of our lives.

Over 1000 experts of our 317 member associations work on translating strategic aims into concrete projects. At the same time, sectoral alliances have been formed in order to realise planned developments as soon as possible.

The implementation of the action plan is supported by the Hungarian Data Asset Agency responsible for the utilisation of the national data asset, the AI National Laboratory working

to raise applied research to a higher level, and the AI Innovation Centre. The latter one helps to accelerate AI adoption in the corporate sector by providing a test environment, free consultations and an Experimental Fund that enables enterprises to try out AI applications in practice.

Both economy and society have to be prepared for the changes induced by artificial intelligence. This essential, widespread awareness raising is helped by our AI Challenge jointly launched with the Ministry for Innovation and Technology, where participants can get an overall picture of the benefits and ethical implications of AI in the form of a free online course. Our aim is that 100,000 Hungarian people complete the AI Challenge, as if at least one percent of society gains a basic understanding in this field, it can improve the competitiveness of the whole country and create more high value-added jobs for the economy.

The AI Exhibition and Conference presented in this publication is a great occasion to take stock of our achievements in the global AI competition along with existing and potential developments in Hungary.

One thing is sure: we have a lot of work ahead of us but we are on a good way, and with the effective implementation of the Strategy, we have a good chance to succeed.

JAKAB ROLAND
President, AI Coalition

Dr. András Levente Gál

Head of Digital Success Programme and Hungarian Data Asset Agency

Dear Reader,

Data is the fuel of the digital economy and AI application, which drives the economy.

An important feature of data is that it gets better, clearer and more reliable with every use. And in order to make an efficient digital economy, we need plenty of data that are clean, easy to access and easy to use. Besides, the proactive use of data is essential for a proactive public administration offering personalised services for citizens and to enable the creation of high-performing Hungarian companies.

Each and every sector of the economy has to be reconsidered from a digital perspective as digitalisation is the most powerful global force transforming our world at the beginning of the 21st century. The use of social media and search engines has made us accustomed to personalised services, as if our smart phone would always know what we are thinking. It is fully understandable then that companies and citizens expect the same “mind-reading” from public administration, too.

We already have thousands of public records in Hungary all contributing to the national data asset. Our aim is to connect them in a way that allows us to provide as much and as valuable information for the organisation of public administration as possible.

This is exactly why the Hungarian Data Asset Agency was established under Hungary's Artificial Intelligence Strategy: to ensure that Hungary's data asset is well governed and effectively structured.

We have to see that in a few years a quarter of Hungarian jobs will be affected by artificial intelligence, therefore it is crucial that the Hungarian society, businesses, communities and individuals come out as winners of this disruption.

DR. ANDRÁS LEVENTE GÁL
Head of Digital Success Programme
and Hungarian Data Asset Agency

Artificial Intelligence Coalition – the engine of the Hungarian AI ecosystem

We can see top-notch Hungarian developments in the field of artificial intelligence (AI) in Hungary including solutions in self-driving, customer service automation, medical diagnostics, warehouse automation or precision agriculture but, on the other hand, it is also true that domestic micro, small and medium sized enterprises significantly lag behind in terms of digitalisation and automation.

AI development has become an important branch of digitalisation, its growing presence in social and economic interactions is one of the greatest technological innovations of the past 15 years. These technologies induce such changes in our lives that radically affect how we work, how we learn and how we connect to each other. Artificial intelligence may contribute 15% to Hungarian GDP by 2030. Data also has the potential to increase economic growth, the rise of the data economy and widespread adoption of AI solutions can further increase the growth potential of Hungary.

In this early phase of global competition for the development of AI capabilities, it is essential to provide the regulatory framework for the transition, to help early innovators, and to provide a strict ethical and regulatory framework to keep control of human-machine collaboration. That is why the **Hungarian Artificial Intelligence Coalition** was established on 9 October 2018 on the initiation of Prof. dr. László Palkovics, minister for innovation and technology with the participation of 78 international and domestic companies along with universities, scientific workshops, professional and public associations.

The AI Coalition liaising with the experts of the AI Division of the Digital Success Programme has been organising events to strengthen the local AI ecosystem since its establishment. While the professional days are to create cohesion within the expert network, at the half-yearly plenary meetings the board evaluates the work of the professional forum to the members.

The **Hungarian AI Strategy** presented in 2020 September defines the most promising focus areas for the country, the advantages stemming from the introduction of AI technology as

well as the system of measures needed for its implementation and the schedule of its introduction.

Among its high-level targets, the Strategy foresees a 15% GDP increase and a 26% average productivity growth in the Hungarian corporate sector in the next ten years. Although the Strategy sets out plans until 2030, a detailed roadmap has been laid down only for the next five years as technology is changing so fast that it will require a continuous adaptation. The measures laid down in the paper are now being translated into concrete projects by AI Coalition's task forces.

The successful implementation of the Strategy is primarily subject to a smoothly functioning institutional framework, the first pillar of which is the newly established Hungarian Data Asset Agency (Nemzeti Adatvagyon Ügynökség – NAVÜ). The Agency's main task is to set Hungary's data economy in motion by managing the strategic national data asset and encouraging the secondary use of data. Another novel institutional entity is the Artificial Intelligence National Laboratory (Mesterséges Intelligencia Nemzeti Laboratórium – MILAB), which was set up to promote applied research activity and thus adapt domestic research to real market demands. MILAB is part of the Hungarian National Laboratory Network.

The third pillar of the AI institutional framework is the AI Innovation Centre launched in 2021 spring, which helps SMEs adopt AI-driven applications. Local businesses can use the Centre to test AI solutions before implementing them in their business processes, and free consultancy services are also offered to them.

Key objectives of the Coalition:

- to propel Hungary in the European forefront in the field of AI development;
- to strengthen the competitiveness of Hungarian enterprises through widespread AI adoption;
- to facilitate the participation of Hungarian start-ups and SMEs in AI developments within corporate, university and international partnerships.

Priority goals of the AI Strategy:

- allowing for 1 million people to find higher value-added work in the next 10 years;
- achieving a 15% increase in the GDP induced by AI adoption;
- achieving a 26% increase in the productivity of the Hungarian SME sector;
- raising the awareness of 1 million people of AI; and training 100,000 Hungarian citizens through a basic course in AI and developing their digital competences;
- setting the data economy in motion, supporting research and development;
- establishing the institutional framework for the Hungarian data economy and AI ecosystem;
- setting up the regulatory and infrastructural framework for data governance.

