An Artificial Intelligence strategy for Catalonia

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Abstract

Catalonia's Artificial Intelligence Strategy, known as CATALONIA.AI, is a comprehensive plan designed to enhance the region's AI ecosystem. The strategy emphasises the development of AI technology and its ethical application, fostering economic growth and improving quality of life. It is structured around six lines of action: ecosystem, research and innovation, talent, infrastructure and data, AI adoption, and ethics and society. Key initiatives include the Centre d'Innovació en Dades i Intel·ligència Artificial (CIDAI), Observatori d'Ètica en Intel·ligència Artificial de Catalunya (OEIAC), the Catalan AI community (DCA-IA), and Aliança per la Recerca en IA (AIRA).

The technology

Artificial Intelligence (AI) is a specialised branch of computer science focused on creating algorithms that enable machines to exhibit intelligent behaviour or, at the very least, mimic human intelligence. The concept of AI encompasses a variety of definitions. Prominently, John McCarthy's 1956 definition describes AI as the process of "making a machine behave in ways that would be deemed intelligent if a human were behaving similarly". The scope of AI's application extends across countless fields and industries, boasting significant and already realised contributions. These contributions demand the involvement of diverse disciplines such as ethics, law, psychology, philosophy, economics, digital marketing, engineering, healthcare, sociology, biology, and more in its development and practical use.

AI is poised to be a major force in shaping future societies and economies. Its transformative potential is expected to substantially impact global economic growth, with projections suggesting a $15.7 trillion increase in global GDP by 2030 due to AI advancements. The implications of AI extend to the workforce, industrial processes, education, and all facets of public service, necessitating the
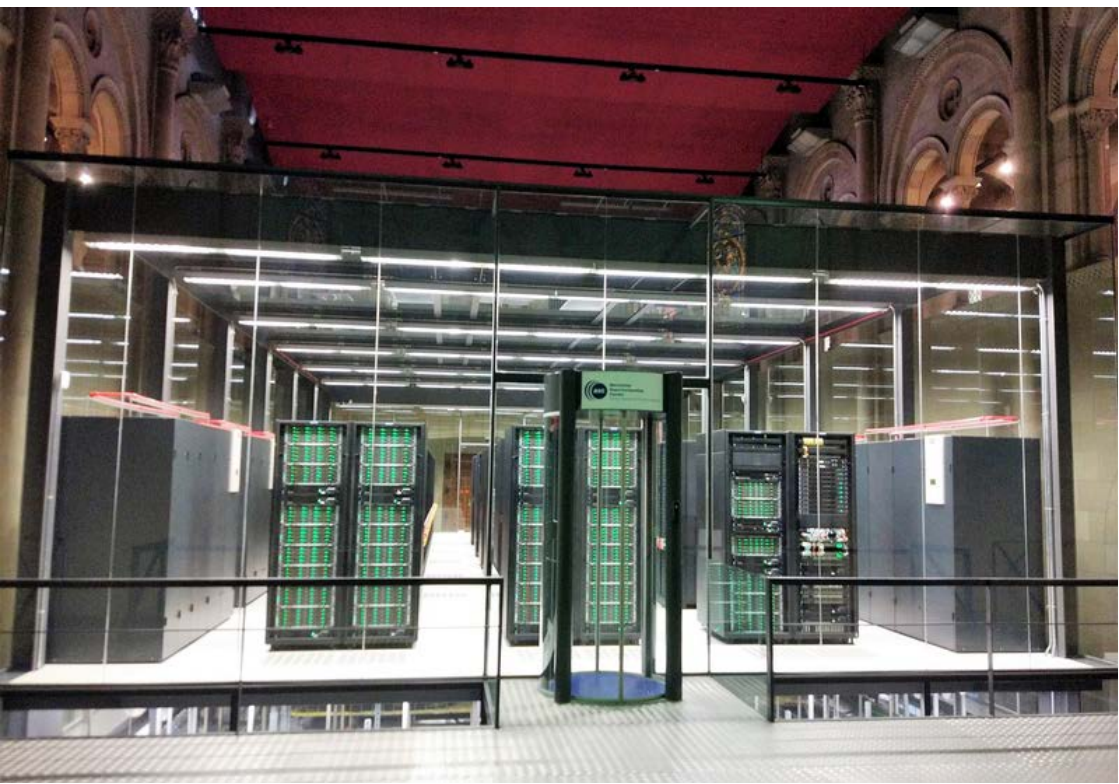
adoption of new models and profound transformations.

In this era of change, it is imperative for governments and public entities to responsibly foster and implement widespread AI usage, with a focus on ethical considerations. This includes enhancing people's well-being, ensuring secure and responsible solution development, preserving natural resources, combating gender discrimination, providing transparent access to technology and information, and monitoring for data and algorithm misuse.

The capacities of Catalonia

Catalonia possesses the capabilities to lead the development and adoption of

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Artificial Intelligence in Europe, and to become a global technology hub in AI. Among these capabilities, the knowledge ecosystem of Catalonia is paramount, with its universities, research and innovation centres, and the scientific community, leading the generation of talent and technology development. The strength of the Catalan ICT sector is also remarkable, with a strong digital entrepreneurship ecosystem, the ability to attract technology investments, and the creation of an emerging Artificial Intelligence sector, making the country one of the most competitive and dynamic digital innovation hubs in Europe. Finally, Catalonia has leading infrastructures serving the development of Artificial Intelligence, which include scientific facilities such as the Barcelona Supercomputing Center, technology infrastructures like the public fibre optic network across the territory, and the axis of data processing centres located in Barcelona metropolitan area. Currently, the Artificial Intelligence sector encompasses over 200 companies in Catalonia, with a turnover dedicated to Artificial Intelligence of €1.4 billion and employing around 10,000 workers.

