



Croatian AI Association

p r e s e n t s

The Croatian AI Landscape

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1. About the Author

CroAI was founded in December 2019 as an association of AI entrepreneurs and grew to become a major platform for cultivating a culture of dialogue between business, politics, academia and the general public. CroAI consists of more than 120 members, which include companies & startups, universities, research institutions, early adopters, and AI enthusiasts.

Find out more about CroAI by following the link: www.croai.org

CroAI key activities in 2020:

- 13 April 2020 Donated [Andrija](#), a digital assistant for the fight against COVID-19, to the Croatian Ministry of Health
- 5 June 2020 Submitted the [Opinion](#) on the EU's White Paper on AI
- 10 June 2020 [Panel discussion](#) on defining Europe's regulatory framework on AI
- 30 June 2020 Co-founded and organised the first [European AI Forum](#)

→ Held over a dozen expert panels on topics ranging from **human relations in the age of AI**, to the deployment of **AI in industries** such as telco, banking and healthcare, and the potential for **cooperation between business & academia**.



2. Executive Summary

Overview

The Global Race for AI

Artificial Intelligence (AI), loosely defined as a set of behaviours and outcomes we usually associate with human-like intelligence, has a long history consisting of multiple peaks and lows of public interest. After several 'AI winters', or periods of reduced funding and interest in artificial intelligence research, a new 'AI summer' came during the 2010s with the rise of Deep Learning, the 'smarter cousin' of Machine Learning. We're also witnessing the global race for AI headed by the USA and China and followed by the privacy-centered EU that is building its approach around the principles of excellence and trustworthiness. As for the real-world applications of AI, they are omnipresent, and the COVID-19 global pandemic showed us the tangible impact that AI could have in sectors like healthcare, outbreak tracking, drug development, and high-accuracy diagnosis, to name a few.

AI in Croatia

Traditionally known as an attractive market for tourism, agriculture, and industry production, Croatia's economic growth and development in the past years were largely driven by Croatian tech companies that emerged from a new generation of entrepreneurs. The rise of AI startups in Croatia comes as a result of continuous efforts by the research institutions and universities that have been shaping Croatia's AI talent and founding AI labs for the purpose of research and education in the past decades. Croatia has a strong and healthy export-oriented tech community that is open towards the integration of AI within existing business models. The founding of numerous specialized AI startups across industries in recent years has prompted the need for publishing a clear overview of the Croatian AI ecosystem.

Strategic Framework for AI in Croatia and the EU

CroAI has compiled a non-exhaustive list of relevant documents which may be used as reference points for forming upcoming regulatory frameworks specifically for AI, in Croatia and the EU.

a. Highlighted

NATIONAL LEVEL

- **Ministry of Regional Development and EU Funds**
 - [National Development Strategy of the Republic of Croatia by 2030](#)
 - TBA (was due to go into Parliament discussion in March 2020)
- **Ministry of Economy and Sustainable Development**
 - [National Strategy for the Development of Artificial Intelligence](#)
 - TBA (was due at May 2020, rescheduled for 2021)
 - [Smart Specialization Strategy of the Republic of Croatia for 2016-2020](#) (May 2016)
- **HUP ICT**
 - [The Potential of Artificial Intelligence for Croatia](#) (July 2019)

EU LEVEL

- **European Commission**
 - [Coordinated Plan on the development of Artificial Intelligence in Europe](#) (December 2018)
 - [White Paper on Artificial Intelligence: a European approach to excellence and trust](#) (February 2020)
 - CroAI published an [Opinion on the European Commission's White Paper on Artificial Intelligence](#) (June 2020)

b. Chronological

PUBLISHED SO FAR

Croatia and the EU

- [Declaration of Cooperation on AI](#) (launched in April 2018, Croatia signed it in July 2018)

