CENIA

CENTRO NACIONAL DE INTELIGENCIA ARTIFICIAL

AI at service of the People

Research and Project Management Coordinator
sebastian.martinez@cenia.cl

Building the first national Artificial Intelligence Research Center for Chile

CENIA | A Latinamerican AI Ecosystem

Our goals and mission

Transform Chile into a pillar of AI development in Latin America

Our lines of action

- Excellence research.
- Public incidence and government influence
- Technology transfer.

CENIA | An AI ecosystem

Our lines of action

Excellence research

Research lines:

- **RL1: Deep Learning for Vision and Language**
- **RL2: Neuro-symbolic AI**
- **RL3: Brain-inspired AI**
- **RL4: Physics-based machine learning**
- **RL5: Human-centered AI**
- **Internal Research Group**

Public impact and dissemination/Outreach

- **Latin American Artificial Intelligence Index (ILIA).**
- **Contribution to the Economic Commission for Latin America and the Caribbean (ECLAC)**
- **Participant in debates with the Organization of American States**

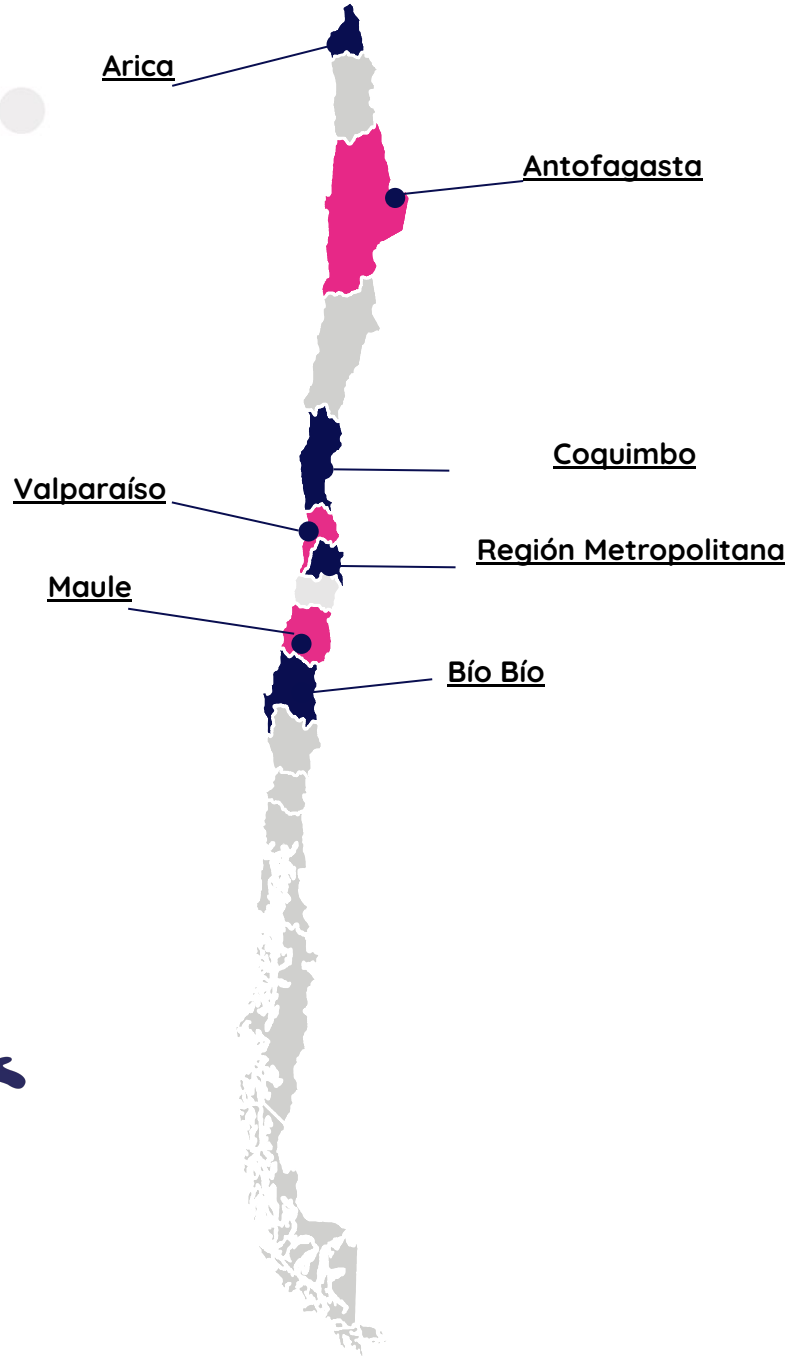
His involvement ensures that policies and regulations are aligned with technological advances and ethical needs, contributing significantly to the development of a robust and up-to-date legal framework in the field of artificial **intelligence**.

Technology Transfer

CENIA develops solutions based on artificial intelligence, building bridges between cutting-edge research and real-world applications.

Our Services;

- LLM's and GENAI
- Computer Vision
- Optimization
- Strategy
- Training & Upskilling



Cenial´s

More than 300 professionals nationwide.

10 Principal Researchers

8 Cenia Researchers

7 Postdoctoral Fellows

13 Associated Researchers

14 Associated Collaborators

5 International Collaborators

28 Young Researchers

180 Affiliated Students

55 Technology Transfer Team

25 Executive Team Professionals

CENIA | Partners universities

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE

UNIVERSIDAD DE CHILE

UNIVERSIDAD ADOLFO IBÁÑEZ

UNIVERSIDAD TECNICA FEDERICO SANTA MARIA

Universidad de Concepción

UNIVERSIDAD SAN SEBASTIAN
FACULTAD DE INGENIERÍA Y TECNOLOGÍA

TALCA UNIVERSIDAD CHILE

UNIVERSIDAD ANDRES BELLO

Universidad de los Andes

UNIVERSIDAD CATÓLICA DEL NORTE CHILE

UNIVERSIDAD DE TARAPACÁ
Universidad del Estado

UNIVERSIDAD DE LA SERENA CHILE

CENIA | Partners companies

SONDA

SimpliRoute

COPEC

INIA

Coca-Cola ANDINA

ODEPA
Ministerio de Agricultura
Gobierno de Chile

C1DO1

Subsecretaría de Transportes
Gobierno de Chile

goplaceit.com

gob digital
CHILE

Associated Institutions

CENIA IN 4 YEARS

46
Production of AI Projects

410
Scientific Work (papers, conferences)

4.5M
Annual Budget

1600
People Trained in AI

2M
People reached through outreach activities

Excellence research

Cenia Research: Research Lines and Internal Research Group

Our researchers lead AI research with a multidisciplinary and ethical approach, leading advances from deep learning to applied neuroscience. Cenia seeks to be a top-level national research center, with the aim of expanding the horizons of AI science, in different research lines (RL) and the research group.

