

Juanpablo Heredia

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Education

Getulio Vargas Foundation (FGV), Visual Data Science Lab
PhD in Mathematical Modelling and Data Science
Supervisor: Prof. Jorge Poco

Rio de Janeiro, Brazil
Mar 2023 - Feb 2027

Universidad Católica San Pablo
BSc of Science in Computer Science
Supervisor: Prof. Regina Ticona
2nd in class

Arequipa, Peru
Jan 2016 - Feb 2021

Research Projects

Spatiotemporal forecasting with LLMs and knowledge graph reasoning July 2025 – Present
Conduct literature review on spatiotemporal forecasting, LLM integration, and knowledge graphs.
Collect, preprocess, and curate data from multiple sources.

Visual analytics system for exploring and explaining spatiotemporal anomalies Feb 2025 – Aug 2025
Article accepted at SIBGRAPI 2025.
Modeled crime data as a spatiotemporal graph and applied STARMA procedure for anomaly detection.
Designed and implemented an interactive visualization system using *d3.js*.
Integrated LLM-based web search to generate contextual explanations from news and external events.

Graph-based deep learning for spatiotemporal forecasting Jul 2023 – Present
Applied geometric deep learning methods and state-of-the-art models to predict time series on graph nodes (spatiotemporal signals).
Achieved over 90% overall accuracy; however, local forecasting on sparse crime data hotspots remains below 40%.
Exploring extensions to topological deep learning with hypergraphs and multi-resolution architectures (e.g., U-Net variants).

Participation in VAST challenge (Two Tasks) May 2024 – Oct 2024
Final project for graduate course *Visual data analysis*; awarded the *Strong Data Enrichment Award*.
Developed visualization systems to explore and analyze bias and anomalies in knowledge graphs using fishing data.

Emotion detection system for human-robot interaction Oct 2021 – Jun 2022
Implemented a client-server architecture where a deep learning model processed camera images to detect emotions and adapt robot behavior accordingly.

Multimodal emotion recognition from images Mar 2020 – Aug 2021
Processed images to extract posture, facial, and background features; combined modalities using a multinomial distribution-based fusion mechanism.

Comparison of human pose estimation methods Jul 2019 – Dec 2019
Reproduced experiments with state-of-the-art computer vision models on images and videos.

Publications

- Juanpablo Heredia, Edmundo Lopes-Silva, Judith Cardinale, Jose Diaz-Amado, Irvin Dongo, Wilfredo Graterol, and Ana Aguilera. 2022. *Adaptive multimodal emotion detection architecture for social robots*. *Ieee Access*.
- Juanpablo Heredia, Judith Cardinale, Irvin Dongo, and Jose Diaz-Amado. 2021. *A multi-modal visual emotion recognition method to instantiate an ontology*. In 16th **International conference on software technologies**.
- Diego Peña, Ana Aguilera, Irvin Dongo, Juanpablo Heredia, and Judith Cardinale. 2023. *A framework to evaluate fusion methods for multimodal emotion recognition*. *IEEE Access*.
- Juanpablo Heredia, Judith Cardinale, Irvin Dongo, Ana Aguilera, and Jose Diaz-Amado. *Multimodal emotional understanding in robotics*. 2022. In **SENTIRobots Workshop** at 18th International Conference on Intelligent Environments.

- Dany Diaz, Felipe Moreno-Vera, **Juanpablo Heredia**, Fabrício Venturim, and Jorge Poco. 2024. *FishBiasLens: Integrating Large Language Models and Visual Analytics for Bias Detection*. In **IEEE Visual Analytics Science and Technology VAST Challenge**.
- **Juanpablo Heredia**, Fabrício Venturim, Dany Diaz, Felipe Moreno-Vera, and Jorge Poco. 2024. *Tracking Overfishing: Visual Analytics of Suspicious Behaviors in Commercial Fishing Vessels*. In **IEEE Visual Analytics Science and Technology VAST Challenge**.

Theses and Reports

- Juanpablo Andrew Heredia Parillo. 2021. *A multi-modal emotion recogniser based on the integration of multiple fusion methods*. BSc thesis, Catholic University San Pablo, Arequipa, Peru.
- Juanpablo Andrew Heredia Parillo. 2021. *An automatic emotion recognition system that uses the human body posture*. Undergraduate research, Catholic University San Pablo, Arequipa, Peru.

Experience

Teaching assistant

Getulio Vargas Foundation (FGV)

Rio de Janeiro, Brazil

Feb 2024 – Jul 2024, Feb 2025 – Jul 2025

Assisted in teaching the *Data visualization* undergraduate course (two semesters).

Guest researcher (Internship)

Getulio Vargas Foundation (FGV)

Rio de Janeiro, Brazil

Sep 2022 – Feb 2023

Developed an LLM-based chatbot to generate visualizations from natural language queries and CSV datasets.

Full stack developer

Inhogar Real Estate

Arequipa, Peru

Sep 2022 – Feb 2023

Built a website and CRM platform to support real estate operations and HR management.

Research student

Catholic University San Pablo

Arequipa, Peru

Apr 2020 – May 2022

Conducted part-time pre-professional research in computer vision.

Developed an image-based emotion recognition system using machine and deep learning; implemented experiments leading to scientific publications.

Awards and Scholarships

Best paper award

SIBGRAPI - Visualization & Computer Graphics Track.

2025

Strong data enrichment award

IEEE VAST Challenge.

2024

IEEE VIS diversity and inclusion award

Registration and accommodation grant for IEEE VIS 2024.

2024

Direct PhD scholarship

São Paulo State Research Support Foundation (FAPESP): full scholarship with monthly stipend.

Jun 2023 – May 2027

PhD scholarship

Getulio Vargas Foundation (FGV): tuition support.

Mar 2023 – Feb 2027

Undergraduate thesis competition

Awarded 3rd place.

2021

Academic distinguished undergraduate award

Ranked 2nd in my undergraduate class.

Dec 2020

Skills

Programming Python, C++, Javascript, MATLAB/Scilab, LaTeX

Machine Learning PyTorch, scikit-learn, HuggingFace Transformers, TensorFlow, Keras

Technologies Git, Pandas, NumPy, Node.js, Django, Linux, GCS

Languages English (Intermediate/B2), Portuguese (Intermediate), Italian (Elementary), Spanish (Native)

Volunteering

ICEC 2019

Volunteer at the 18th International Conference on Entertainment Computing.

Arequipa, Peru, Nov 2019

JCSG 2019

Volunteer at the Joint Conference on Serious Games.

Arequipa, Peru, Nov 2019

Events, Schools, and Workshops Attended

Machine Learning Summer School

Arequipa, Peru, Aug 2025

Summer School of Data Science

Rio de Janeiro, Brazil, Jan 2025

ACM Conference on Fairness, Accountability, and Transparency (FAccT)

Rio de Janeiro, Brazil, Jun 2024