Artificial Intelligence National Laboratory (MILAB)

The Artificial Intelligence National Laboratory (Mesterséges Intelligencia Nemzeti Laboratóriuma – MILAB) is the biggest institution of the National Laboratory Network, aiming to strengthen Hungary's position in one of the most important fields of RDI, while also enhancing domestic basic research, applied research and innovation activity in Hungary and increasing their synergies and effectiveness.

The consortium is made of five universities, four research institutes and the Special Service for National Security, and is an important pillar of the institutional system of the Hungarian AI ecosystem along with the Hungarian Data Asset Agency (NAVÜ) and the AI Innovation Centre launched in 2021 spring. While NAVÜ is responsible for collecting data and making them available in order to unleash Hungary's data economy, MILAB deals with interpreting, analysing and processing these data.

Main activities of MILAB:

- directly funding high social impact and risky research projects that could not be financed from non-public sources;
- framing AI research projects financed from other sources in order to create synergies among actors;
- supporting cross-border knowledge transfer and collaboration projects;
- enabling the creation of projects defined and financed by the market through continuous communication with the market players and funnelling their research-related expectations;
- representing the interconnected researcher ecosystem in international grant programmes.

The institution is coordinated by the Institute for Computer Science and Control (SZTAKI) and its research activity focuses on fields like machine vision, intelligent manufacturing, language technology, medical application and cyber security, which is in line with those focus areas and transformative projects that Hungary's Artificial Intelligence Strategy has defined for the period of 2020-2030. In this respect the Artificial Intelligence National Laboratory works in liaison with the Autonomous Systems National Laboratory and the Artificial Intelligence Coalition.

The main responsibility of the Artificial Intelligence (AI) Innovation Centre is to provide professional support to the implementation of Hungary's Artificial Intelligence Strategy.

As set down in the Strategy, the new institution is to encourage the widespread use of AI technologies in order to improve the productivity of Hungarian small and medium sized businesses. To this purpose, they also provide consultancy services, developer capacity and equipment.

Data is highly valuable. In order to create value from data and use it in production, we need sector-specific AI applications. According to forecasts, the value of the EU's data asset could be over EUR 1 billion by the middle of the decade. Just to illustrate the size, it is roughly equal to the total EU budget for the next seven years without the EU Recovery plan.

One of the key goals of Hungary's Artificial Intelligence Strategy is to increase the productivity of Hungarian small and medium sized enterprises by some 26% through AI technologies by 2030.

Main responsibilities of the new institution in supporting the AI Strategy:

- making SMEs acquainted with different AI technologies
- helping businesses identify the most suitable suppliers

To this purpose, the expert teams of the Centre:

- put together ready-made application packages,
- provide consultation trainers to foster widespread uptake of AI applications, and
- create opportunities for SMEs to learn from each other.

The AI Innovation Centre aims to encourage a spirit of experimentation among Hungarian SMEs. The "Experimental Fund" allocated to this purpose helps small Hungarian businesses to embrace AI developments without taking risks by testing new technologies. The institution also plays a largely market-creating and broker function. The marketplaces created enable the actors of the ecosystem to quickly find each other.

The AI Innovation Centre is based in Budapest but it will be also present in two other Hungarian cities as an AI accelerator. In Zalaegerszeg the ZalaZone Industrial Park provides a state-of-the-art test environment, while in Debrecen the main focus will be on data processing, based on the computing power of the Supercomputer infrastructure (HPC) to be set up there.

The accelerator centre in Debrecen will be set up in cooperation with another institute of the AI institutional framework, the Hungarian Data Asset Agency being responsible for the maintenance and development of the national data asset. The AI Innovation Centre is also supported by the AI National Laboratory (MILAB), which was established under the Institute for Computer Science and Control (SZTAKI) and is responsible for boosting market-led research and putting Hungary on the global AI map.

Hungarian Data Asset Agency

The government adopted Hungary's Artificial Intelligence Strategy in 2020 September, as part of which the Hungarian Data Asset Agency (Nemzeti Adatvagyon Ügynökség – NAVÜ) was established. One of the major goals of the Strategy is to boost Hungary's data economy, and for that it is essential to establish a system of institutions that enables the broad utilization of national data assets, along the core values of efficiency, economic growth and national sovereignty.

NAVÜ provides the institutional framework for boosting the data economy, and coordinates the management of public data assets. There is no modern digital economy, including AI development, without data assets. However, data is not only information to be protected, but also a marketable asset.

In order to successfully boost Hungary's data economy and establish the frameworks for its operation, it is essential to provide the legal definition of data, which requires the introduction of a new data asset concept, where data is defined as a sui generis entity.

NAVÜ does not deal with data processing, it will not contribute to building a large aggregated database, but it cooperates with data owners for modelling purposes. The Agency aims at creating a national digital ecosystem where the data assets of public data owners can be successfully utilised through the establishment of appropriate digital platforms.

The Government of Hungary is among the world leaders in data asset management with the activity of NAVÜ.

Results of Hungary's Artificial Intelligence (AI) Strategy

The Ministry for Innovation and Technology together with the AI Coalition evaluated the latest results of the Action Plan at the AI Professional Day and Exhibition held on 15-16 June 2021 with leading stakeholders, where the ambassadors of the AI Challenge Awareness Campaign have also been introduced.

The evaluation included the two newly set up **Accelerator Centres** based in Zalaegerszeg and Debrecen, which work within the AI Innovation Centre in order to encourage the widespread use of AI applications.

The Accelerator Centres connect the institutional competences of the AI ecosystem: after surveying the needs of small to medium enterprises, the next phase is prototype development and testing, where relevant research resources may be involved, while those interested can develop personal skills using available training materials.

In order to encourage small Hungarian businesses to uptake AI developments, an **experimental and support fund** will be established, with the help of which SMEs can test new technologies without taking risks. During the procurement of AI-based solutions, small and medium sized enterprises receive answers to crucial questions like who will operate the system, how long it will take to implement it, or where they can find references where stakeholders are willing to share their experiences.

During the implementation of the Strategy released in 2020 September, experts of the AI Coalition translate the Action Plan into projects responding to real life problems. From the focus areas of the Strategy, sectoral projects have been formed in energy, agriculture, logistics and transportation, focusing for example on AI-powered voice and text support of customer service call processes or the forecasting of factors affecting agricultural production.