RL1: Deep learning for vision and language.

RL2: Neuro-symbolic AI.

RL3: Brain-inspired AI.

RL4: Physics-based machine learning.

RL5: Human-centred AI.

Internal Research Group CENIA

Scientific Production

Numbers for the area between 2023 and 2025

+183 Index Publications

+212 Participation on Scientific Events

+15 Organization of Scientific Events

+100 Q1 Publications Published

+50 A* & A Conferences Accepted

e.g NeurIPS, CVPR, ICML, EMNLP, IJCAI, etc.

+55 Associated Researchers

+5 R&D projects awarded

CENIA

CENTRO NACIONAL DE INTELIGENCIA ARTIFICIAL

CENIA RESEARCH GROUP

CENIA

CENIA RESEARCH GROUP


Cristian Buc


Carlos Aspillaga


Andrés Carvallo


Francisca Gil


Christ Devia


Brayan Díaz


Nicolás Alvarado


Jorge Salas


Rex Liu


Alexander Kozachinskyi


Franziska Wagner


Mitchell Bosley


Gabriel Sepúlveda


José Reyes


Cinthia Sánchez

Researchers:

1. Cristian Buc ***(Head)***
2. Christ Devia
3. Carlos Aspillaga
4. Brayan Diaz
5. Rex Liu
6. Alexander Kozachinskyi
7. Francisca Gil

Postdocs;

1. Andrés Carvallo
2. Nicolás Alvarado
3. Jorge Salas
4. Franziska Wagner
5. Mitchell Bosley
6. Gabriel Sepúlveda
7. José Reyes
8. Cinthia Sánchez

CENIA RESEARCH GROUP

Cristian Buc

Carlos Aspillaga

Christ Devia

Brayan Díaz

Rex Liu

Alexander Kozachinskyi

The CENIA Research Group is dedicated exclusively to advancing theoretical and applied artificial intelligence. Its work spans from exploring the mathematical limits of current architectures to developing more efficient, interpretable, and context-adapted models. The areas of expertise and research focus:

1. **Energy-Efficient AI and Biologically Inspired Models**
   - Christ Devia develops low-energy AI models inspired by neural networks, optimizing adaptive behavior and improving efficiency based on brain principles.
2. **AI Theory and New Architectures**
   - Alexander studies the theoretical limits of Transformers, analyzing their reasoning and generalization capabilities.
   - Cristian Buc and his team work on novel attention mechanisms, including triplet-attention, to improve relational composition and representation in AI models.
3. **Reinforcement Learning and Generalization**
   - Rex Liu leads research on hierarchical reinforcement learning, enhancing the ability of AI to generalize across unknown environments.
4. **AI for Indigenous Language Preservation and Translation**
   - Carlos Aspillaga develops the Mapudungun - Rapa Nui translator, an AI-powered tool for preserving indigenous languages, now expanding to Náhuatl and other Latin American native languages.
5. **AI in Education and Rural Contexts**
   - Brayan researches AI integration in education, with projects including: Teachers' perceptions of AI in rural education, analyzing challenges and opportunities in low-connectivity schools and pedagogical strategies for AI and data science education, fostering computational thinking in interdisciplinary environments.

CENIA RESEARCH GROUP

Andrés Carvallo

Francisca Gil

Nicolás Alvarado

Jorge Salas

Franziska Wagner

Mitchell Bosley

The CENIA Research Group is enriched by researchers whose expertise spans advanced theoretical AI, human-centered applications, and interdisciplinary innovation.

- **Andrés Carvallo** contributes to fairness in AI and unbiased language models, designing strategies to reduce bias in large-scale NLP systems.
- **Francisca Gil** specializes in interactive visualization and 3D educational tools, creating human-centered solutions that enhance learning and reasoning in complex domains.
- **Nicolás Alvarado** advances geometric deep learning, focusing on hyperbolic neural networks and dynamical systems to capture hierarchical and relational data for vision, language, and neurosymbolic AI.
- **Jorge Salas** brings expertise in network science and centrality measures, applying them to neural architectures and graph neural networks to improve interpretability and theoretical understanding.
- **Franziska Wagner** explores AI for democratic participation, information quality, and governance, developing multilingual and citizen-centered systems to combat disinformation and foster transparency.
- **Mitchell Bosley** merges social science and AI, pioneering hybrid methods for computational social science, legislative discourse analysis, and human-centered AI interventions for positive social change.

CENIA RESEARCH GROUP

Gabriel Sepúlveda

José Reyes

Cinthia Sánchez

Gabriel Sepúlveda

Gabriel Sepúlveda specializes in autonomous robotics and AI-driven navigation systems. His research focuses on affordance-based methods for robot perception and decision-making, combining deep learning with behavior-based control. At CENIA, he contributes to the Physics-based Machine Learning and Robotics line, advancing resilient and adaptive AI for real-world applications in space and indoor navigation.

José Reyes

José Reyes-Rojas is a Doctor in Education with expertise in educational technology, teacher agency, and inclusive learning. His research explores how educators integrate AI and digital tools in diverse and crisis contexts, promoting fairness and ethical adoption. At CENIA, he strengthens the Human-Centered AI line by bringing an educational and social sciences perspective that fosters responsible and inclusive AI design.

Cinthia Sánchez

Cinthia Sánchez-Macías is a Doctor in Computer Science at the University of Chile, specializing in Natural Language Processing, Machine Learning, and Data Mining. Her research connects computational social science and AI for social good, addressing challenges in crisis informatics, multilingual data processing, and fairness in AI systems. At CENIA, she contributes to the Human-Centered AI line, promoting ethical, inclusive, and socially aware approaches to intelligent technologies.

CENTRO NACIONAL DE INTELIGENCIA ARTIFICIAL

OUR RESEARCH LINES GROUP

CENIA

RL1: DEEP LEARNING FOR VISION AND LANGUAGE

Iván Sipirán

Felipe Bravo

This research line focuses on developing deep learning models for vision and language, tackling key challenges such as multimodal data integration, model efficiency, and large language model interpretability.

It includes approximately 15 researchers specializing in NLP, computer vision, and human-AI interaction.

Its flagship projects are:

- **Multimodal Models,** enhancing AI's ability to handle highly heterogeneous data.
- **Lean Machine Learning,** simplifying deep learning models while maintaining performance.
- **LLMs - Taming the Monster,** optimizing large language models for efficiency and explainability.

