Nil Biescas

https://github.com/NilBiescas Barcelona, Spain nbiescas@cvc.uab.cat

Personal Profile

AI undergraduate specializing in deep learning, computer vision, and NLP, with demonstrated publications in two international conferences. Particularly interested in graph neural networks and vision-based systems, with hands-on experience in graphs and other fundamental deep learning models. Fluent in three languages, and passionate about AI.

Education

Autonomous University of Barcelona September 2021-Present
Bachelor of Science in Artificial Intelligence with Honors Graduation: Jun 2025
Specialization: Deep Learning, Computer Vision, Natural Language Processing
GPA: Overall 9.1/10; Top 3%

Honors in Fundamentals of Computer Vision, Learning and Processing of Natural Language, Analysis of Graphs and Networks, Fundamentals of Programming 2, Ethics, Probability and Statistics, Autonomous Agents, Intelligent Robots, and Synthesis Project 2.

Publications

Nil Biescas, Carlos Boned, Josep Lladós, Sanket Biswas. *GeoContrastNet: Contrastive Key-Value Edge Learning for Language-Agnostic Document Understanding* International Conference on Document Analysis and Recognition (Oral Presentation ICDAR '24).

Maria Pilligua, **Nil Biescas**, Javier Vazquez-Corral, Josep Lladós, Ernest Valveny, Sanket Biswas *LayeredDoc: Domain Adaptive Document Restoration with a Layer Separation Approach* ECCV WICV workshop 2024 — ICDAR ADAPDA workshop 2024 WebPage Demo

Research Experience

Computer Vision Center (CVC) July 2023 - Present
Research Student on Computer Vision applied to Document Analysis
Supervisor: Dr. Josep Lladós

Graph Neural Networks for Document Analysis
Developed a Graph Neural Network for document analysis, focusing on tasks such as link prediction and named entity recognition.

- **Two-stage Graph Neural Network**: Developed a model to process documents represented as graphs for visual understanding. The first stage leverages enhanced geometric information, which is then combined with visual data to improve visual information extraction.
- **ICDAR '24 Presentation**: Presented this work as an oral presentation at the International Conference on Document Analysis and Recognition (ICDAR) 2024.

Semantic Layer Separation for Document Image Restoration (DIR)
Proposed a novel approach for domain adaptation in document image restoration (DIR).

- **LayeredDoc Framework**: Proposed a semantic layer separation approach that treats documents as composed of distinct text and graphic layers, enhancing adaptability to various document types.
- **Synthetic Data Training and Real-world Evaluation**: The model was trained on synthetic data and evaluated on the LayeredDocDB dataset, which includes real documents from various domains to test domain adaptability. The results demonstrate strong generalization for real-world DIR tasks across diverse document types.

Ongoing Work

- **Large Language Models (LLMs) for Document Understanding**: Currently working with Llama3.1 for document understanding tasks using the Hugging Face transformers library and PyTorch.
- **New Dataset Development**: Creating a document-based dataset to evaluate the reasoning capabilities of vision-language models.

Additional Contributions

- Actively participated in weekly research discussions and reading groups, where I presented multiple research papers and discussed ongoing work with supervisors.

Highlighted Projects

AI for Story Generation Spring 2024

- Developed StorIA in collaboration with three undergraduates, an app that generates stories through collaborative storytelling.
- Experimented with Sketch2Image models using ControlNet and Variational Autoencoders.
- Generated descriptive text based on images using BLIP2 and Mixtral.
- Integrated all components into a fully functional application.

Advanced Natural Language Processing Spring 2024

- Enhanced Catalan text summarization with a novel LLM-guided augmentation technique.
- Generated a synthetic dataset using LLAMA 70B to mitigate data scarcity.
- Fine-tuned smaller LLMs on synthetic data for better performance.
- Developed a structured framework for data-scarce domains.

Summer school July 3-5, 2024

Summer school in robotics, control systems and AI

Awards

2023 CVC Internship Award – 2,000€

Community Involvement

Participated in Deep Learning Reading Groups July 2023-Present

References

Dr. Josep Lladós
Director of the Computer Vision Center. Supervised me during my time at Computer Vision Center.
Email: josep@cvc.uab.es

Sanket Biswas
Research intern at Adobe and CVC co-supervisor.
Email: sanket.biswas@cvc.uab.cat