Specialised groups of the Hungarian Data Asset Agency set up within the Artificial Intelligence Strategy have started **modelling different methods** for utilizing various data asset elements. The investigation of data utilization and its findings allow for Hungary to be among the first countries in the global data governance competition, for which it has every instrument now at hand. During the summer the **public data cadastre** is to be finalised and the test version of the **Hungarian public data** portal is to be launched. The survey of the cadastral data asset of the municipalities has also started, as part of which the first round of pilot is underway with the involvement of Kaposvár, Kecskemét and Monor.

Thanks to the **sandbox projects of the AI Coalition**, the intake capability of customers may be broadly improved, there is an increasing number of Hungarian language technology datasets available, and natural language processing solutions are also becoming more widespread in general. On the customer side the improvement of operational capabilities may be further expected.

We must not forget about the community-developed Hungarian language models either, which are freely available. In order to stimulate these, a dedicated **crowdsourcing project** has been launched, the result of which will be a working Hungarian language model that can

be the basis of further development. It can take AI development to the next level in solutions where suppliers did not have the possibility earlier to involve this size of model testing community. The aim is to release freely available components that can be used by anyone for building and creating their own solutions using language technology.

The AI Coalition is only one example of the success stories of the Digital Success Programme. Similarly to the AI Coalition, the 5G Coalition and the Drone Coalition focus on strategy formation and the creation of an incentive regulatory framework in order to support the widespread adoption of state-of-the-art technologies in Hungary, and to exploit their potential for growth.

The AI Challenge, our nation-wide awareness raising campaign in AI has reached one of its targets set for the end of 2021.

By June the message on the importance of AI had been delivered to more than 1 million Hungarian citizens through various means. This initiation is the result of the cooperation with several organisations, chambers and other professional associations, and educational institutions.

In order to achieve an even bigger outreach, the free basic course of the programme has been revised. In the 2.0 version both content and design have been reviewed and updated: the new, more appealing design can attract even more people to the course, which covers a wide range of topics from the basics to industry-specific use cases, satisfying the needs of both everyday people and developers. As of 1 July 2021, the AI Challenge is also available in the V4 languages, i.e. in Czech, Slovak and Polish, as well as in English.

From Covid–19 mobile location data analysis to autonomous robot planes – AI Coalition Professional Day and Exhibition

On the AI Coalition's Professional Day and Exhibition held on 15-16 June 2021 at the Budapest University of Technology and Economics 20 exhibitors were present with 28 solutions. In this publication we would like to summarise the most important thoughts of the 2021 presentations and present our exhibitors.

Analysing the national data asset through machine learning methods

In his presentation, Dr. Balázs Harangi talked about the main objectives of establishing the **Data Analysis Competence Centre**, which are to support SMEs by transforming the public data utilisation model and to provide SMEs with data analytics competences. He gave account of their artificial intelligence projects where several sub-projects are implemented as part of which for example they create data packages enabling the re-use of public data assets and offer them to SMEs.

The data packages can be directly accessed and analysed. Dr. Harangi also gave account of the establishment and development of the **research and accelerator centre in Debrecen**. The research centre will have a division focusing on the analysis of public data specifically, and the joint analysis of public data and other market data and open data, where **the HPC capacity of the University of Debrecen will be of great help**.

He said that in order to enhance SME's efficiency and improve their data asset management, demo (proof of concept) applications are developed for project participants, allowing them to try out in practice **the advantages of utilising their data asset by using AI technologies**.

Dr. Balázs Harangi

Senior Data Analyst,
Data Analysis Competence Centre, NAVÜ

▶ Presentation of Dr. Balázs Harangi

How to make Hungarian Siri? Creating the technological bases freely available to everyone

Dr. Ádám Feldmann presented general Hungarian-language open source technologies, which can bring about **dramatic changes in present language technology**, as text processing is a game-changer in AI development. As he noted, the past few years had seen huge advances in this field, in certain task types machine solutions can perform almost at a human-level.

However, these technologies are mostly available in the major languages, therefore the aim is to develop language processing tools for the Hungarian language as well. As he highlighted: **"the new digital literacy has to prepare for the Hungarian language"**. If these solutions are widely accessible, widely usable and can be easily integrated with existing cloud services solutions, it means that some parts of language technology can become mainstream and build in our everyday lives.

The presenter showed two technologies. The first is a **chatbot tool** based on the content of Wikipedia articles, while the second one examines the steps and components of Hungarian Natural Language Processing Pipelines. As Dr. Ádám Feldmann put it, more open source solutions, community developments and increased technology transfer may stimulate competitive-cooperative processes in this field.

Dr. Ádám Feldmann

Head of
Applied Data Science and Artificial Intelligence Group at University of Pécs, Medical School

What have we learnt from 5 million customer calls a year?

The AI specialist talked about what they had learnt from Vanda and the **more than 5 million customer calls they receive yearly through Vanda** at their customer service. As he said, their customers like AI-based solutions, as they improve customer experience and efficiency but it requires mutual learning both from technology and customers.

Using AI in customer service has many benefits, which cannot be overlooked today. Vanda helps with the automation of customer service processes from simple cases to processes requiring more complex solutions.

Vanda performs complex automated tasks from 2018, understands customer intentions in 96.2% and serves customers in 13 topics. **The company would like to automate 60% of its customer service interactions by 2030.**

János Horváth Varga

Senior AI Specialist,
T-Systems Hungary

The message and what is behind it

Chatbots can do more now than we think. **A good algorithm can almost read our minds.** Let's think about recommendation systems: how does Netflix know what I would like to see? Bayrak Yusuf explained with practical examples why it is worth it, what competitive advantage it brings to use chatbots from the perspective of improved customer experience and data analysis.

Their company has 1.1 million users with 52 million messages so far. Their mission is to bridge the gap between programs and people by using chatbots. On the basis of their continuously increasing chatbot modules, they can build chatbot applications for their customers quickly and cost-effectively.

Their modules use the benefits of both conversational user interfaces and graphical user interfaces. He also talked about the difficulties of Hungarian language and its deciphering, concluding that **"it is difficult to develop a chatbot in Hungarian, but not impossible"**.

Bayrak Yusuf

CEO,
RoboRobo

Let's convert bytes to forints – Solutions for the profitable utilization of industrial data assets

In his presentation, Mr. Tamás Frisch talked about Stratis's approach and practical experiences regarding the **available data assets of Hungarian industrial companie**s, and their use for analysis purposes.