Additionally, **it leads DashAI, an open-source no-code platform for AI experimentation,** making machine learning more accessible for researchers and practitioners.

RL2: NEURO-SYMBOLIC AI

Pablo Barceló

Cristóbal Rojas

This research line aims to integrate symbolic and connectionist approaches to enhance reasoning and interpretability in AI models. It explores the computational power of Transformers and graph neural networks, the explainability of ML models, and the extraction of complex patterns from incomplete knowledge graphs. **With around 7 researchers, it focuses on:**

- **Computational power of Transformers,** analyzing their limitations and designing extensions for improved compositional reasoning.
- **Explainability for ML models,** developing metrics and tools to interpret predictions using SAT solvers.
- **Pattern extraction in incomplete knowledge graphs**, optimizing link prediction techniques for structural inference.
- **Computational power in graph neural networks and dynamic systems**, studying their expressiveness and applications in biological signal analysis.

RI3: BRAIN-INSPIRED AI

Marcela Peña

Pedro Maldonado

This research line aims to integrate AI with cognitive neuroscience and psychology to develop biologically inspired models that enhance learning, reasoning, and perception. RL3 explores cognitive modeling, biophysical networks, and AI applications in cognitive aging and language development.

With approximately 10 researchers, its flagship projects include:

- **"The Cost of Intelligence",** studying energy-efficient AI inspired by brain function.
- **"Interactive Language and Communication System"**, an AI-based intervention for language development.
- **"Visual Reasoning Machines with Behavior in the Loop"**, combining cognitive science and AI for enhanced decision-making.

RL3's work has led to high-impact publications on early detection of neurodegenerative diseases, language acquisition, and cognitive image analysis, positioning it at the forefront of AI and neuroscience integration.

RL4: PHYSICS-BASED MACHINE LEARNING

Paula Aguirre

Carlos Sing-Long

This research line aims to integrate AI with physical sciences to enhance computational models and infer complex physical phenomena. RL4 focuses on two main areas: improving the efficiency of traditional numerical methods using AI and developing AI-driven models to simulate intricate physical systems. **With around 7 researchers, it focuses on:**

- **AI for Computational Models,** enhancing the resolution of complex physical simulations.
- **Wildfire Propagation Modeling,** using AI to predict fire behavior from diverse data sources.
- **AI for Biochemical Reactions, leveraging machine learning to model reaction systems** based on experimental data and physical principles.

RL4 has contributed to high-impact research, including Physics-Informed Neural Networks (PINNs), Fourier analysis in computational modeling, and AI applications in environmental risk assessment.

RL5: HUMAN-CENTRIC AI

Claudia López

Marcelo Mendoza

This research line focuses on ethical, fair, and socially responsible AI, addressing misinformation, bias, and human-computer interaction. **RL5 explores AI applications in education, social media, and public services to ensure AI benefits society equitably.**

With approximately 10 researchers, its flagship projects include:

- **Propaganda Detection in Social Media, analyzing misinformation patterns** and AI-driven mitigation strategies.
- **Fairness in Machine Learning and NLP, developing multilingual approaches for unbiased AI.**
- **Ethical AI Development, using bias networks** to enhance moral imagination in AI teams.
- **Evaluation of Large Language Models in Spanish,** establishing auditing frameworks for LLMs.

RL5 has produced high-impact research in AI for education, digital journalism integrity, and algorithmic fairness, positioning itself as a leader in human-centric AI innovation.

Technology Transfer

CENIA | Technology Transfer

Our goal and mission

Establishment of an AI ecosystem in Chile:

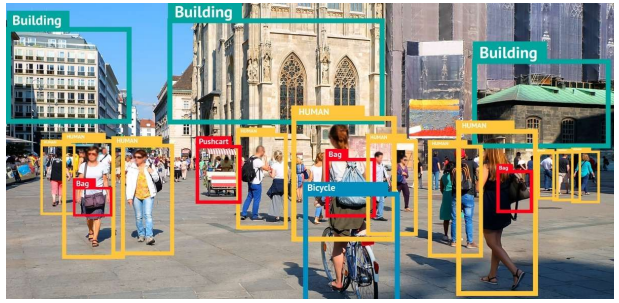
1. **Transfer technology and capabilities.**

2. **Provide expert advice to industry, communities and public services.**

The impact of AI in Chile is estimated between 1.5% and 3% of GDP annually (Goldman Sachs 2023), that is, between 4,500 and 9,000 million dollars per year in productivity.

Our capabilities

- **Visual recognition in video.**
- **Natural language understanding.**
- **Big data optimization and analysis.**



We accelerate our clients' AI transformation across five service lines:

Vision

We generate solutions to extract and make valuable information available from images, videos, and documents.

Gen AI

We create tailor-made solutions for organizations, using and implementing cutting-edge models.

Advanced Analytics

We deliver valuable solutions to our customers by maximizing the use of their data through the application of machine learning and AI.

Strategy

We support organizations in defining their AI strategy, discovery, valuation, and project prioritization.

Talent Training

We offer upskilling and talent training programs for organizations, ranging from AI literacy to technical elements.

What is our value proposition?

Integration with research

Ability to integrate engineering resources at the pace of industry and tackle complex challenges.

Efficient, fast, and high-quality development

Application of agile principles and methodologies with a team of engineers who are 100% dedicated.

Public impact

Plays a key role in debates on AI and legislation, actively participating in international forums and discussions.

AI Vision solution | Subtrans

Intelligent urban mobility monitoring

Context:

- The Traffic Control Operational Unit (UOCT) has over 300 24/7 surveillance cameras over the city that must be monitored. Currently, there is no way to prioritize, visualize and analyze information to plan interventions or evaluate implemented measures.