European Commission

- [Report on the safety and liability implications of Artificial Intelligence, the Internet of Things and robotics](#) (February 2020)
- [Artificial Intelligence for Europe](#) (April 2018)
- [Liability for emerging digital technologies](#) (April 2018)
- [Coordinated Plan on Artificial Intelligence](#) (December 2018)
- [Building Trust in Human-Centric Artificial Intelligence](#) (April 2019)
- [Ethics Guidelines for Trustworthy AI](#) (April 2019)
- [Policy and investment recommendations for trustworthy Artificial Intelligence](#) (June 2019)
- [Liability for artificial intelligence and other emerging digital technologies](#) (November 2019)
- [A European strategy for data](#) (February 2020)
- [Summary report of the public consultation on the European strategy for data](#) (July 2020)
- [A New Industrial Strategy for Europe](#) (March 2020)
- [Proposal for a Council Regulation on establishing the European High Performance Computing Joint Undertaking](#) (September 2020)

Council of the EU

- [Presidency conclusions on the charter of fundamental rights in the context of artificial intelligence and digital change](#) (October 2020)

European Parliament

- [European Parliament resolution of 20 October 2020 on intellectual property rights for the development of artificial intelligence technologies](#) (October 2020)
- [European Parliament resolution of 20 October 2020 with recommendations to the Commission on a civil liability regime for artificial intelligence](#) (October 2020)
- [European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies](#) (October 2020)

UPCOMING

European Commission

- [Commission Work Programme 2021 - New Policy Objectives](#) (October 2020)
 - Europe's Digital Decade: 2030 Digital Targets (non-legislative, Q1 2021)
 - Data Act (legislative, incl. impact assessment, Q3 2021)
 - Review of the Database Directive (legislative, incl. impact assessment, Q3 2021)
 - Updating the new industrial strategy for Europe (non-legislative, Q2 2021)

AI Landscape — the industry standard for visualising the AI market

For the first time in Croatia's history, we have the ability to get a clear overview of the entire Croatian AI Landscape including all relevant stakeholders, AI companies, startups, academia, and research institutions, associations, and the public sector. This landscape is the key foundation element for further AI development in Croatia.

The three main categories are:

- Companies & Startups,
- Early Adopters,
- Enablers & Extended Ecosystem.

Methodology & Release Information

Methodology

Identifying organizations on the landscape:

- Researching data available through the service *Digitalna Komora (Digital Chamber)* of the Croatian Chamber of Economy
- Researching startup incubators and accelerators in Croatia
- Open application calls for companies and organizations active in the AI ecosystem through offline and online media
- Analysis of submitted application forms and existing CroAI members

<u>Criteria for selection:</u>	<u>Clustering logic:</u>
<ul style="list-style-type: none">• Companies & Startups: AI as part of their central offering• Early Adopters: experimenting with AI on various side projects• Enablers & Extended Ecosystem: supporting local and national AI efforts• Headquarter or the legal entity in Croatia	<p>Primary: industry</p> <p>Secondary: AI tool / technology in focus</p>