He demonstrated how a well-selected project aim can contribute to **the use of available data and technology in a way that can really generate profit**, not just solving short term problems but also enabling to get closer to the vision of Industry 4.0.

They believe that data-based decisions are the best. Mr. Frisch brought several examples of how advanced analysing methods can significantly increase a company's productivity, flexibility and profitability.

He highlighted that **it is important to bring AI "down to earth"**: industry 4.0 is only a vision today, everyone is talking about it, but we have to find out the way first and not realise the vision. Many things are already available for stakeholders, but machine-human communication still have some unanswered questions.

Tamás Frisch

AI Solutions Manager,
Stratis Consulting Ltd.

▶ Presentation of Tamás Frisch

How to integrate AI in our existing processes and applications? How will we know if it is performing well?

Regarding artificial intelligence, it is an often discussed issue whether AI is a threat to jobs. Where and how should we start assessing our current situation and how to define the position of AI in it? If we can solve this question and communicate clearly **the real role of AI within the organisation**, then our staff and the whole community will see a hard-working, somewhat laconic but reliable partner and tool in it.

It is critical, because without the support of people the introduction of any new technologies is difficult. The aim is that each member of the human community, colleagues and leaders have the right attitude in this, and **see AI as a key to the future and not as a threat**. In order to do so, we have to make sure that we do not lose control and supervision.

Mr. Péter Boros gave an overview of the types of tools and knowledge that can help us in this process, and highlighted the importance of cooperation in order **to create the Hungarian model for natural language understanding** (NLU).

Péter Boros

CEO, Senior Systems Engineer,
it4all Hungary Ltd

Machine Intelligence Designer – MInD: MI-platform az adatmenedzsmenttől az üzemeltetésig

Mr. Attila Agod started his presentation by pointing out to the similarities of deep learning and the early phase of internet development then, following this train of thought, estimated the future development of the business applications of artificial intelligence, and made suggestions for business and technology leaders on AI application. He gave a concrete example to illustrate how their customers use the Machine Intelligence Designer (MInD) platform in their production from data management to operation.

The aim of the Machine Intelligence company is to **show stakeholders in the Hungarian industry, food industry and processing industry how they can use artificial intelligence in their production.**

For digitally less advanced companies they typically develop unique solutions but in the case of digitally mature companies they teach their engineers how to develop AI solutions for themselves using the MInD platform. The Machine Intelligence Designer (MInD) platform has been developed by Hungarian engineers and allows for the creation and operation of such artificial brains that make decisions or predictions for the future based on camera image and sensor data.

Attila Agod

CEO,
Machine Intelligence Zrt.

▶ Presentation of Attila Agod

Invoice processing with AI. Automatic recognition of invoice data and preparation for accounting

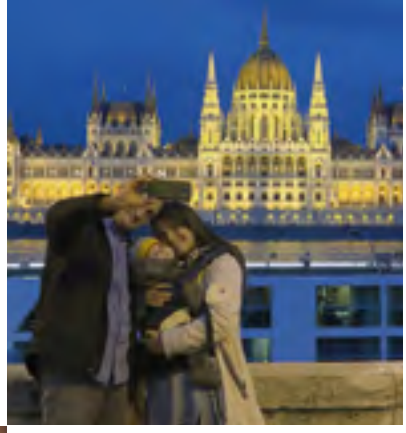
In his presentation, Mr. Gábor Vadász drew attention to the primary aim of new technologies: to help people in their work, and not to replace them. He gave the example of accounting, where the real work is preceded by numerous preparation and checking tasks. He stressed that **“artificial intelligence is not to replace humans but to support them while also creating value”**.

As he said, even paper-based invoices can be processed easily by taking advantage of AI. There are algorithms that recognise the data necessary for invoicing, e.g. VAT number or sums. They check if these data are correct and then the invoices can be exported instead of having to enter each line manually in the accounting system. **The model building was started with 2-3000 invoices for Hungarian invoices**, of which there are a lot of types.

Presently they have a three-tier architecture and external colleagues are also involved in the annotation. As opposed to earlier templates, the **advantage of AI is that it finds the values in the invoice and makes them easy to process**.

Gábor Vadász
CEO
Kerubiel Ltd.

digital
future



digital
state

digital
citizen

digital
business

digital
industry

digital
health

digital
safety

digital
education

digital
systems

digital
economy

https://digitalisjoletprogram.hu/en

digital success
programme

Ferenc Kása:
Towards better paid jobs through artificial intelligence knowledge

We do not have to be a geek to understand how artificial intelligence (AI) can assist everyday life and corporate efficiency. The AI Challenge launched on 1 December offers a freely available online course to take the first step on the way to making the most of the advantages of the digital age. No wonder that the World Economic Forum launched a **Reskilling Revolution** on its annual meeting in Davos.

> ***The international organisation aims to prepare one billion people with broad-based education and training programmes for the accelerating technological change by 2030***

hso that they can fulfil the new roles created by the Fourth Industrial Revolution.

Hungary has also defined the targets and instruments to achieve this in a 10-year period in its Artificial Intelligence (AI) Strategy. As we can see that technological innovations are often met with resistance, it is important to remove this resistance first and replace it with awareness.

> ***One million well-paid jobs may be created***

If we can deliver the planned reskilling and upskilling in certain professions to meet the needs of the digital age and introduce possible and useful smart solutions, then

> ***up to one million people may be able to find a higher value-added job by 2030.***

That is why the Ministry for Innovation and Technology and the AI Coalition working within the Digital Success Programme announced their **Challenge Social Awareness Campaign** to provide the possibility for one million people to obtain a general picture of artificial intelligence, and for at least one hundred thousand people to acquire a general understanding of AI through an online course.

The AI Challenge is an outstanding opportunity for lay people and business stakeholders to gain an overall understanding of AI, on the basis of which they can determine the opportunities ahead of them, and identify the risks. Personalised learning paths with attractive content

There is no need to be afraid: the online basic course launched on 1 December does not contain Mathematics, the programme is for everyone. Instead of formulas, those completing the challenge are provided with interactive content: videos and further clickable articles enable them to deepen engagement in an easy-to-digest format.

In addition to basic concepts and ethical implications, the focus here is on presenting use cases to raise awareness of how AI can make our lives and business processes easier.

As the programme offers a complete learning path, after completing the basic course participants can select from the subsequent modules launched in the first half of 2021 according to their choice. Taking advantage of personalised learning, they can choose a learning path that best meets their needs and preferences.