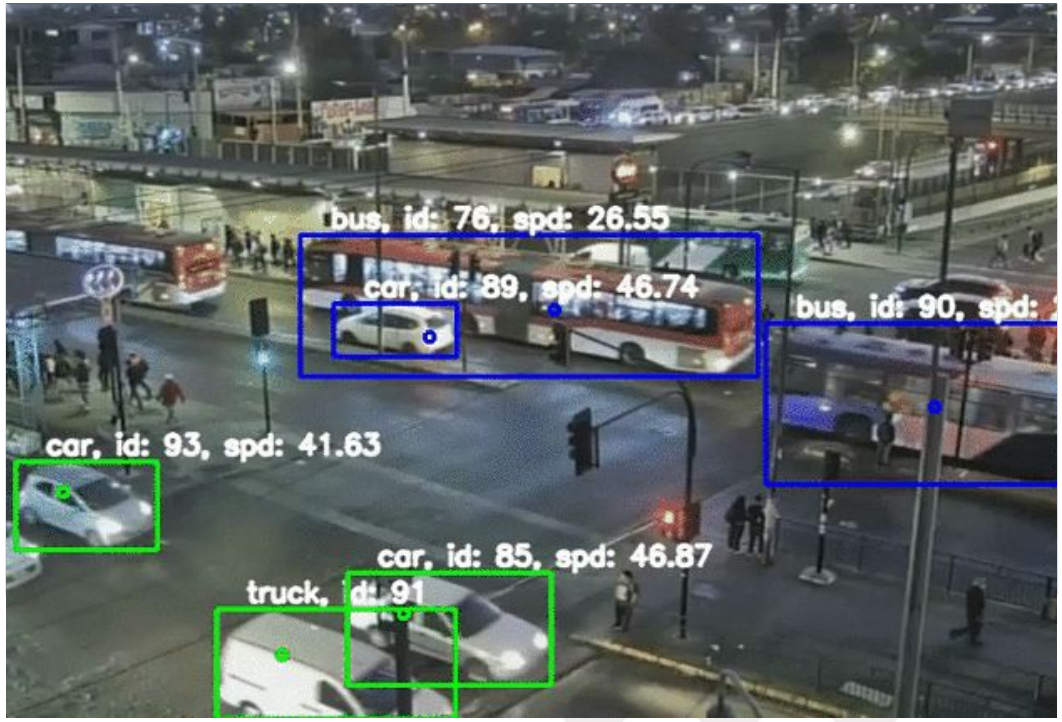
Approach:

- Develop a platform that combines AI, Computer Vision and traffic simulation to collect city metrics.
- Blind spots of the city are simulated with low presence of cameras and other sensors.
- Raise anomalies with time series analysis on metrics.

Results:

- 3 module solution
  - M1: video analysis and other data sources.
  - M2: Simulation of city areas.
  - M3: Detect abnormal moments in traffic.
- Web Dashboard for visualization, prioritization and analysis of information.

Solution example



Description: Visualization of traffic classified by vehicle class and direction. The average flow and velocities are obtained.

AI Language solution | Go Place It

Chatbot support buying and selling

Context:

- GoPlaceIt requires improving the buying and selling process, clients were lost due to excessive processing times and difficulty in obtaining the necessary documents.

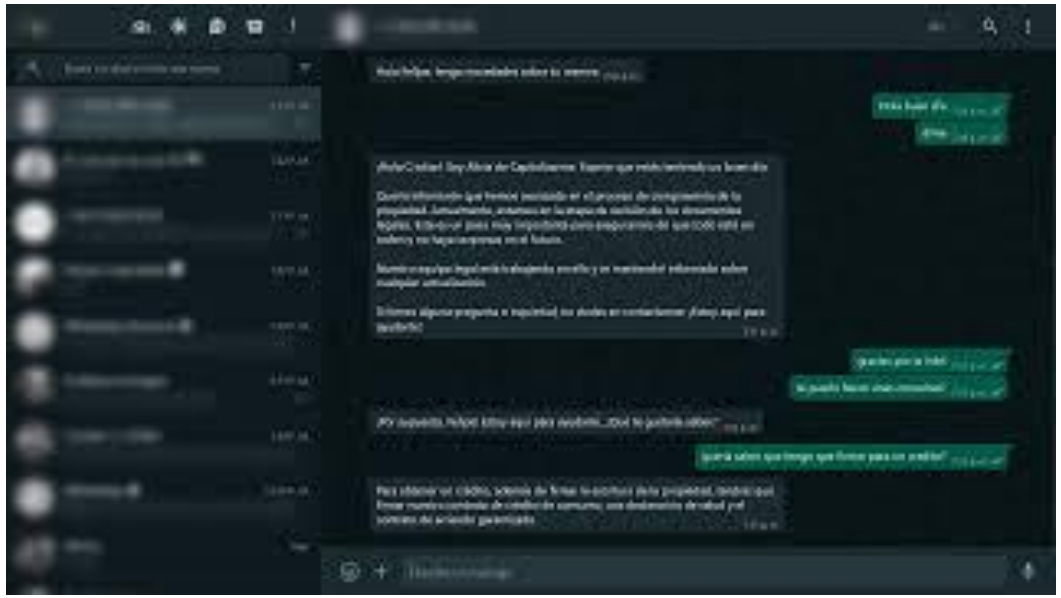
Approach:

- Develop and integrate a ChatBot via WhatsApp that takes charge of the interaction with clients and provides support to brokers.
- The Chatbot notifies the client of progress in the process, provides reminders and resolves doubts and questions regarding the status of a request.
- Chatbot provides support to brokers during the process.

Results:

- ChatBot in the process of being implemented in production.
- When making the ChatBot available to users, it is expected:
  - Streamline the buying and selling process.
  - Improve customer satisfaction.
  - Reduce customer loss.

Solution example



Description: Chatbot Buy-Sell Support - Go Place It 2023.

AI Language solution | Chile Atiende

BOT Generative AI user attention

Context:

- Chile Atiende concentrates information on 2,500 procedures for citizens. The information is available via the web, call center and service offices.

Approach:

- Develop an AI solution to process people's requirements.
- Support open queries in “Chilean” natural language.
- Conduct a study of the data, process it and encode it for recovery using natural language processing (NLP) techniques.
- Develop a web user interface.

Results:

- When making the solution available to the public:
  - Reduce search effort.
  - Reduce the time to find a solution.
  - Reduce barriers to access to information.
  - Improve citizen satisfaction.

Solution example

Description: Generative AI system - Chile Atiende 2023.

Optimization & big data | Main beverage production and distribution company

Optimization - Supply Chain

Context:

- Leading beverage production and distribution company contacts CENIA to accelerate the stock balance process of its SKUs in the network of distribution centers in Chile. Since the process was highly manual.

