EXECUTIVE REPORT: FINDINGS AND CONCLUSIONS OF PROJECT PID2021-124978NB-I00 LABORAr-IA PROJECT: Transforming the Future of Employment through Artificial Intelligence (Universitat Jaume I-Castellón, España)

1. PROJECT CONTEXT

This executive report summarizes the primary outcomes of the project **"Artificial Intelligence for the Enhancement of Public Labor Intermediation" (PID2021-124978NB-I00)**, funded by the Spanish Ministry of Science and Innovation.

The central objective of this research has been to facilitate a strategic transition from a **"reactive"** labor intermediation model to a **"proactive"** one through the deployment of **Deep Learning** algorithms. This initiative aligns with the mandates of **Spanish Employment Law 3/2023 (LE-2023)** and the regulatory framework established by the **EU AI Act (Regulation (EU) 2024/1689)**. In an increasingly digitalized labor market, the LABORAr-IA project—led by Universitat Jaume I (Principal Investigator: Arantzazu Vicente Palacio)—seeks to modernize Public Employment Services by shifting the paradigm from passively receiving job postings to actively securing employment opportunities for every worker.

2. PRIMARY RESEARCH FINDINGS

- **Development of the AI Agent:** The project successfully concluded the development of a **demonstrator for the management of job seekers' curricula vitae (CVs)**. This tool is accessible via a web platform and includes a programmatic service for integration, enabling the massive processing of data to optimize the efficiency of matching labor supply with demand. It is accessible here.
- **Diagnostic of Administrative Practice (LABORA):** The research identifies a structural gap between legislative ambition and operational reality. Currently, public employment service personnel dedicate approximately **80% of their time to manual data entry ("typing")** because CVs and job postings are predominantly collected in unstructured free-text fields.
- **Inadequacy of the Current System:** The existing "automatic matching" system is marginal and relies primarily on registration seniority. Consequently, it systematically overlooks **priority collectives** (vulnerable groups) within ordinary private-sector job offerings.
- **Legal and Risk Framework:** AI systems utilized for recruitment and selection are classified as **"high-risk"** under European regulations. This

classification imposes rigorous obligations regarding data governance, algorithmic transparency, and, most importantly, **significant human oversight** to allow for the correction or annulment of automated decisions.

3. KEY CONCLUSIONS

- **The Mandate for Proactivity:** It is imperative to replace the current system, which relies on voluntary candidate applications, with a model where the AI agent actively identifies job openings that align with the applicant's profile.
- **Mandatory Inclusion of Priority Collectives:** We propose that the algorithm must consistently include at least one candidate from a priority group in every "shortlist" of preselected applicants. This proposal should be accompanied by automated, precise information regarding the economic incentives and subsidies associated with their hiring. This "direct marketing" of active labor policies serves as an immediate stimulus for companies—particularly small-to-medium enterprises (SMEs) that may be unfamiliar with the bureaucracy of subsidies—to select these profiles.
- **Transparency and Explainability:** "Algorithmic opacity" or the "black box" phenomenon remain the primary obstacle to effective judicial protection. The right to receive a **clear explanation of the applied logic** is fundamental for detecting indirect biases related to gender, age, or disability.
- **Administrative Efficiency:** Automation must not only enhance matching but also streamline bureaucracy. For example, the system should automate subsidy applications upon the formal registration of a contract for a priority profile.

4. TECHNICAL CAPABILITIES OF THE AI AGENT

1. **Intelligent CV Analysis:** Automated extraction of competencies, educational background, and skill sets from PDF documents.
2. **Total Privacy:** Implementation of an anonymization system (via ADIA) to ensure that personal data does not interfere with the objectivity of the matching process.
3. **RAG Recommender:** Utilizing **Retrieval-Augmented Generation (RAG)**, the agent suggests personalized training itineraries and job offers based on the candidate's unique strengths.
4. **Semantic Mapping:** Translation of natural language into the administration's internal technical codes (the Tauró database), thereby facilitating internal organizational management.

This **Explainable AI (XAI)** system is not conceived as an opaque "black box," but rather as a support tool that guarantees transparency and human supervision—elements we consider the "backbone" of fundamental rights protection in the algorithmic era. Its operation is based on the following technical and legal pillars:

- **Individualized Transparency and Counterfactual Criteria:** Unlike generic descriptions, our system provides **"local" or individualized explanations** for every job seeker.
    - Outcome logic: The system must be capable of explaining not only the factors that led to a specific recommendation but also the conditions under which the outcome would have been different (counterfactual criteria). For example, it could indicate which additional skills or training would have enabled the candidate to be selected for a specific position.
    - Intelligibility: Transparency does not consist of displaying the source code—which would be unintelligible to the average user—but rather of making the parameters and criteria that determine decisions understandable.