These thematic parts to be introduced later will contain plenty of examples, including Hungarian ones, there will be content specifically tailored to SMEs, and the experts of the Faculty of Informatics of Eötvös Loránd University, the creators of the course content, will not forget about developers either.

If we do it well, we may enter a golden age

The message of the AI Challenge is simple: learn about AI and use it, start working with it, thus improving your efficiency.

The founders of the challenge would like to inspire people to be courageous, step forward and start experimenting, which will sooner or later bring measurable economic benefits.

This is where awareness comes in, as primarily those have reservations about AI, who are not fully aware of the possibilities.

As György Buzsáki, professor of the NYU School of Medicine pointed out some days ago at the **Future Talks virtual panel discussion** held with top-notch experts of the topic: the gap is increasingly widening between the metropolises that understand and use AI and the lagging peripheral regions.

The responsibility is great: we have to educate not only young people but everyone to reverse the trend. Another participant of the discussion, Stuart J. Russel was however very positive about the future: if we do it well, artificial intelligence may be the most positive thing in human history and we can enter a golden age.

The AI Challenge's free online basic course in artificial intelligence is available at **www.ai-hungary.com**.

Tícia Gara

Chess player,
Woman Grandmaster

AI Mission:

> ***I can see it in my own career how technology advancement changes everyday life and makes it easier. I think it is important that a wide range of Hungarian society know about the latest technological advancements. I would like to help people overcome irrational fears of artificial intelligence and show them how it can help us in our daily lives.***

She obtained a degree at the King Sigismund College in International Relations in 2009. She is a three-time Hungarian Youth Girls Champion, World Youth Girls Bronze Winner, European Youth Girls Silver and Bronze Winner, three-time Hungarian Women's Champion, five-time Chess Olympian.

György Lévay

Research Manager, Infinite Biomedical Technologies
Biomedical Engineer, MSc, Johns Hopkins University

Lévay György graduated from Pázmány Péter Catholic University in Informatics. During his studies he suffered a devastating meningitis infection, which led to amputations on all four of his limbs. After his recovery he continued his studies and shifted his field of interest to the control systems of upper-limb prostheses. He then applied for a Fulbright scholarship and completed his master's in Biomedical Engineering at the Johns Hopkins University in the United States focusing on human-machine communication to control upper limb prostheses.

AI Mission:

"I continuously use artificial intelligence algorithms both in my work and in my daily life. This helps me to decide when to use them, and when not, whether it is an online activity, or more and more often an offline one. Algorithms learn on the basis of what we do to them, and if we would like them to continue to serve public benefits in the future, we have to push their development and training in the right direction now. And in order to do so, we have to understand how they learn and how they make decisions.

I would like everyone to see that algorithms do not work by magic and the knowledge necessary for their understanding is available and acquirable for anyone."

AI timeline

9 October 2018

Establishment of the **Artificial Intelligence (AI) Coalition**, *Balatonfüred*

29 November 2018

1st Plenary Meeting: the members decided on the creation of the six work groups and elected the eight board members of the Coalition, *Budapest*

12 February 2019

1st Professional Day: identification of the project topics and the presentation of the AI Map, *Budapest*

9 May 2019

MI ÉlményTÁR, MI ÉlményTÉR – Interactive Artificial Intelligence Exhibition, *Budapest*

21 June 2019

2nd Plenary Meeting: presentation of the AI Action Plan, which serves as a basis for the national AI Strategy, *Budapest*

29 August 2019

Technology Workshop: PwC presented its institution development plans regarding the AI Centre of Excellence created jointly with the AI Coalition; and the results of the survey on the present situation of the Hungarian AI ecosystem conducted by IVSZ were also released.

30 September 2019

2nd Professional Day: presentation of the items of the AI Action Plan, *Budapest*

15 October 2019

Infotér Conference 2019: Prof. Dr. László Palkovics minister released the AI Coalition's Action Plan, *Balatonfüred*

27 November 2019

AI Studio – podcast: The AI Coalition launched its own podcast called AI Studio, where top-notch experts analyze trends, phenomena and current hot topics of AI.

28 November 2019

3rd Plenary Meeting: presentation of the main pillars of the AI Coalition's Action Plan and AI Strategy, *Budapest*

20 December 2019

The first integrated version of the AI Strategy has been drafted.

2018–2021

8 May and 9 June 2020

EU Whitepaper: Merged workgroup meetings to comment on the EU's Whitepaper on Artificial Intelligence

8 September 2020

Announcement of the AI Strategy: Hungary's Artificial Intelligence Strategy was formally released by Prof. Dr. László Palkovics, minister and Roland Jakab, president of the AI Coalition, *Debrecen*

1 December 2020

Launch of the AI Challenge: the aim of the Challenge is to allow for one million Hungarian citizens to get an overall picture of AI benefits and for one hundred citizens among them to gain a basic understanding of artificial intelligence through e-learning training materials.

January 2021

The number of member associations of the AI Coalition exceeded 300.

February 2021

AI Challenge Derby: the aim is that the employees of the AI Coalition's member associations complete the AI Challenge e-learning basic course in the highest possible number.

22–26 March 2021

6th Digital Theme Week: with artificial intelligence in the focus.

15–16 June 2021

Artificial Intelligence Conference and Interactive Exhibition: with the introduction of Tícia Gara and György Lévay, the Ambassadors of the AI Challenge, *Budapest*.

2021 Autumn

AI EXPO BUDAPEST 2021

announcement of strategy

educational cooperation

Ministry of Interior

Customer Service KIOSK

Thanks to the stand-alone, AI-powered intelligent kiosks, customers can complete administration without human intervention following biometric face identification.

Four hundred self-service kiosks will be installed soon in Hungary, where 12 types of government services can be delivered for citizens using these devices including automated document issuance.

