Comunitat Valenciana
**Artificial Intelligence
Strategy**

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ARTIFICIAL INTELLIGENCE (AI): WHAT IS IT AND WHAT IMPACT DOES IT HAVE?

AI is the discipline within the field of information technology and engineering for the development of intelligent systems, using human intelligence as a model.

While AI has existed as a field of knowledge since the 1950s, its relevance has increased exponentially over the last 5 years due to it being one of the key technological areas brought about by the Fourth Industrial Revolution. This increased relevance has been enabled by (1) the availability of Big Data as a result of the exponential growth in the use of digital services (largely driven by the use of smartphones) and the digitalisation of the physical world via sensors; (2) the availability of large, low-cost computing capacities; and (3) the development of complex artificial intelligence architectures (such as deep neural networks) that allow patterns to be identified automatically and predictions to be made, amongst other things, based on data.

As a general purpose technology, AI can be applied to practically all areas of society, with multiple applications in complementary technologies. AI is therefore considered as the electricity of the 21st century, with the availability or absence thereof affecting the wellbeing, prosperity and equality of all societies.

Besides electricity, humanity has been witness to many other general purpose technologies such as the wheel, iron, the steam engine, automobiles, personal computers and the Internet.

It is this transversal character that makes AI a driving force for sustainable socio-economic growth. Not only will AI allow for increased productivity and efficiency, but it will also allow us to develop new industries and solve problems that were, until now, unsolvable.

This makes it the only option to stay ahead of the curve. As such, more than twenty countries[1] have already drafted their national AI strategies. Spain published its R+D+i strategy in June 2019, with the publication of its national AI strategy expected shortly[2]. The European Commission published its AI strategy in June 2019[3].

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[1] https://futureoflife.org/national-international-ai-strategies/?cn-reloaded=1
[2] http://www.ciencia.gob.es/stfls/MICINN/Ciencia/Ficheros/Estrategia_Inteligencia_Artificial_IDI.pdf
[3] https://ec.europa.eu/digital-single-market/en/artificial-intelligence#A-European-approach-to-Artificial-Intelligence

Applicability of AI

AI is a strategic technology that is producing changes in all sectors. For this reason, we need to ask ourselves 'How will each sector change, and which disruptions will it cause?' In this scenario, we will need to prepare society for these changes.

There are already very clear signs of the disruptions caused by AI in several highly relevant sectors in Valencian society, such as:

- Agriculture: algorithms that analyse agricultural and environmental data, and learn from them. These tools accelerate decision making and generate answers to questions regarding things such as pest control, precision agriculture, crop viability, the use of meteorology for crop optimisation, environmental conservation and the regeneration of sustainable crop ecosystems.
- Tourism: by applying AI to tourist reservations, it is possible to foresee up to 85 % of possible cancellations and other incidents, allowing for a better planning of resources and assets in order to offer the best possible tourist experience. Tourist services and products can also be personalised in accordance with the preferences of the visitors. When applied to meteorology, AI can also help to optimise resources.
- Industrial production: AI can foresee the need to maintain and repair industrial material and to automate the most routine tasks.
- Medicine: AI is a tool that can be used for the automatic analysis of medical records, improved diagnostics, early detection of tumours in radiological tests, precision surgery and waiting list optimisation. By improving the precision of clinical trials, this will reduce the cost and time required to discover new drugs. Early prevention and more precise and personalised treatments have the potential to increase life expectancy and quality of life. AI also plays an important role in the biological and pharmaceutical research of aging by, for example, developing social robots that accompany elderly people and assist their mobility.
- Trade and marketing: AI can be used to forecast demand and thus optimise production. It can also personalise the experience of the customer and be used to recommend products.
- Energy: AI can optimise production and consumption in renewable energy systems (solar and wind energy, amongst others), foresee consumption peaks, avoid blackouts and detect failures in the electricity grid.
- Transport: autonomous driving will change the automotive industry. Not only will transport be more intelligent, but it will be more efficient and more environmentally-friendly.
- Education: AI will allow for a much more personalised learning. This, in turn, will improve student performance and teaching efficiency.