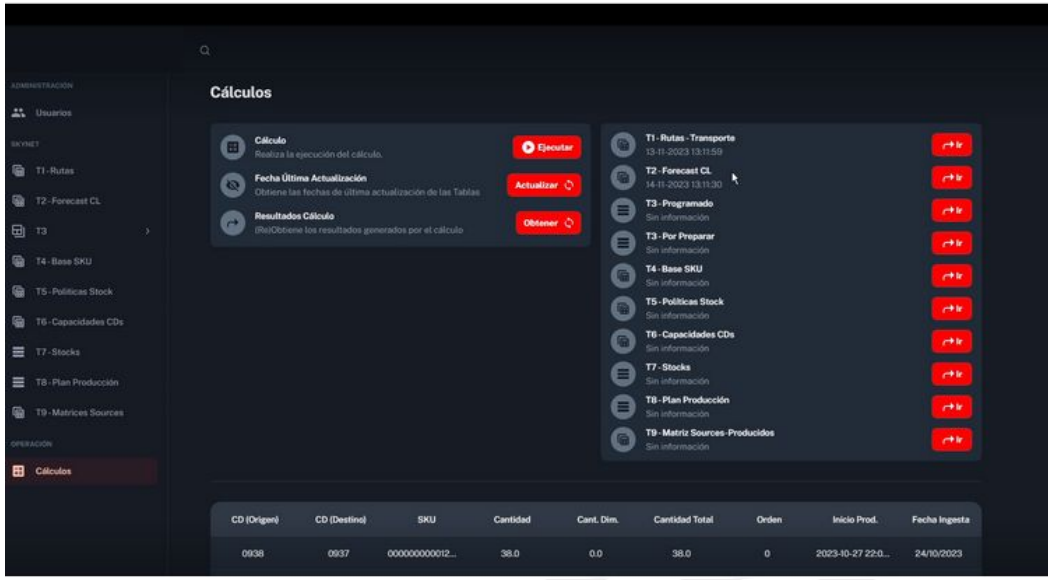
Approach:

- Initiate an automated data flow and storage plan for future work with Big Data.
- Implement an optimization model focused on complying with the stock policies of each center involved in the operation.
- Incorporate business rules and deliver a ready-to-execute hauling plan to the distribution team.

Results:

- Production hauling plan optimization model implemented with its user interface.
- Model and continuous interface in a continuous improvement process.

Solution example



Description: Solution interface v1.0 made available to users.

DashAI - Machine Learning Model Execution Platform

An interactive AI experimentation tool

Context:

- DashAI is a platform to facilitate experimentation of machine learning models for various tasks on tabular data, natural language processing, and computer vision.
- It allows you to expand both the available models and the supported tasks.

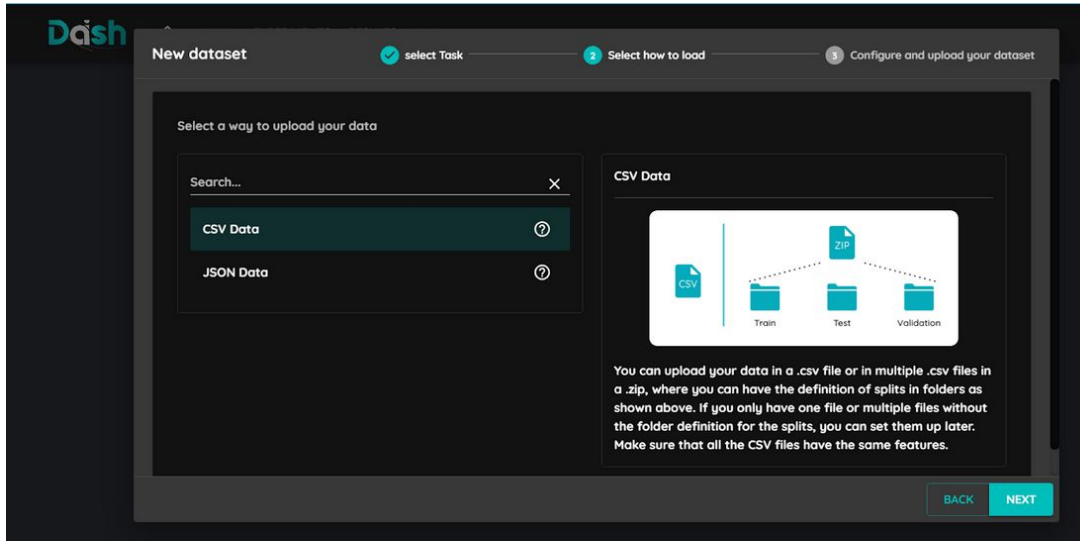
Approach:

- Coding machine learning pipelines with available scientific libraries is cumbersome and error-prone.
- DashAI is designed for Data Scientist, academic community and people who have no programming knowledge.

Results:

- Development of a platform without the need for code for model experimentation.
- Development a plugin-based system that allows adding new models and tasks.

Solution example



Description: DashAI interface. Available at https://www.dash-ai.com/.

Dissemination and connection with environment

Dissemination and connection with the environment

For Cenia, it is a priority to inform and educate to promote understanding and increase the appreciation of AI as a pillar for Chile's progress, capable of helping us nurture comprehensive development with equity and justice. To achieve this, we will work on three axes:

- **Think AI - Education**
  Propose experiences for the public, bringing AI closer to people.