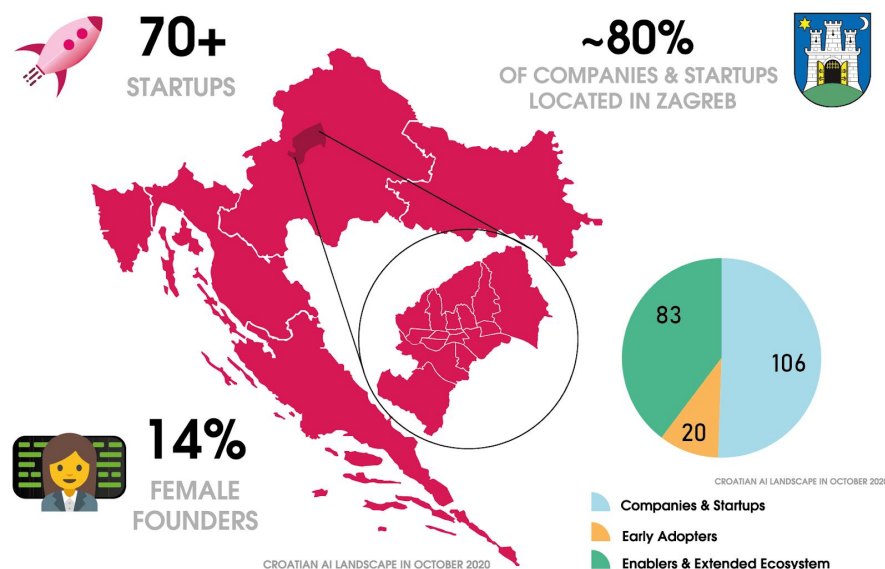
Release Information

- ❖ Created by CroAI in 10/2020.
- ❖ Update **v1.2** published in 10/2020. Cut-off date for **v1.2** was 6.11.2020.
- ❖ The next major update, **v2.0**, is expected in Q4 2021.
- ❖ The main source for updates to the Croatian AI Landscape will be the **feedback** we receive from the wider community. We encourage all interested organizations that want to be included in the upcoming Croatian AI Landscape to fill out the following survey: <https://forms.gle/j8kfCtMPXD68VsSR9>.
- ❖ The latest **up-to-date version** of the Croatian AI Landscape can always be found on the CroAI website: www.croai.org/landscape.