- Communication and languages: simultaneous and real-time translation of multiple languages will greatly facilitate communication between people. AI will allow us to communicate more easily with services or devices that provide us with information (chatbots, virtual assistants, etc).
- Telecommunications: AI will help to optimise the network traffic, operation and maintenance of telecommunications networks.
- Smart Cities: in conjunction with the Internet of Things (IoT), AI will enable cities to be safer, more habitable and more sustainable, providing personalised services for citizens. One such example is the ability to forecast pollution levels and the effect that these have on allergies.
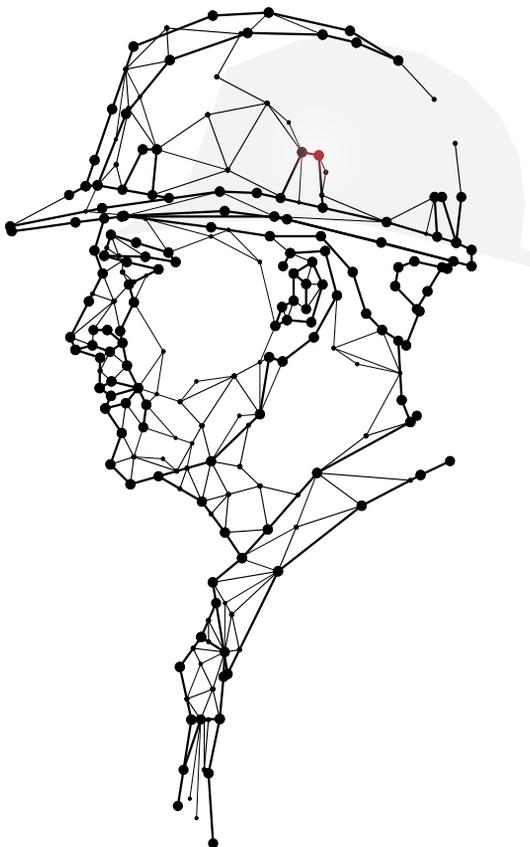
Benefits of adopting AI:

The adoption of AI will lead to improved decision making, taking into account all possible variables and contrasting more data. As they are based on algorithms that are not affected by personal subjectivities, the decisions are more objective. Decisions are also made more quickly, as its computational capacity exceeds that of human intelligence.

- Benefits of adopting AI in the global economy: during the 2020s, AI is expected to contribute $15.7 trillion ($6.6 trillion in increased productivity and $9.1 trillion in effects on consumption). Between 2017 and 2023, AI is expected to be responsible for 55 % of the total increase in global GDP growth.[4]
- Benefits of adopting AI in Spain: it is estimated that AI could double the current GDP growth rate and generate up to one million new jobs every year, providing that the right investment conditions are met; that AI is promoted by public administrations; that there is digital education in schools and universities; and that the creation of business clusters related to the subject are promoted.[5]
- Benefits of adopting AI in production systems: a European Union research project has confirmed that agricultural and construction companies that adopted AI were better able to expand, penetrate new markets and improve their products and services.[6]

[4] Rao, D. A. S., & Verweij, G. (2017). Sizing the prize: What's the real value of AI for your business and how can you capitalise?. PwC Publication, PwC.
https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf
[5] Jorge Diaz-Cardiel: Inteligencia Artificial, Internet de las cosas, Big Data y éxito empresarial
[6] EU Digital Transformation Scoreboard

OBJECTIVES OF THE GENERALITAT VALENCIANA'S AI PLAN

With the development of AI technologies and their growing adoption on a global scale, it is essential for the Generalitat Valenciana to promote the expansion of AI in all areas of society, while simultaneously encouraging technological adoption and digitalisation.

The main goal is to improve the quality of life of citizens, while boosting the economic growth of the Comunitat Valenciana and generating jobs in future sectors. The risks of not adopting an AI strategy are high, including reduced competitiveness, the emergence of mass unemployment owing to automation and a lack of preparation by new generations of employees and current employees whose professionals will be impacted by AI.

Regarding the legal or ethical concerns that may arise due to the use of disruptive technologies such as AI, this government wants to work in such a way that allows the citizens to trust the technology. We need to promote an ethical AI that prevents manipulations, biased decision making and the generation of false content. For this reason, we shall guarantee competition, reliability and transparency: the European Union's three pillars for gaining the trust of citizens.