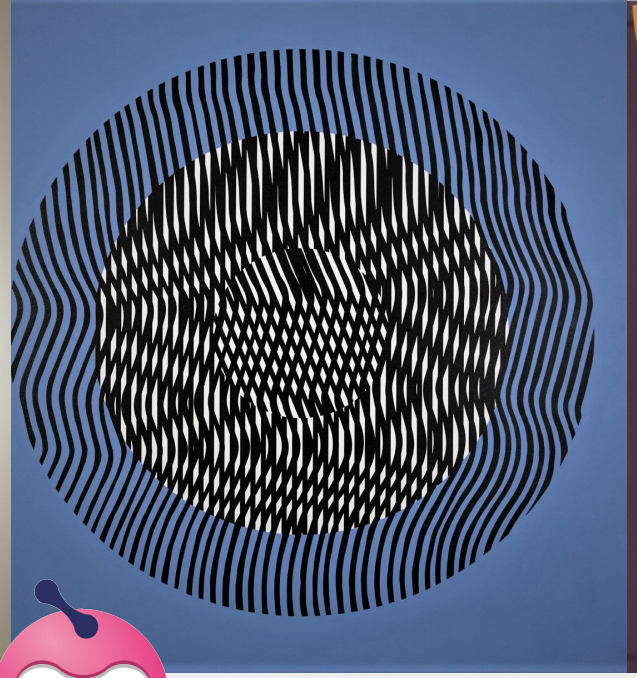
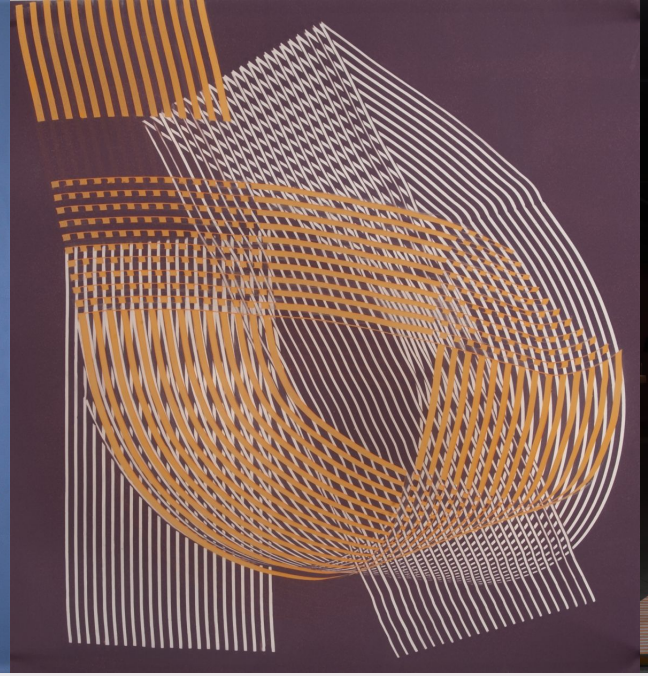
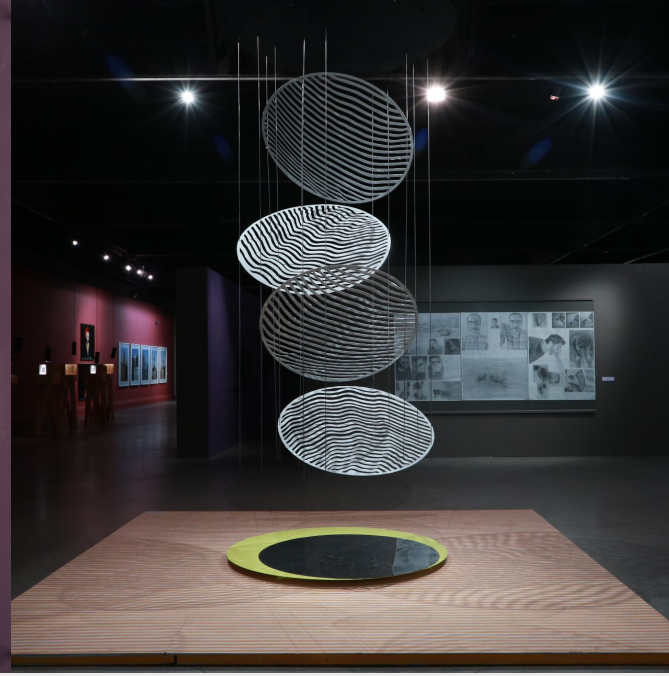
- **Apply AI – Private, public and academic sectors**
  Dissemination on how AI can be transformed into a tool at the service of people.

- **Promote AI - Autonomous Activities**
  Provide information and education, fostering understanding and increasing the appreciation of AI as a pillar for social progress.

Dissemination and connection with environment

2025 Impact

+50.000	Visits and direct interactions.
+19.000	Participating boys, girls and adolescents.
+500	Appearances in the media in Latin America.
+90	Bonding Activations.
+40	Alliances with Latin American institutions.
+8	Alliances with educational communities.
+6	Alliances for gender equality in Chile.

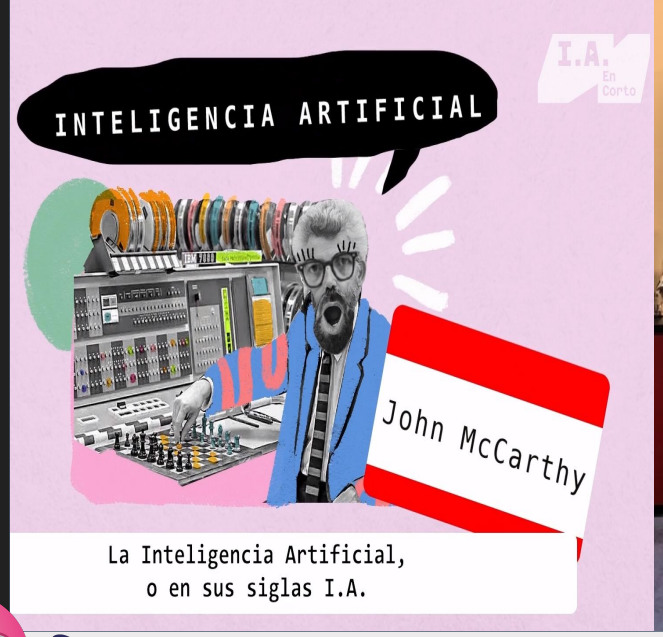
GAM EXPO

Installation with the renowned artist Liliana Iturriaga at the GAM Cultural Center.

★ **Intervention of the first floor and main gallery** with 4 works and 4 robots based on LLM that explain the work and career of the artist.

★ **Expected audience of 300,000 people** in addition to press coverage with mediapartners.

★ **Audience interaction station** with generative AI models developed by Cenia.



1

Cenia Podcast:

25-minute chapters dedicated to sharing information about AI and the like.

2

IA en corto:

6 capsules. Alliance with VTR Foundation and regional media network.

3

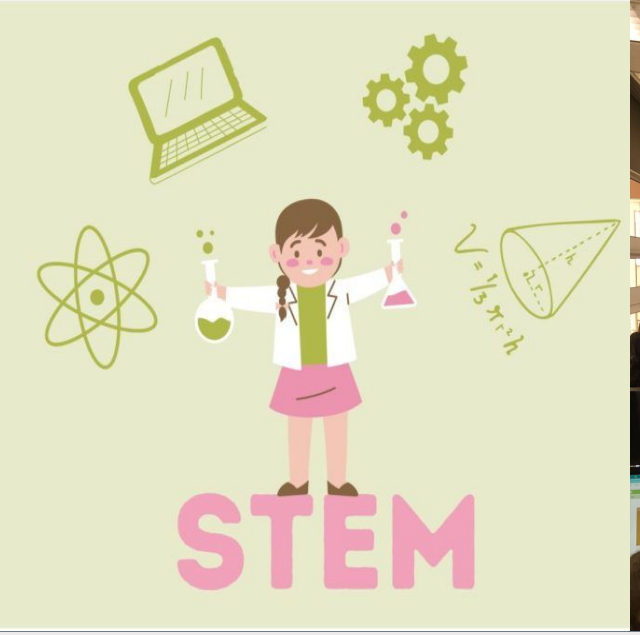
IA LAB seminars:

Technical talks by academics and developers about the state of the art and practice of the discipline.