Video identification, full-range of customer service

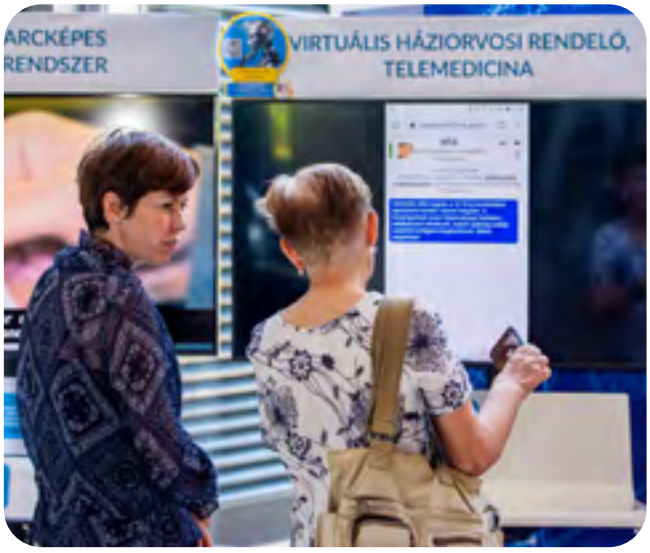
A process management platform has been established recently where – uniquely in Europe – government services can be delivered through a video channel between the administrator and the identified citizen. This will allow for whole groups of government services traditionally delivered in person to be completed through a video communication channel.

In addition, from 1 February 2021, a biometric facial recognition service is available on the Central Identification Agent, which is already used by a large number of citizens.

Virtual Family Doctor Services

The Virtual Family Doctor Services allow for virtual doctor visits where family doctors see and treat patients via videoconferencing.

The system can verify the personal identity of the patient and enables family doctors to use all the information available in the National eHealth Infrastructure (EESZT) as well as medical diagnostic tools that can be integrated with the system (blood glucose meter, oximeter, blood pressure monitor, ECG, etc.) to perform virtual doctor visits.



1818 Governmental Hotline – AI Applications – ChatRobot

There are several types of AI-powered chat applications in the market differentiated by their technical complexity, from which the 1818 Governmental Hotline started to use an AI-Human Collaboration (hybrid) chatbot as a pilot. It means practically that customer queries are answered with the combination of human and artificial intelligence.

The human chat ensures appropriate level of responds while some – frequently asked – topics can be automated. Where the AI chatbot cannot give a full, appropriate answer to the query, the human agent can take over the chat. With the AI support and following an expert validation, the application gradually learns the answers to these queries as well, and can later handle them without human intervention.

BME

The Faculty of Electrical Engineering and Informatics (VIK) of Budapest University of Technology and Economics (BME) is a leading innovator in Hungary: the institution is one of the most important bases of electrical engineering and informatics research, where the best-performing global ICT companies have set up their laboratories. They use artificial intelligence in multiple solutions for example in optimizing the operation of logistics centres or monitoring manufacturing processes.

Their innovative solutions include an electronic nose that uses the most advanced machine learning algorithms to mimic the human smell sensing mechanism, and a remote controlled model car that can be controlled and supervised immersively using 5G networks.

Continental AI Development Centre

Continental Artificial Intelligent Development Centre unit is working towards Vision Zero, a goal to eliminate accidents in the future. Our AI Development Centre in Budapest is part of its international network, where highly committed experts work to make safety technologies available for people in mobility at the earliest possible time. By applying the Sense-Plan-Act process we develop solutions that can help to avoid unwanted situations on the roads.

The most important goal of the Artificial Intelligence Development Centre is to develop engineering solutions that can pave the way for “trustworthy artificial intelligence”.

Robert Bosch Kft.

BOSCH
Invented for life

Robert Bosch Kft., founded in 1991, is a commercial operation involved in sales and customer service for vehicle parts, vehicle diagnostic equipment, power tools, thermotechnology equipment and security systems.

The company has been involved in development since 2000, and following an expansion to the portfolio of the automatic transmission software development division, the Engineering Center Budapest (ECB) was founded in 2005 and now has more than 2700 employees, making Hungary Bosch's largest R&D location in Europe after Germany in terms of automotive engineers.

The Engineering Center Budapest has a constantly-rising profile in Bosch's world-scale developments and plays an important role in the development of automated and electrified mobility. It is also one of the foremost research, development and test facilities for automotive electronics in the Bosch Group.

A wide range of electronic vehicle control systems and mechanical components are under development in the ECB. These include ABS, ESP, air bags, engine management and automated parking systems, electric drive systems and electric motors. Among its areas of development are dashboards and driver assistance systems, which are paving the way towards automated cars.

All phases of the work are conducted in the ECB, including system and algorithm development, electrical and mechanical design, simulation, and reliability checks and tests.

Ericsson Hungary

Ericsson Hungary is one of the largest telecommunications and IT research and software development companies in the country. The chain of education–basic research–applied research– industrial implementation is exemplary in the activities of Ericsson in Hungary. The patents of Hungarian engineers are determinant in the world's current systems enabling mobile and fixed broadband internet communication.

Ericsson Hungary is committed to the development of domestic education. It has contributed to strengthening international relations in science, enabling the international integration of Hungarian research and higher education, and is a supporter of secondary and higher education in Hungary. It has formed multilateral cooperation with different higher education institutions in up-to-date and scientifically relevant topics. The training topics of Ericson are integrated into the university curricula.

The results of the state-of-the-art research and development activity performed at Ericson Hungary's R&D department with its 1700 employees – 5G, IoT, Artificial Intelligence, Cloud, Edge Computing – are built into the Ericson group's products and systems worldwide.

Fintech

digital success programme

The Sectoral Digital Strategies Division of the Digital Success Programme (DJP) deals with the topics of fintech and blockchain. As a foundation of the field, the Digital Success Programme's Fintech Strategy was developed in 2019, which defined its professional objectives on the pillars of competence, regulation, business innovation and technology. The Digital Success Programme aims to improve and strengthen domestic finance digitalisation along these pillars. As part of their activity, they operate the Fintech Salon professional forum and presentation series, represent the main issues of the sector at various events, prepare regulatory concepts and operate the Digital Success Financial Trademark.

IBM

IBM

IBM has a multi-decade experience in artificial intelligence. Development has come a long way since its first spectacular result, when the Deep Blue dedicated chess computer defeated the reigning world champion Garry Kasparov in 1997.

IBM builds now AI-native products making deep learning and other AI capabilities available for companies in a simple way (Ask-HR robot, Cognitive Supply Chain Advisor 360, Cognitive Contract Application, Watson Cognitive Audit Tool).

it4all Hungary Ltd.

it4all Hungary Ltd. is a dynamically growing company focused on critical application development. We deliver solutions that serve as cornerstones to organizations 24 hours a day, 7 days a week. To achieve this goal, we have gained a strong team of IT professionals. Our key experts have more than two decades' worth of experience, which guarantees that quality and functionality shall not be compromised.