The Generalitat Valenciana therefore seeks to develop an AI that is ran by and for society, benefiting the local population, with the following characteristics:

- **Competitive:**
  A Comunitat Valenciana (CV) that is competitive in the digital economy will spark economic growth and improved employment for citizens, by:
  (1) increasing the productivity of its employees and companies, while fostering a more sustainable and competitive industry;
  (2) diversifying the economy by adopting new strategic technologies such as AI and committing to their application in the productive tissue of the CV.

- **Focused on people and the planet's sustainability:**
  We want AI to significantly improve peoples' lives and society in general. By offering better, more efficient and more effective public services, AI has immense potential to deliver important benefits to our society and economy. The areas that will be directly impacted are healthcare, public transport and smart cities (they can't be 'smart' without AI), education (personalised thanks to AI), energy and strategies for fighting climate change.

- **Inclusive:**

  This government will strive to ensure that the adoption of this technology will bring benefits to everyone, making sure that nobody is left behind.

  Each of the previous industrial revolutions have had an enormous impact on the organisational structures, processes and skills required to find a job.

  AI will lead to a significant change in the types of jobs and skills. These will be highly different to those of the previous industrial revolutions, which were notable for a high demand for routine and repetitive tasks, as was the case with the textile sector, the footwear sector and any chain production line.

  AI will increase automation in practically all aspects of the production process and in many aspects of the service sector, which is of great importance for the Comunitat Valenciana.

  Globally, the intense technological adoption of recent years has already increased the productivity of the best qualified employees, deepening the polarisation of the labour market.

  AI will also have an impact on jobs that involve information processing (such as accountants) and jobs which provide a service to people (such as cashiers in shops or supermarkets). It may also replace certain routine activities, such as those involved in lower skill jobs.

  Instead of a pyramid, the organisational structure of companies shall assume the shape of a diamond. AI systems shall replace the tasks found at the base of the pyramid, representing many routine and repetitive tasks.

  However, as with previous industrial revolutions, this new structure shall also generate new jobs and specialised professional activities, creating further job opportunities. The European Commission estimates that, by the end of 2020, there will be a deficit of 500,000 Information and Communications Technology (ICT) employees.

  AI may also improve existing jobs. For example, it may help in certain dangerous activities such as the cleaning of industrial pipes, or with highly important tasks by assisting doctors when diagnosing patients.

SOCIO-ECONOMIC CONTEXT OF THE COMUNITAT VALENCIANA

• Polarisation of the Valencian labour market. In 2018, the distribution of employment in the Valencian economy was fairly clear, with the predominance of labour-intensive activities such as commerce, hospitality, administration and construction jobs, accounting for 45 % of recorded employment.

On the other hand, high-salary jobs such as those in the finance, machine industry, energy and ICT industries are some of the least common jobs in the Valencian employment market.

Besides this polarisation of wages, there is also a high proportion of precarious jobs as a result of temporary contracts (28.4 % of all contracts in the second quarter of 2019) and the recent presence of gig work (precarious jobs associated with the collaborative economy through digital platforms). AI, as a disruptive technology, may deepen this polarisation and create further inequalities.

• Business size: 99.86 % of companies in the Comunitat Valenciana are SMEs (0-200 employees). Of these, 340,042 (95.4 % of the total) are micro-enterprises (with 0-9 employees). The capacity of these companies to adopt cutting-edge technology is more limited.

• Barriers to entrepreneurial growth: the traditional financial sector and its products do not encourage the creation of technology-based companies. There is a clear lack of a risk capital culture in the Comunitat Valenciana.

• Talent: The Comunitat Valenciana is home to figureheads of AI and other key areas of the scientific community. The recently published map of AI capacities (public and private) in Spain shows that we have a critical mass in this area.
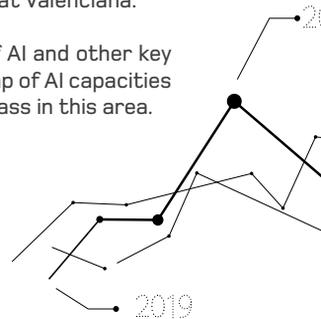
- Knowledge: Vocational training in the Comunitat Valenciana suffers from a lack of prestige, despite the technology-related courses having a 100 % employability rate. Furthermore, there is a lack of flexibility in responding to new training requirements and opportunities of the productive system.