4

Mass festivals:

Participation in Puerto Ideas and Science Festival in RM and at least one region.



5

Directiva "+ Mujeres":
Constitution of a committee with focal points/representatives of the different partner organizations, for the promotion and articulation of initiatives that reduce STEM gender gaps in Chile.

6

Technovation IA:

12-week course for 300 girls on AI topics to develop projects associated with SDG solutions.

7

DocencIA en Aula:

Training for professionals who work with students and want to apply AI in the classroom.

8

Desafiantes program:

Didactic workshops to teach basic notions of AI to basic and secondary education students.

Gender equality

1

Recognition “Inspiración STEM”
Award to the institution/person that contributed the most to reducing the gaps in AI in Chile within the activities managed by the “Directiva + mujeres”.

2

Technovation IA
12-week course for 300 girls and adolescents on AI topics to develop projects associated with SDG solutions.

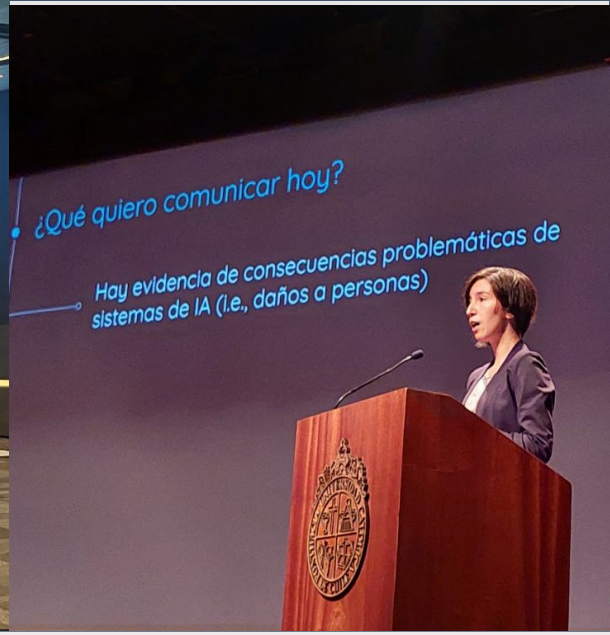
3

Mass Festivals: Cenia’s participation in massive activities with a gender perspective and aimed at the target audience (girls and adolescents).

Early AI vocation promotion

+750 girls in 3 years.
+ 100 solutions.
Top 5 wolrdwide in AI.

TECHNOVATION
Girls Chile



Academy

1

Academic Workshops: Presence at workshops and academic activities organized or co-organized by Cenia.

2

Second generation workshop of disseminators: Training of 20 academics and developers in scientific dissemination, focus on children and adolescents.

3

Cenia seminars: Technical talks by academics aimed at companies and their specific action. Aimed at C-class executives.

4

Dissemination talks: Focused on undergraduates, they bring AI concepts to promote it in university students.

Emblematics
Projects

Train and Upskilling
HAZLO CON IA

What is *Hazlo con IA?*

Artificial Intelligence at work service

A pioneering initiative that seeks to bring Generative Artificial Intelligence closer to the world of work, with the aim of streamlining tasks, optimizing time, and improving processes.

Hazlo con IA consists of three main areas:

- ☑️ Personalized training paths and e-learning courses
- ☑️ Minimum Viable Products - MVP
- ☑️ Research

CENIA
CENTRO NACIONAL DE INTELIGENCIA ARTIFICIAL

FUTURO DEL TRABAJO
SOFOFA
Capital Humano

Ministerio de Ciencia, Tecnología, Conocimiento e Innovación
Gobierno de Chile

Ministerio de Economía, Fomento y Turismo
Gobierno de Chile

Ministerio del Trabajo y Previsión Social
Gobierno de Chile

Ministerio del Trabajo y Previsión Social
Gobierno de Chile
sence
SOFOFA

with support from
Google.org

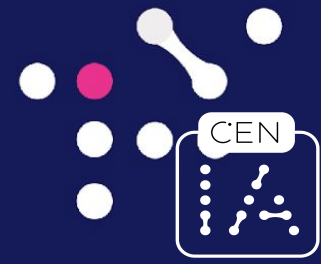
Hazlo con IA

1 month:

- **+59 K** web visitis
- **18.281** users
- **15.805** routes created
- **4.840** finished courses
- **18** ambassador organizations and **13** allied companies