We have an ever-widening range of clients, mostly large multinational enterprises, which are generally sector leaders of their own industry. We have solid experience working with telecommunication, governmental and financial companies. But at the same time, we also offer solutions for the small and medium-sized enterprises to raise their level of digitalization. We have a strong focus on introducing new technologies – like the artificial intelligence – to everyday business and life.

ELRN Centre for Social Sciences, Hungarian Academy of Sciences Centre of Excellence

Társadalomtudományi Kutatóközpont tk

The Centre is a research institution where 200 Hungarian and international researchers engage in exploratory and innovative national and international research projects in diverse fields of the social sciences.

The Centre's research activities focus on sociology, political science, computational social science, network science, minority studies, and law. Researchers take an interdisciplinary approach in their scientific work.

The Centre's main goals are to extend the quality of Hungarian research to Europe and beyond, to take a prominent regional lead in social science research, and to serve as a point of scientific reference in Hungary. Researchers at the Centre have actively engaged in numerous international projects. Our AI-related research covers, inter alia, the following topics: natural language processing, topic modelling, social network analysis, the analysis of sensor data, and the social and legal impact of AI.

Kerubiel Consulting Ltd.

The company provides complex IT, information security and data protection solutions for domestic and international companies. In addition to IT and data protection law expertise, they also build on economic and business management knowledge to assess the whole operation of their partner companies and create their advice and suggestions based on it.

The company's IT activity include IT strategic planning, designing infrastructure solutions with various hardware and software tools, open IT audits, consultations and other IT-related services (creating incident response plans, drawing up IT rules, preparing and following-up IT applications). They also specialise in customised artificial intelligence, augmented reality and virtual reality solutions.

Machine Intelligence

Machine Intelligence was established in 2019 to solve machine vision and measurement problems in industry and services by applying deep learning technologies. Their main product is the MInD software platform, where engineers can develop and maintain fast and accurate deep learning solutions. With their own engineer capacity, they also develop personalised solutions on the platform for their customers, and offer consultation and annotation services.

MedInnoScan

MedInnoScan has been developing medical diagnostic artificial intelligence since 2017.

Their projects include diagnostics of chronic wounds, determining knee cartilage geometry and teledermatology.

Nokia

Nokia is an innovative global leader in developing telecommunications solutions and services.

The Nokia Bell Labs research and development unit is credited with developing a wide range of revolutionary technologies including the transistor, the laser or the UNIX operating system which, upgraded, are parts not only of the current information systems but new-generation 5G networks as well.

The research carried out at Bell Labs led to the creation of convolutional neural networks, a decisive model in artificial intelligence, applied for analyzing visual imagery and optical character recognition, which are basic capabilities of autonomous vehicles.

The use of artificial intelligence is becoming increasingly common in operating networks and their automation relying on developed self-learning methods, developing and customising services, or predicting, revealing and correcting networks failures and unexpected operational events. The Hungarian team of Nokia Bell Labs has also made numerous innovations using artificial intelligence, including algorithms capable of autonomously analysing networks data and revealing hidden failures, or car, driver, traffic and road network analytics using sensor data of connected vehicles.

PTE Inno-Capital Kft.

AI & Data Solutions

AI & Data Solutions is a UP located interdisciplinary developer group. It was established to accelerate the transfer of knowledge in Hungary by putting the latest machine learning and artificial intelligence technologies into practice.

In this context, the development of new applications and services is our main focus. We are working on the development of computationally demanding artificial intelligence models and we also provide the technical leadership of the University of Pécs Microsoft Artificial Intelligence Knowledge Centre.

We also maintain good relations with several international developer teams. We have trained a unique AI for the Hungarian language, which is the 10th such model in the world, and we are currently hosting the largest database of drug and pill photos for machine learning. Our market presence is through PTE Inno-Capital Kft. Microsoft Azure-based enterprise solutions guarantee quick development and scalable deployment for our Clients. Nevertheless, we also provide on-premises solutions if needed.

Roborobo

ROBOROBO

Our chatbot studio is a successful Hungarian AI and chatbot researcher and developer company. Uniquely in the market, we do not approach this technology only on a programming basis, but we also emphasize the user experience to enable the bot to operate with the highest possible efficiency and accuracy.

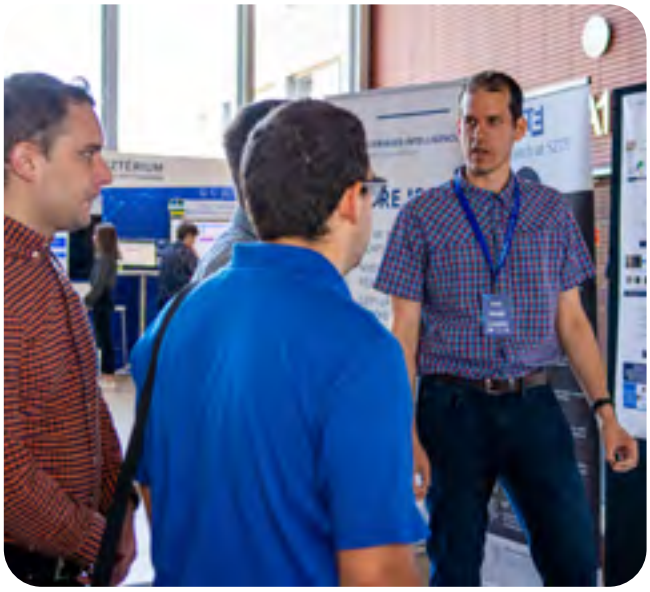
Since our start, we received 52.000.000+ messages from more than 1.000.000 Hungarian users.

SOTE

The Semmelweis Health Services Management Training Centre was established to prepare students for the management of the healthcare system and healthcare organisations. It is a leading institution in Europe, taking part in numerous research and development programmes focusing on the development of the healthcare system, health policy issues, healthcare data mining, or the digital transformation of healthcare.

The Digital Healthcare and Data Utilization Group created in response to the COVID-19 epidemic at the Semmelweis University works under the leadership of the Health Services Management Training Centre, investigating for example possible ways for infection control and how healthcare data science can help in their realisation using Big Data and Network Research methodologies.

A management information system has been set up to monitor the national population movements based on more than two billion data sets related to mobile cell information. Semmelweis University is the driver of artificial intelligence in the Hungarian public healthcare. Data science technology development is one of the most important innovative fields in the digital transformation of healthcare, and intensive work is underway to provide artificial intelligence support for medical diagnostics.



Stratis Consulting Ltd.