Other points worth addressing are the inclusion of computational thinking, the cultivation of creativity, critical thinking and the promotion of technological careers amongst teenagers.
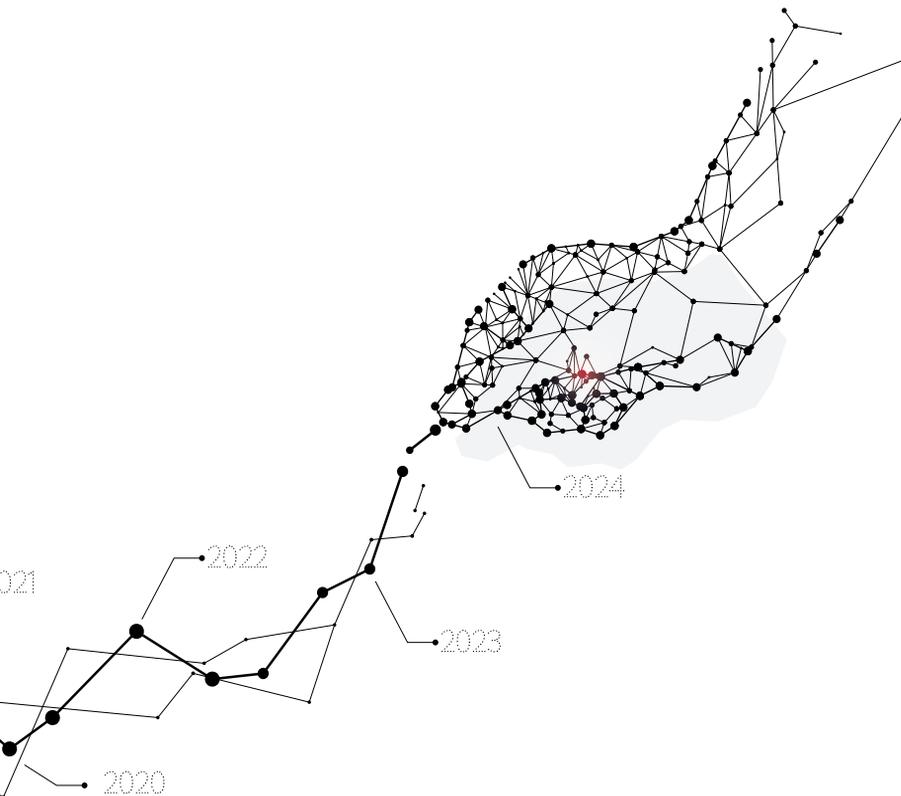
AN AI STRATEGY FOR THE COMUNITAT VALENCIANA

The Generalitat Valenciana plans to increasingly invest part of its annual budget in stimulating a production model that includes an AI strategy structured around three pillars:

– The promotion of an innovative and integrating production ecosystem;
– The preparation of the aforementioned ecosystem for socio-economic changes;
– The adoption of AI in the Public Administration.

There are also several concrete actions which we have already undertaken, or which we shall undertake in the near future.

Creation of an innovative and integrating ecosystem with researchers, entrepreneurs, production talent and agents of the production sector to boost the competitiveness of the entire AI value chain.

1. Investment in AI research that aligns AI technologies with the needs of society in strategic sectors of the Comunitat Valenciana, such as the environment, health, digital economy and transport, in which the CV is amongst the leading regions in Europe.

- Action: Creation of an ELLIS (European Laboratory for Learning and Intelligent Systems) department that allows us to collaborate with the best researchers in Europe, promoting the synergy of AI research with the entrepreneurial ecosystem and the transfer of research.

- Action: Promotion of collaboration and dialogue structures between different agents of the Valencian innovation system, with a special emphasis on those that reinforce AI throughout the value chain and offer useful services to companies, such as the TECH4CV initiative.

2. Promotion of entrepreneurs, allowing them to overcome barriers to business growth.

- Action: Promotion and development of AI hubs in the Comunitat Valenciana that comprise a powerful ecosystem with an integrating axis in the Digital District, with programs that facilitate the settlement of talent and companies.

- Action: Adoption of AI technologies in all economic sectors and the productive tissue of the CV, with a special emphasis on non-technological SMEs.

- Action: Promotion of new products of the Institut Valencià de Finances (IVF; Valencian Finance Institute, in English) for investments that facilitate technological adoption.

- Action: Guaranteeing and supporting the transfer of technology to the production system within the framework of the European Union and the programmes included in the TECH4CV initiative of the Agència Valenciana de la Innovació (AVI; Valencian Innovation Agency, in English), such as the development and demonstration of technologies that can be used in productive systems.