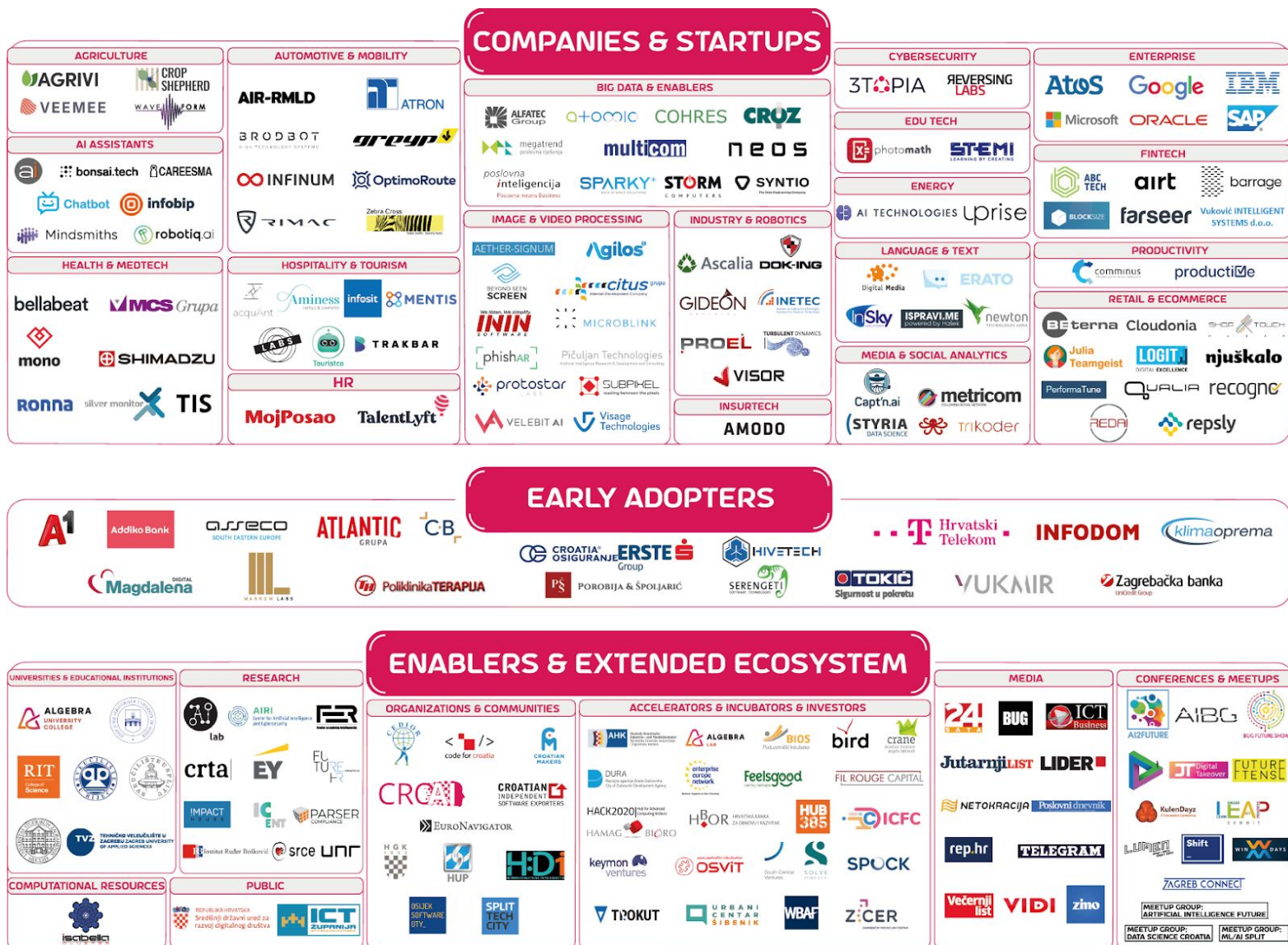
Key Statistics

- 209 organizations in total are listed on the Croatian AI Landscape v1.2
- 70+ AI startups
- 80% of all companies and startups are headquartered in Zagreb
- 14% of all companies and startups have one or more female co-founders

Croatian AI Ecosystem - Facts & Figures



3. Croatian AI Landscape v1.2



CROATIAN AI LANDSCAPE IN OCTOBER 2020

* Full size available on www.croai.org/landscape



4. Rundown by Category

Companies & Startups

The current categories include:

- Agriculture,
- AI Assistants,
- Automotive & Mobility,
- Big Data & Enablers,
- Cybersecurity,
- EduTech,
- Energy,
- Enterprise,
- FinTech,
- Health & MedTech,
- Hospitality & Tourism,
- HR,
- Image & Video Processing,
- Industry & Robotics,
- InsurTech,
- Language & Text,
- Media & Social Analytics,
- Productivity,
- Retail & eCommerce.



Agriculture

AI applications in the agricultural sector focus on crop monitoring. Technologies like these can support farmers to increase margins and limit operational risk. Agriculture in Croatia has always been an important sector and the recent innovations have landed on fruitful ground, helping the startups to gain global traction.

- [Agrivi](#)
- [Crop Shepherd](#)
- [VeeMee](#)
- [Waveform](#)

AI Assistants


AI startups and companies specializing in scaling relationships are predominantly present across different sectors and industries, with the exception of a few that have put a special emphasis on healthcare and tourism. This sector is growing rapidly, with some companies even reaching a dominant global position.

- [Alter Info](#)
- [BonsAI](#)
- [Careesma](#)
- [Chatbot.com.hr](#)
- [Infobip](#)
- [Mindsmiths](#)
- [Robotiq.ai](#)

Automotive & Mobility

Industry that emerged mostly on the global success of startup phenomenon Mate Rimac who managed to build the world's fastest electric supercar and inspired many startups to introduce to the world their solutions in the automotive and mobility sector.

- [AIR-RMLD](#)
- [ATRON](#)

- 
- [Brodbot](#)
 - [Greyp](#)
 - [Infinum](#)
 - [OptimoRoute](#)
 - [Rimac Automobili](#)
 - [Zebra Cross](#)

Big Data & Enablers

Companies like Poslovna Inteligencija, Megatrend, and Neos have been leading the first domestic wave of AI startups in Croatia. Croatian Big Data and AI enabler companies successfully service clients from around the world, while at the same time supporting Croatian AI initiatives.

- [ALFATEC Group](#)
- [Atomic Intelligence](#)
- [Cohres](#)
- [CROZ](#)
- [Megatrend poslovna rješenja](#)
- [Multicom](#)
- [Neos](#)
- [Poslovna inteligencija](#)
- [Sparky](#)
- [STORM Computers](#)
- [Syntio](#)

Cybersecurity

Although not numerous, Croatian cybersecurity companies within the AI ecosystem have proved their worth on the local and international market. Further growth is stifled by a lack of talent, though the academic community has recently made considerable efforts to nurture new generations of experts, mainly by introducing specialized cybersecurity university programs.

- 
- [3topia](#)
 - [ReversingLabs](#)

EduTech

Photomath's free mobile app utilizes AI and image recognition to read and solve mathematical expressions using your smartphone camera in real time. Photomath is the #1 math learning app in the world that provides a step-by-step guide showing how each of the problems are solved. Although a young category, EduTech is sure to grow in the coming years.

- [Photomath](#)
- [STEMI](#)

Energy

AI offers numerous applications along the energy value chain, and the startups in this category aim to help create a more sustainable world.