Stratis is a market leader among domestic, locally owned management and IT consulting companies.

We focus on maximizing corporate business results by utilizing IT solutions and leveraging data assets. For our service range from strategic consulting through building data platforms up to developing artificial intelligence-based solutions, we lean on our expert staff of more than 100 specialists and more than 20 years of expertise.

In addition to a wide range of services, Stratis is investing significantly in research and development. As a result, our product portfolio

includes the A.N.I.T.A text processing system leveraging artificial intelligence based natural language processing as well as Industry 4.0 solutions such as the quality control equipment utilizing machine vision.

We at Stratis are proud that our customers not only choose us because they know that we can successfully fulfil their ideas even under the most complex circumstances but because they know that we will go the extra mile. The pledge is our cohesive, supporting team and our shared values which make our company powerful

Institute of Computer Science and Control (SZTAKI)

The Institute of Computer Science and Control (SZTAKI) is the largest and most successful IT research institute in the country. SZTAKI is a national research base for data science, information technology, computer science and related fields.

It focuses primarily on the technical, scientific and mathematical aspects of computer science, but also covers research in all areas related to the fundamental issues. In addition to a wide range of basic and applied research, it is important to exploit the specific knowledge acquired in the fields of research and development, systems design and integration, consultancy and software development.

In the new research funding system launched in 2020, SZTAKI is the lead institution for the

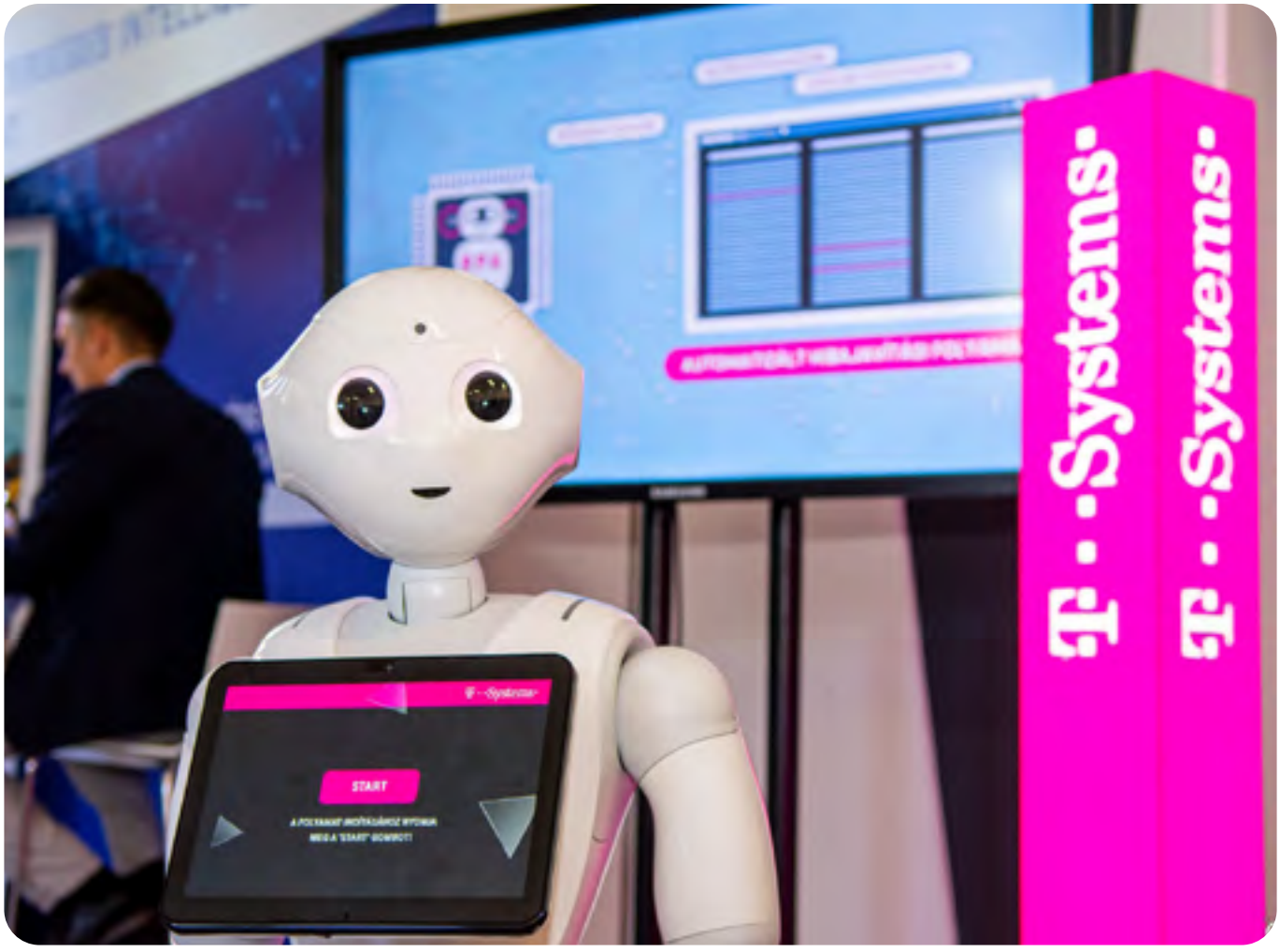
National Laboratories for Artificial Intelligence and Autonomous Systems. The mission of the National Laboratory for Artificial Intelligence (MILAB) is to strengthen Hungary's role in the field of AI.

T-Systems Hungary Ltd.

T-Systems Magyarország Zrt. is Hungary's market leading ICT company, member of the Magyar Telekom Group.

As the only business in the market, T-Systems provides telecommunications services, IT and system integration from a single source, which means reliability, speed, simplicity, cost-effectiveness and plannability for its customers, making not only implementation but also operation and maintenance smoother and more predictable.

In addition to its comprehensive ICT competencies, T-Systems has in-depth, sector-specific knowledge and experience also beyond its own sector. As a strategic and transformation partner, T-Systems Magyarország Zrt. strives, in cooperation with its customers, to find future-proof solutions that respond to the challenges of a constantly changing world, thus contributing to the long-term competitiveness of its customers.



Learn more about Artificial Intelligence!

Accept the AI Challenge!

www.mikihivas.hu

Ministry for Innovation and Technology

digital success programme

artificial intelligence coalition

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www.ai-hungary.com
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ITM INNOVATION AT WORK

:D digital success programme