- Action: Developing digital skills training programmes for professionals, aimed specifically at professionals who may be affected by AI.

- Action: Promoting the growth of AI companies and start-ups within the Comunitat Valenciana, increasing their visibility and improving relations with productive sectors.

3. Fostering a culture of technological transformation by providing AI training for the wider public that focuses on future generations, the training of AI specialists and the attraction of international talent.

- Action: Launching a competitive programme which attracts excellent research talent, along the lines of the Institució Catalana de Recerca i Estudis Avançats (ICREA; Catalan Institution for Research and Advanced Studies, in English)

- Action: Promoting greater university hybridisation of computing and AI with certain university degrees.

- Action: Designing vocational training degrees in specialised technological niches, such as AI, data sciences and cybersecurity.

- Action: Launching an online education programme for Valencian society, similar to the Finnish government's "Elements of A1" programme.

4. Promoting a legal framework to accelerate a competitive, people-centred, inclusive and supportive AI model.

- Action: Approving the Valencian Law for the Development of the Digital Society, which shall create the necessary legal framework to carry out this strategy.

- Action: Promoting AI technology experimentation and data exchange in key areas for the improvement of social wellbeing through the creation of regulatory "sandboxes" (where controlled trials can be carried out), under European Union guidelines.

5. Attracting European funding sources and seeking agreements with the traditional banking sector.

- Action: Taking advantage of funding opportunities offered by DG Connect, the European Commission's team responsible for the AI strategy.

6. Political impetus through the creation of a task force and a High Commissioner in the Consell de la Generalitat, of an advisory nature, for the establishment of ethical frameworks for the use of AI in Public Administration that assist informed decision making.

- Action: Promoting the AI Observatory (www.observatorioia.gva.es), applied to the Public Administration as a platform for the communication of the task force's activities and promotions.

7. Developing computer and telecommunications infrastructures that are the foundations of innovation ecosystems.

- Action: Promoting and encouraging the deployment of broadband, 5G and IoT networks to enable equal opportunities for access to AI services for citizens and businesses.

- Action: Establishing policies for the use of cloud-based computer systems (Cloud First) that, within the national and European frameworks, allow for the development of competitive AI projects.

8. Developing an appropriate framework that increases the quality and availability of data, and which ensures the protection of citizens' privacy.

- Action: Creating a space for the exchange and access of data between public administrations in order to carry out socially beneficial projects, along the lines of the European Commission's Business to Government Data Sharing High Level Expert Group, which is scheduled to publish its report in early 2020.

Preparation for socio-economic changes:

1. Committing to high-quality work: reducing job insecurity and increasing AI-related job opportunities by promoting well-paid technological jobs and by offering digital and technological training to citizens.

- Action: Anticipating changes in the labour market by conducting studies on new employment opportunities generated by AI in the Comunitat Valenciana.

- Action: Identifying the sectorial impacts of AI by designing strategies and specific actions in the key sectors of the Valencian economy.

- Action: Investing in the development of technological industrial niches, such as cybersecurity.

- Action: Including computational thinking in the compulsory education and Bachillerato (non-compulsory secondary education) curriculum, and promoting general digital education at all educational levels.

2. Assuming a democratising and anticipatory approach to education and technological knowledge, giving professionals with jobs that are at risk of disappearing or transforming due to automation an opportunity to learn how to use AI.

- Action: Tax incentives for SMEs to encourage investment in human capital and the promotion of new IVF products to be used in employee training courses.
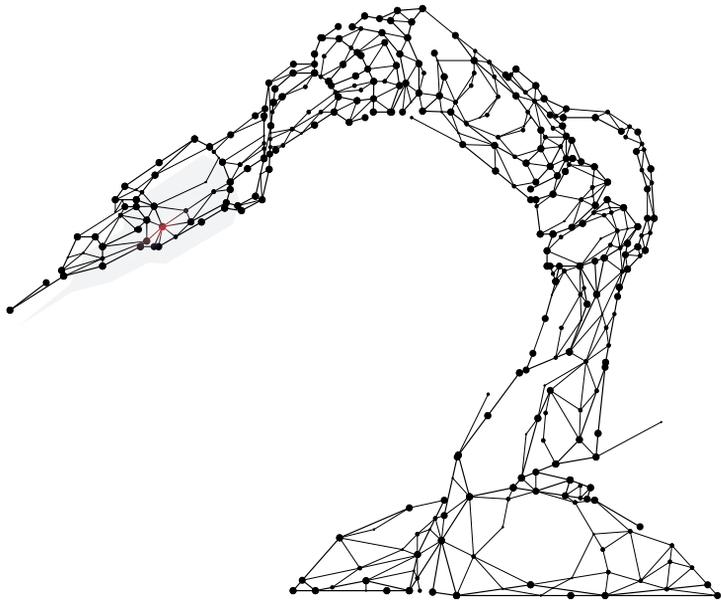
3. Breaking down the barriers of access to technological education at all levels, promoting diversity in AI with more women and representation of all social groups.