- [AI Technologies](#)
- [Uprise](#)

Enterprise

Croatia is home to several regional headquarters of international tech companies. These companies are very active in both promoting AI and its capabilities to corporates, as well as supporting the ecosystem with free training and events.

- [Atos](#)
- [Google](#)
- [IBM](#)
- [Microsoft](#)
- [Oracle](#)
- [SAP](#)



FinTech

Financial institutions have been widely disrupted by new technologies, and AI is one of them. Fintech startups from Croatia aim to help financial institutions increase security, reduce processing times, improve levels of automation, and provide a more personalized service to their clients.

- [ABC TECH Group](#)
- [airt](#)
- [Barrage](#)
- [Blocksize](#)
- [Farseer](#)
- [Vuković Intelligent Systems](#)


Health & MedTech

A category that emerged with one of the first Croatian startups Bellabeat, the health and medtech category now accommodates valuable AI and robotic applications developed with the help of universities and medical institutions.

- [Bellabeat](#)
- [MCS Grupa](#)
- [Mono](#)
- [Ronna](#)
- [Shimadzu](#)
- [Silver monitor](#)
- [TIS Group](#)

Hospitality & Tourism

With a 20% share of Croatia's GDP, tourism is one of the most important contributors to the Croatian economy. Startups in this sector often focus on process optimization, dynamic pricing, and improving the tourist experience.

- 
- [Acquaint](#)
 - [Aminess Hotels & Campsites](#)
 - [Infosit](#)
 - [Mentis.ai](#)
 - [Orion Labs](#)
 - [Trakbar](#)

HR


The automated screening of resumes and subsequent matching with job profiles is among the most frequent AI applications in the Croatian HR and job market companies.

- [MojPosao](#)
- [TalentLyft](#)

Image & Video Processing

Companies in this field have identified global needs and turned them into new business models. Microblink is changing the way we interact with secure data by using its patented technology to provide image recognition services for scanning of identity cards, payment slips, invoices, receipts, and much more. A growing number of startups is in this category, a more detailed analysis in the next version of the AI landscape.

- [Aether-signum](#)
- [Agilos IT](#)
- [Beyond Seen Screen](#)
- [CITUS](#)
- [ININ Informatički Inženjering](#)
- [Microblink](#)
- [PhishAR](#)
- [Pičuljan Technologies](#)
- [Protostar Labs](#)
- [Subpixel](#)
- [Velebit AI](#)
- [Visage Technologies](#)



Industry & Robotics

The Industry and Robotics category represents a selection of startups that employ various AI applications, from robotics, to RPA and Internet of Things within traditional manufacturing and distribution industries. Croatia's industry and robotics startups are allowing traditional industries to enter the age of industry 4.0.

- [Ascalia](#)
- [DOK-ING](#)
- [Gideon Brothers](#)
- [INETEC](#)
- [Proton EL](#)
- [Turbulent Dynamics](#)
- [Visor](#)

InsurTech

While small in number, InsurTech companies from Croatia are just beginning to emerge. Amodo uses AI to match insurance products with user needs. Announcements of more startups in this category let us believe that this category will grow significantly in the coming months.

- [Amodo](#)

Language & Text

With ispravi.me we have received a Croatian language spelling and grammar checker and the emergence of Croatian language & text applications fuels the growth of the Croatian-speaking user engagement.

- [Digital Media](#)
- [Erato](#)
- [InSky](#)
- [Ispravi.me](#)
- [NEWTON Technologies Adria](#)



Media & Social Analytics

Social media monitoring or auto-summarization of documents and text is carried out by companies specialized in media analytics. Some focus on optimizing marketing campaigns, while others allow for better screening of media coverage.

- [Capt'n.ai](#)
- [Metricom](#) (tool by Briefing Media)
- [Styria.ai](#)
- [Trikoder](#)

Productivity

There are a smaller number of tech pioneers developing new solutions for tackling productivity, but their applications are internationally competitive.

- [Comminus](#)
- [Productive](#)

Retail & eCommerce

Few areas are as suited for AI-based analytics as retail, pricing, and payments. AI startups in this category service different needs, from utilizing digital assistants to selling experiences to offices, unlocking sales potential with predictive CRM systems, to highly optimized recommendation engines that make the online shopping experience a blast.