- **Significant Human Supervision:** The AI agent is designed as a **decision-support instrument**, not a replacement for public employment staff. To avoid **"automation bias,"** public managers must conduct **substantive assessments** rather than merely ratifying algorithmic results. Personnel must have the authority and capacity to identify anomalies or biases and, ultimately, **override or modify automated decisions**.

- **Technical Implementation via RAG and Intelligent Agents.** From a technical perspective, the system employs a combination of Retrieval-Augmented Generation (RAG) and intelligent agents to generate recommendations. It identifies not only job opportunities but also training deficits and skills gaps in vulnerable profiles. Based on this analysis, it generates personalized course recommendations to enhance the candidate's employability, helping them proactively redirect their career.
    - Analysis of strengths and weaknesses: The agent analyzes the resume and identifies transversal skills and capabilities.
    - Justification of recommendations: When proposing a training course or job offer, the system uses the knowledge base to assess profile suitability, ensuring the recommendation is linked to elements previously extracted from the CV.

- **Data governance and bias mitigation**

As a **"high-risk"** system under Regulation (EU) 2024/1689, the project incorporates stringent controls:

- **Data Quality:** Training datasets must be relevant, representative, and error-free to prevent systemic discrimination.
- **Periodic Evaluation:** The system must undergo impact assessments and maintain traceability via automatic logs to ensure it does not perpetuate historical biases related to gender, age, or disability.

Summary: The proposed system enables public administration to remain accountable regarding algorithmic operations, ensuring that citizens understand the basis for specific recommendations while maintaining **genuine human control** over the labor intermediation process.

5. PUBLICATIONS AND OTHER RESULTS

A) Peer-reviewed publications

1) VICENTE PALACIO, A. "Inteligencia artificial para la mejora de la intermediación laboral de los servicios de empleo", en "Efectos laborales, sindicales y de seguridad social de la digitalización", Thomson Reuters Aranzadi, 2022 (978-84-1391-930-0)

2) VICENTE PALACIO, A. "La inteligencia artificial en la Ley Integral para la Igualdad y no discriminación", IUSTEL, Revista General de Derecho del Trabajo y de la Seguridad Social, núm. 64, 2023. ISSN 1696-9626; https://www.iustel.com//v2/revistas/detalle_revista.asp?id_noticia=425875.

3) VICENTE PALACIO, A., "De la pasividad reactiva a la intermediación proactiva. El rol del Deep Learning en la remoción de obstáculos para la contratación de personas con discapacidad", en "Empleo vulnerable de las personas con discapacidad: políticas de empleo y reformas para un mercado de trabajo inclusivo", Albacete (Bomarzo), 2026.

4) VICENTE PALACIO, A., "Leveraging AI for public labor intermediation in Spail: bridging the gap between Law 3/2023 and administrative practice in Labora", Beijing Law Review, vol. 17, n. 2 https://www.scirp.org/journal/paperinformation?paperid=151962 (Beijing Law Review; ISSN Print: 2159-4627 ISSN Online: 2159-4635)

5) TRUJILLO PONS, F., "La intermediación laboral digital a través de sistemas de IA recomendadora: sesgos algorítmicos y vulneración de derechos fundamentales", Revista Temas Laborales, en prensa.

6) BALLESTER PASTOR, I., "Como trazar una IA para Labora: reveses y objetivos (parte 1)", Revista de Derecho del Trabajo y de la Seguridad Social (IUSTEL), pendiente.

B) Congresses, conferences, or workshops related to the project

1) A. VICENTE PALACIO, Jornada formativa organizada por la Universidad de Cantabria-Gobierno de Cantabria, con el título "Deep Learning para la mejora de la eficiencia de los Servicios Públicos de Empleo (en especial, de la intermediación)". 2 y 3 de noviembre de 2021.

2) A. VICENTE PALACIO. Ponencia en el Congreso EL IMPACTO DE LA DIGITALIZACIÓN EN LAS RELACIONES DE TRABAJO: RETOS Y OPORTUNIDADES, organizado en Universidad Complutense de Madrid con la ponencia “Inteligencia artificial e intermediación de empleo”. Día 18-9-2023.

3) A. VICENTE PALACIO. Conferencia en la UJI en el marco de la actividad organizada por la Oficina de Prácticas e Inserción Laboral (OIPEP) “Superdimarts per l’ocupació”. La conferencia, dirigida a PDI, PTAS y estudiantes, tuvo lugar el 11-4-2024.

4) A. VICENTE PALACIO, Congreso Internacional celebrado en la Universidad de Castilla-La Mancha con la presentación y defensa oral de la comunicación “De la pasividad reactiva a la intermediación proactiva. El rol del Deep Learning en la remoción de obstáculos para la contratación de personas con discapacidad”. 27 y 28 de noviembre de 2025.