- Action: Promoting agreements with civil society to create specific programmes that address the gender gap in these jobs (similar to the "Woman Who Code" programme in the USA and the "Mujer e Ingeniería" programme of the Royal Academy of Engineering of Spain), and promoting technological education for marginalised and disadvantaged groups (collaborations with the Red Cross's "Empleando Digital" programme).

4. Anticipating the consequences of an ageing population on the labour and financial markets and the demand for goods and services.

- Action: Promoting and developing R+D+i on ageing, based on the promotion of good health and wellbeing amongst elderly people.
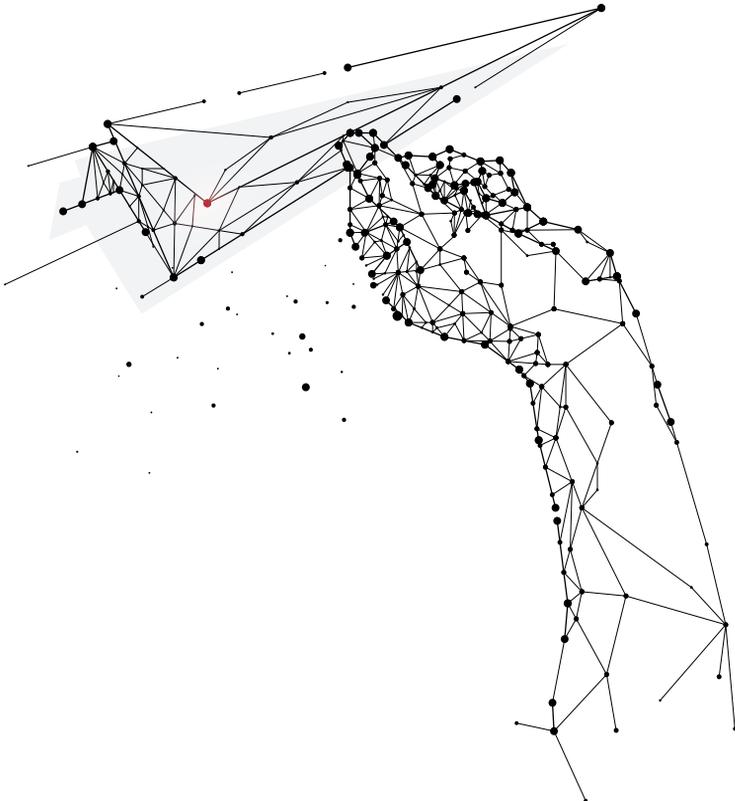
Adoption of AI in the Public Administration:

1. Preparing the Generalitat Valenciana for the change that AI will entail in the design of initiatives, projects and services for citizens, particularly in the areas of health, transport, infrastructures, energy, the environment, the economy and education.

- Action: Designing specific training programmes for civil servants, giving them the opportunity to acquire certain digital skills. These programmes are also designed to provide them with knowledge of AI technology and its driving and innovative role in the improvement of public management.

- Action: Defining the new professional profiles that must be incorporated by the Public Administration, along with the skills that are necessary to execute the public role in a field that has been altered by the implementation of AI.

- Action: Developing an original infrastructure policy that enables and facilitates the incorporation of AI fed by Big Data in the Administration's services.

- Action: Designing an AI implementation strategy in the Public Administration that prioritises efficiency, transparency and service quality.

- Action: Promoting a close relationship between digital start-ups and public administrations for the acquisition of products and services through proof of concept and innovative public procurement.

**Estrategia de
Inteligencia Artificial**
de la Comunitat Valenciana