- [BE-terna](#)
- [Cloudonia](#)
- [Husar](#)
- Julia Teamgeist
- [LOGIT](#)
- [Njuskalo.hr](#)
- [Performatune](#)
- [Qualia](#)
- [Recogno](#)
- [RedAI](#) (tool by Besplay Adria)

- [Repsly](#)

Early Adopters

Early adopters are companies that are at the forefront of AI adoption, experimenting with AI and launching fresh initiatives while seeing positive returns on their investments, as well as establishing themselves as trailblazers and learning hubs for AI adoption in Croatia. These companies are using AI to improve their business processes, with increased emphasis on AI's ability to support internal and external operations. They are also using AI to enhance current products and improve decision-making.

- [A1](#)
- [Addiko Bank](#)
- [Asseco](#)
- [Atlantic Grupa](#)
- [Čipčić-Bragadin, Mesić & Associates](#)
- [Croatia osiguranje](#)
- [Erste Bank](#)
- [HiveTech](#)
- [Hrvatski Telekom](#)
- [InfoDom](#)
- [Klimaoprema](#)
- [Klinika Magdalena](#)
- [Marrow Labs](#)
- [Poliklinika Terapija](#)
- [Law firm Porobija & Špoljarić](#)
- [Serengeti](#)
- [Tokić](#)
- [Vukmir and Associates](#)
- [Zagrebačka banka](#)



Enablers & Extended Ecosystem

The Croatian AI ecosystem wouldn't be complete if it didn't account for the wider context of AI development in Croatia. Before the entrepreneurs stepped in, the AI scene in Croatia was sparked from initiatives at universities and research centers. In the past years, many other organizations have played a major role in establishing the market and enabling AI to thrive in Croatia.

The main eight categories are:

- Universities & Educational Institutions
- Research
- Organizations & Communities
- Accelerators & Incubators & Investors
- Media
- Conferences & Meetups
- Computational Resources
- Public

Universities & Educational Institutions

Croatia's universities and educational institutions were the first to start important conversations around AI and have since made efforts in compiling AI-related course curricula. They are keeping up with their European colleagues in terms of AI research and have shown a great ability in attracting EU funds to establish important resources, such as AI labs and high-performance computing infrastructures.

- [Algebra University College](#)
- [Josip Juraj Strossmayer University of Osijek](#)
- [RIT Croatia](#)
- [University of Rijeka](#)
- [University of Split](#)
- [University of Zagreb](#)
- [Zagreb University of Applied Sciences](#)



Research

Strong and forward-thinking research centers are the prerequisites for using AI on a more advanced level and are key to making Croatian AI less dependent on external expertise by accumulating nuanced in-house knowledge. The past few years have seen a proliferation of AI labs as spin-offs of traditional ICT research institutions.

- [AI Lab](#) @Faculty of Organization and Informatics, University of Zagreb
- [AIRI](#) (Centre for Artificial Intelligence and Cybersecurity) @University of Rijeka
- [CAI](#) (Center for Artificial Intelligence) @Faculty of Electrical Engineering and Computing, University of Zagreb
- [CRTA](#) (Regional Center of Excellence for Robotic Technologies) @Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb
- [Ernst & Young](#)
- FutureHR Consulting
- [ICENT](#) (Innovation Centre Nikola Tesla) @Faculty of Electrical Engineering and Computing, University of Zagreb
- [Impact House Consulting](#)
- [Parser compliance](#)
- [SRCE](#) (University Computing Centre) @University of Zagreb
- [UNR](#) (Office of Advanced Computing)

Organizations & Communities

Croatia has a vibrant AI community, which organizes events and meetups on a regular basis. Driven by the desire to educate young people and support the efforts of startups, communities across Croatia provide courses and workshops. CroAI, with the help of other partner organizations, has put the topic of AI on the political and economic agenda by actively participating in the forming of the legal framework for AI in Croatia and the EU.