Hazlo con iA

LATAM-GPT



Latam GPT

De Latinoamérica para Latinoamérica

Resumen General

Países en la base de datos: **21**

Total de documentos: **2.645.500**

Promedio de completitud: **59.5%**

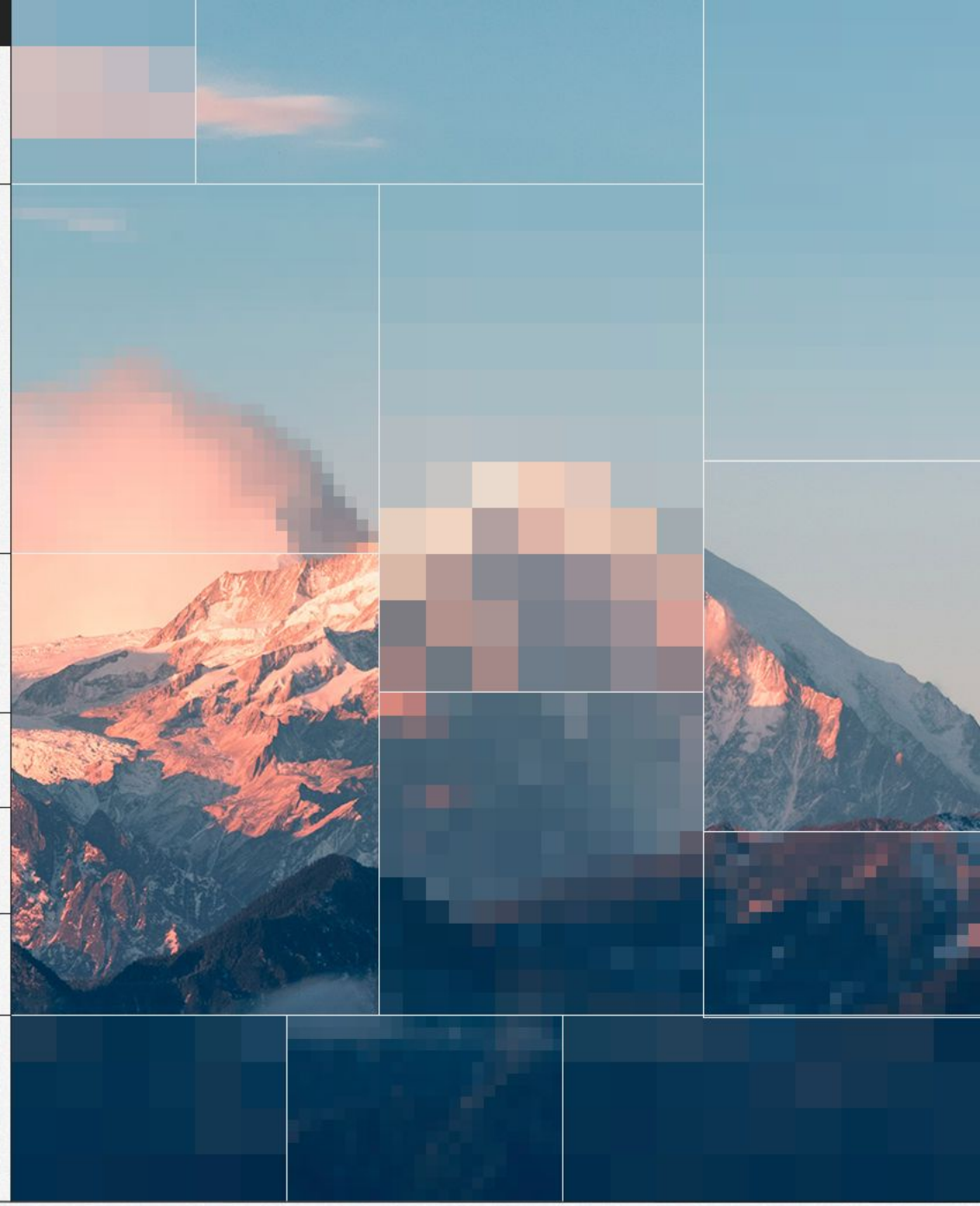
Los 5 países con mayor recolección:

Brasil	685.000
México	385.000
España	325.000
Colombia	220.000
Argentina	210.000

Selecciona un país en el mapa para ver información detallada.

Latin American
AI index

Índice **latinoamericano** de inteligencia artificial



Latin American AI Index

DOWNLOAD HERE

Sponsor and Allies

Proposal

Build an AI index that considers the material, social and cultural context of Latin America and the Caribbean.

Goal

- Measure and come relative performance by country, tracking it over time.
- Make visible the state of the art and practice in each country.
- Facilitate decision making through cross-cutting learning.
- Understand the social perception of AI.
- Identify future trends and expected impacts.

Dimension of analisys

Enabling factors	Research development and adoption	Governance	Social perception of AI	Future of AI in Latin America
Elements that are necessary for a robust AI system to be developed in the country.	Maturity of the elements that are necessary for a robust AI system to be developed in the country.	Measures the level of development of the institutional environment around AI.	Perception and dominant topics in social networks and digital media.	Academic trends and experts' view of social impact.

Public Impact

Press	Social media	Events	Webpage	Alliances
108 Publications. **12** Countries. **3** Languages.	**More than 1500** Publications. **More than 120.000** Reactions.	**CEPAL:** 1500 people. **Chile:** 470 people **Presentations:** Suiza Uruguay Perú México Colombia Panamá	**27.640** Visits **8.456** Downloads	Uruguay Argentina Chile Colombia Perú

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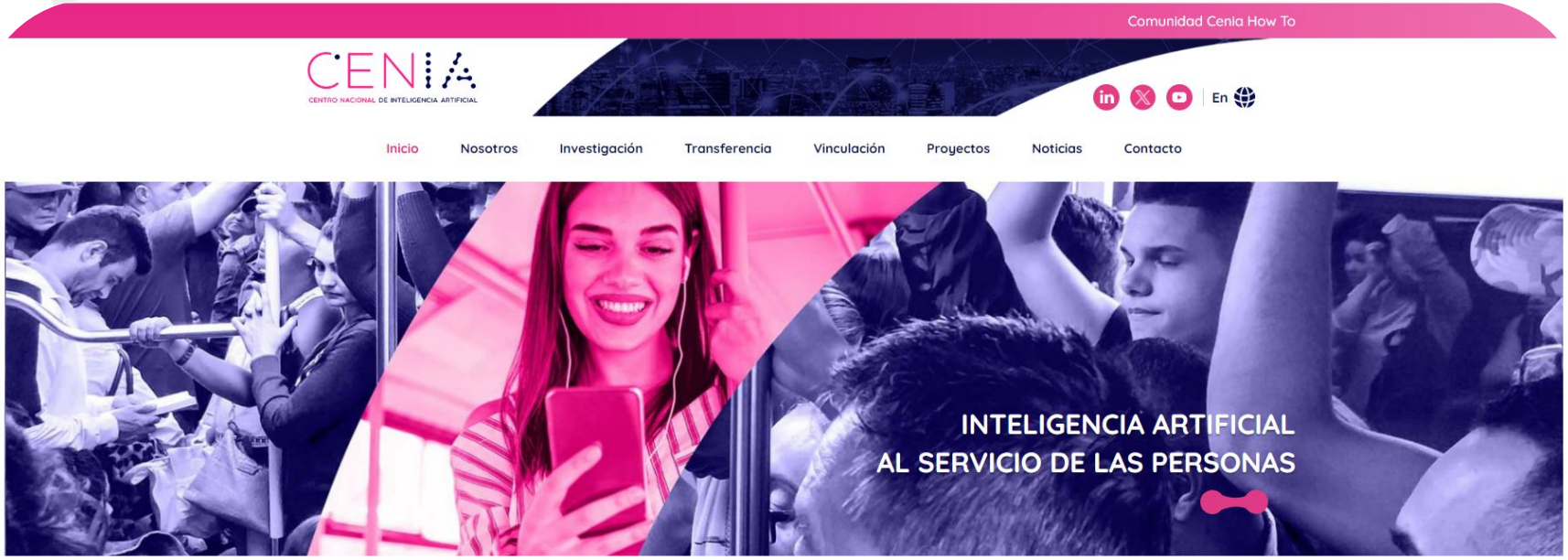

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Centro Nacional de Inteligencia Artificial

@cen_ia

Centro Nacional de Inteligencia Artificial

Research and Project Management Coordinator
sebastian.martinez@cenia.cl