Juan Gutiérrez

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Education

Sep 2023 – Present **Ph.D. in Signal Processing & Machine Learning** Madrid, Spain
Universidad Politécnica de Madrid (UPM)

Sep 2020 – Jun 2023 **M.S. in Telecommunications Engineering** Madrid, Spain
Universidad Politécnica de Madrid
– Scholarship at *TU Hamburg*, Germany (Oct 2021 – Sep 2022)

Sep 2016 – Sep 2020 **B.S. in Electronic and Telecommunications Engineering** Málaga, Spain
Universidad de Málaga

Skills

Research Topics: Self-Supervised Learning (SSL), Multimodal Learning & Data Efficiency
Frameworks and Tools: C, C++, Python, PyTorch, TensorFlow, JAX, MATLAB, Git, Docker
Languages: Spanish (Native), English (Fluent)

Publications

Under Review

[1] **PANC: Prior-Aware Normalized Cut for Object Segmentation**
Juan Gutiérrez, Víctor Gutiérrez García, Jose Luis Blanco-Murillo.
CVPR 2026. Submitted: 08 Dec 2025.
Relevance: A weakly supervised framework for efficient segmentation leveraging manifold geometry to inject sparse token priors into spectral affinity graphs, significantly improving data efficiency via sparse token priors.

[2] **An Evaluation of Hybrid Annotation Workflows on High-Ambiguity Spatiotemporal Video Footage**
Juan Gutiérrez, Víctor Gutiérrez García, Ángel Mora-Sánchez, Silvia Rodríguez-Jiménez, Jose Luis Blanco-Murillo.
ICML 2026. Submitted: 23 Jan 2026
Relevance: Leverages fine-tuned CLIP encoders, transfer learning and hierarchical clustering to optimize data labeling efficiency in high-ambiguity settings.

Published

[3] **AI-Boosted Video Annotation: Exploring Pre-Labeling with Cross-Modalities**
Juan Gutiérrez, Ángel Mora Sánchez, Silvia Rodríguez Jiménez, José Luis Blanco. In *Distributed Computing and Artificial Intelligence (DCAI 2024)*, Springer LNCS, 2025.

[4] **Data Integration and Analytics of Cone Crusher Responses**
G. Asbjörnsson, M. Evertsson, P. Plaza, S. Rodríguez-Jiménez, J. Gavilanes, J. Cortón-González, **Juan Gutiérrez**, J. L. Blanco, J. E. Ortiz. In *14th International Comminution Symposium (Comminution '25)*, Cape Town, South Africa, 2025.

[5] **Open-Source System for Multilingual Translation and Cloned Speech Synthesis**
Mateo Cámara, **Juan Gutiérrez**, María Pilar Daza, José Luis Blanco. In *Forum Acusticum / Euronoise 2025*, Málaga, Spain.

[6] **Study for the Development of a Video Annotation Support System Using an Agnostic Image Model**
Juan Gutiérrez. Master's Thesis, Universidad Politécnica de Madrid, 2023. Supervised by José Luis Blanco.

Work Experience

Predoctoral Researcher Aug 2025 – **Present**

Department Signals, Systems and Radiocommunications, UPM, Madrid, Spain

- Research in self-supervised foundation models and the geometry of feature manifolds for image and video.
- Teaching assitant in signal processing, communications, and programming courses.
- Supervised two M.S and two B.S. theses.

Computer Vision Engineer Sep 2023 – Aug 2025

Sigma Cognition S.L., Madrid, Spain

- Led architechture design, model prototyping (PyTorch), data-efficient training, and experimental validation in production-like settings.
- Designed and deployed computer-vision solutions for EU and national R&D projects (DEQ, HADA) and industrial contracts (Stellantis, BASF).

Applied Researcher May 2024 – Aug 2025

FUNDETEL at UPM, Madrid, Spain

- Contributed technical research to public–private initiatives (HADA and DEQ).

Research Scholarship Jan 2023 – Jul 2023

UPM, Madrid, Spain

- Develop of M.S. Thesis: "Study for the Development of a Video Annotation Support System Using an Agnostic Image Model."

Relevant Projects

HADA. Publications: [3] [6] Jan 2022 – Aug 2024

Developed efficient cross-modal attention mechanisms for aligning voice, text, and image modalities. Focused on reducing compute overhead during the pre-training phase of multimodal encoders.

DigiEcoQuarry (DEQ). Publications: [4] Sep 2023 – May 2025

Design and validation of an integrated digital quarry system through multimodal sensing and AI-based decision support. Developed computer-vision models and data-processing algorithms for real-time monitoring across pilot sites.

Industrial R&D (Stellantis & BASF) Sep 2023 – Aug 2025

Applied computer-vision projects for weld-defect detection and corrosion identification. Focused on robust model prototyping, cross-domain generalization, and deployment in production environments.

Talks

Seminar: Text-Based Video Retrieval through Hierarchical Content Representation Madrid, Spain (May 2025)

Great Talks @ Teleco, Internal Doctoral Event.

Using Agnostic Models on Image and Text to Support Video Annotation León, Spain (Jun 2023)

Artificial Intelligence Applications and Innovations (AIAI 2023).