- [CEDIOR](#) (Centar za društvene inovacije i održivi razvoj)
- [Code for Croatia](#)

- [Croatian Makers](#)
- [CISEx](#) (Croatian Independent Software Exporters)
- [CroAI](#) (Croatian AI Association)
- [EuroNavigator](#)
- [HGK ICT](#) (Croatian Chamber of Economy, ICT Department)
- [HUP ICT](#) (Croatian Employers' Association, ICT Department)
- [HDI](#) (Humana digitalna inteligencija)
- [Osijek Software City](#)
- [Split Tech City](#)

Accelerators & Incubators & Investors

Currently, domestic VCs don't run any specific AI funds; as a result, a gap was created, which is still to be filled. Plenty of startup incubators and the emergence of AI-specific incubators is a vital sign of a healthy and growing AI market.

- [AHK Kroatien](#) (Deutsch-Kroatische Industrie- und Handelskammer)
- [Algebra LAB](#) @Algebra University College
- [BIOS Incubator](#)
- [BIRD Incubator](#)
- [CRANE](#) (Croatian Business Angels Network)
- [DURA](#) (Dubrovnik Development Agency)
- [Enterprise Europe Network](#)
- [Feelsgood Capital Partners](#)
- [Fil Rouge Capital](#)
- [HACK](#) (Hub for Advanced Computing Križevci)
- [HAMAG-BICRO](#) (Hrvatska agencija za malo gospodarstvo, inovacije i investicije)
- [HBOR](#) (Croatian Bank for Reconstruction and Development)
- [HUB385](#)
- [ICFC](#) (International Crowdfunding Center)
- [Keymon Ventures](#)

- 
- [Osvit Incubator](#)
 - [Solve Studio](#)
 - [South Central Ventures](#)
 - [SPOCK Incubator](#)
 - [Trokut Incubator](#)
 - [Urbani centar Šibenik](#)
 - [WBAF Croatia](#) (World Business Angels Investment Forum Croatia)
 - [ZICER](#) (Zagreb Innovation Centre)

Media

For decades, Croatia had publications covering technology trends, and in recent years we saw the uptake of online media dedicated to technology covering the topic of AI heavily. The business publications cover the topic of AI business and, in recent months, we are witnessing the mainstream media picking up on the topic in an objective and professional manner.

- [24sata](#)
- [BUG](#)
- [ICTBusiness](#)
- [Jutarnji](#)
- [LIDER](#)
- [Netokracija](#)
- [Poslovni dnevnik](#)
- [Rep.hr](#)
- [Telegram](#)
- [Večernji](#)
- [Vidi.hr](#)
- [Zimo](#)

Conferences & Meetups

Due to its natural beauty and attractiveness for foreign visitors, Croatia has managed to build up a sizable portfolio of tech conferences with outreach to international communities. In recent years we've seen the emergence of AI-dedicated conferences that push relevant topics and help create a culture of dialogue in society.

- [AI2Future](#)
- [AIBG](#) (Artificial Intelligence BattleGround) by BEST (Board of European Students of Technology)
- [Bug Future Show](#)
- [Carnet Users Conference](#)
- [Digital Takeover](#)
- [Future Tense](#)
- [KulenDayz](#)
- [LEAP Summit](#)
- [LUMEN](#) by eStudent
- Meetup Group: [Artificial Intelligence Future](#)
- Meetup Group: [Data Science Croatia](#)
- Meetup Group: [ML/AI Split](#)
- [Shift AI](#)
- [WinDays](#)
- [Zagreb Connect](#)

Computational Resources

The Isabella computer cluster was established in 2002 with the aim of providing all interested Croatian scientists with access to a computer cluster and work on the European DataGrid project led by CERN. The cluster provides 3,100 processor cores for arbitrary demanding calculations and 12 NVIDIA V100 graphics processors suitable for artificial intelligence algorithms.

- [Isabella Cluster](#)



Public

Croatia is home to just a few public organizations that are actively promoting the adoption of advanced data science technologies and most of them focus on the general aim of advancing digitization and opening public-sector data pools, as well as positioning certain Croatian regions as ICT-friendly. We are yet to see a more focused approach towards AI, the first step being the publication of the National Strategy for the Development of Artificial Intelligence, driven by the Ministry of Economy and Sustainable Development.

- [ICT županija](#) (Split-Dalmatia County)
- [Središnji državni ured za razvoj digitalnog društva](#) (Central Office for the Development of the Digital Society)