CATALONIA.AI

Building upon these capabilities, the Government of the Generalitat de Catalunya is driving the Artificial Intelligence Strategy of Catalonia, known as **CATALONIA.AI**, which is deploying a programme of specific actions to strengthen the Artificial Intelligence

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ecosystem in Catalonia and lead the generation of knowledge, social and business applications, and the creation of Artificial Intelligence-based solutions that foster economic growth and improve people's lives. The strategy's programme of actions is structured around six lines:

- **Ecosystem**: Promote a model of cross-sectional governance that supports the development of a coordinated and world-connected Artificial Intelligence ecosystem.

- **Research and innovation**: Enhance research and innovation through the application of specific instruments and the establishment of synergies between the Administration, specialised research and innovation centres, and organisations intensively using AI.

- **Talent**: Create, attract, and retain specialised talent that drives the development of Artificial Intelligence solutions and the transfer of knowledge to society, while also empowering citizens and professionals from other sectors to address its impact.

- **Infrastructure and data**: Have the necessary infrastructures for the development of Artificial Intelligence and facilitate secure access to public and private data.

- **Adoption of Artificial Intelligence**: Promote the incorporation of Artificial Intelligence as a driver of innovation in the Administration and in strategic sectors such as agri-food, health and well-being, environment, mobility,

tourism, culture, and industry, among others.

- **Ethics and society**: Promote the development of ethical Artificial Intelligence, which respects current legality, is compatible with our social and cultural norms, and is people-centred.

The initiatives derived from the six lines of action are coordinated through four instruments specifically created within the framework of CATALONIA.AI: CIDAI, AIRA, OEIAC, and DCA-IA. In 2020, the Centre d'Innovació en Dades i Intel·ligència Artificial (CIDAI) was created. Its main goal is to generate, validate and transfer AI technologies of high added value to promote innovation in Catalonia's strategic economic sectors, including public administration and the third sector. To accomplish this goal, the CIDAI generates synergies and encourages the generation of high-impact projects between CIDAI's

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partners and third parties, identifies the Catalan ecosystem's challenges, needs and innovation opportunities through studies of the application of AI in the key sectors of the Catalan economy, promotes technology and business innovation workshops related to AI, supports the creation of common strategies between institutions and companies and promotes synergies with key national and international AI initiatives.

Also in 2020, the **Observatori d'Ètica en Intel·ligència Artificial de Catalunya** (OEIAC) was established. The OEIAC's main goal is to study the ethical, social and legal impact and the risks and opportunities of implementing Artificial Intelligence. To accomplish such goals, the OEIAC investigates the ethical and social impacts of AI, establishes guidelines and best practices and collaborates with groups of experts from around the world. To identify appropriate or inappropriate actions, the OEIAC uses a self-assessment model based on principles, indicators and observables for assessing, recommending and advancing the ethical use of data and Artificial Intelligence systems.

One year later, in 2021, another instrument was created: the Catalan community of AI within the **Digital Catalonia Alliance** (DCA-IA). This community encompasses companies, research centres, administrations, and other stakeholders that develop, integrate, implement and offer technology solutions in the field of Artificial Intelligence. Among other services, the DCA-IA promotes business opportunities for technology

companies, offers participation and visibility to companies in technology fairs and conferences, gives access to workspaces by members from different communities and, above all, builds a network of knowledge and trust among its members.

Finally, in 2022 the fourth instrument was created. Named **Aliança per la Recerca en IA** (AIRA), its main goal is to promote scientific research on AI. Among its main activities, AIRA establishes synergies and promotes research actions and collaborative projects, facilitates the connection of the agents of the Catalan academic AI ecosystem and coordinates actions for attracting and retaining AI talent.

In addition to the activities in technology transfer and innovation by CIDAI, ethics and society by OEIAC, knowledge

generation by AIRA, and start-ups and promotion by DCA-IA, work is carried out on various cross-sectional initiatives (participation in fairs and congresses, webinars, podcasts, training at the Public Administration School of Catalonia, etc.). Among all these initiatives there is one that stands out: **project AINA**. It began in 2020 and will last until 2026 with the aim of building the necessary technology infrastructure to ensure the presence of the Catalan language in the digital world. Project AINA has a total budget of €13.5 million for the period 2020-2024. Currently, new AI models are being created to incorporate the various dialectal variants of Catalan, different linguistic registers (colloquial, literary, administrative, etc.), and voice and image archives, which allow the establishment of training models capable of solving new tasks in Catalan. To accomplish this task, there is invaluable collaboration from multiple institutions and individuals who contribute their data repositories and works to AINA. All models created in project AINA are available for use by any companies or entities, as they are published openly and with permissive licences.

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In the near future efforts will be made to ensure the funding of the AI strategy, including, among others, RETECH funds (Territorial Networks of Technological Specialisation). Work will continue to ensure the continuity and coordination of all activities of existing instruments (CIDAI, AIRA, OEIAC, DCA-IA).

Efforts will be made to include new members in CIDAI and to transform the OEIAC into a nationally and internationally renowned tool for ethical AI. There will be an emphasis on enhancing AIRA's activities, especially in creating, retaining, and attracting AI talent, and in incorporating more research centres into the initiative. Work will be undertaken to rethink activities related to start-ups and their promotion (currently through DCA-IA), not only helping existing companies to consolidate but also encouraging the creation of new companies from ideas emerging in academic and research environments. This approach will cover the entire value chain of "Venture Building" in AI in Catalonia. Finally, all aspects of the project AINA (technical, communication, use cases, demonstrator, etc.) will continue to be promoted and publicised to ensure no company has an excuse for not incorporating Catalan into their products and services, and that the public is aware of the significance of this project for our language. ▌