

Francisco Mena

PHD CANDIDATE · COMPUTER SCIENCE

Kaiserslautern, Germany

✉ famenatoro@gmail.com | 📠 Francisco-Mena-3 | 📞 Francisco Mena | 🌐 fmenat | 📺 fmenat |
0000-0002-5004-6571 | 🐦 fmenat14



About Me

My commitment is to contribute to the understanding of machine learning by identifying the capabilities and limitations of the learning models. At present, the computational complexity of current solutions has grown notably, requiring more resources and data for the proper learning of them. For this reason, it is necessary to propose models with different approaches, changing the perspective of solutions in different areas. Indeed, the solutions should not be based on human intervention (even in the form of labels), or domain-specific, that only works for particular domains and areas needing a careful choice of model type and architecture.

Research Lines & Interests

Deep Learning Applications Artificial Neural Networks, Multi-view Learning, Data Fusion, Multi-sensor Modeling, (Variational) Autoencoders
Earth Observation, Vegetation Applications, Crowdsourcing, Neural Information Retrieval, Astroinformatics

Unsupervised Learning Dimensionality Reduction, Representation Learning, Latent Variable Modeling, Deep Clustering

Education

PhD in Computer Science

UNIVERSITY OF KAISERSLAUTERN-LANDAU (RPTU)

Kaiserslautern, Germany

Jan. 2022 - Now

- Thesis title: *Data Fusion in Multi-view Learning for Earth Observation Applications with Missing Views.*

Magíster en Ciencias de la Ingeniería Informática

FEDERICO SANTA MARÍA TECHNICAL UNIVERSITY (UTFSM)

Valparaíso, Chile

Mar. 2018 - Sep. 2020

- Equivalent to *Master of Science in Computer Engineering*
- Thesis title: *Mixture Models for Learning in Crowdsourcing Scenarios.*
- Thesis description: The learning from crowds area was explored by using probabilistic model and neural networks. Specifically, two methods were proposed to learning from multiple inexpert annotations based on collective confusion patterns. A latent group variable model, with EM inference, was introduced in two settings of the learning from crowds problem. The results show that they are better for large-scale annotation scenarios, computationally (memory and temporal) and in inference (predictions).
- Grade Point Average: 94%.

Ingeniería Civil en Informática

FEDERICO SANTA MARÍA TECHNICAL UNIVERSITY (UTFSM)

Santiago, Chile

Mar. 2013 - Sep. 2020

- Equivalent to *Computer Engineering*
- Grade Point Average: 80%.
- Top 10% on Class Rank. – Rank #4 of 66 students.

Licenciado en Ciencias de la Ingeniería Informática

FEDERICO SANTA MARÍA TECHNICAL UNIVERSITY (UTFSM)

Santiago, Chile

Mar. 2013 - Nov. 2017

- Equivalent to *Bachelor of Science in Computer Engineering*
- Records linked to "*Ingeniería Civil en Informática*"

Experience

German Research Centre for Artificial Intelligence (DFKI)

STUDENT RESEARCH ASSISTANT AT DFKI

Kaiserslautern, Germany

Mar. 2022 - Now

- Working together with PhD on Earth Observation data for crop yield prediction.
- **Technologies:** Python, Confluence, Jira, Teams, OneDrive, Gitlab, QGIS, and Slurm.

Federico Santa María Technical University (UTFSM)

ACADEMIC

Santiago, Chile

2014 - 2021

- (Lecturer) Computational Statistics, 3 times, since 2020.
- (Lecturer) Artificial Neural Networks, 1 time, in 2020.
- (Teacher Assistant) Computational Statistics, 2 times, since 2019.
- (Teacher Assistant) Artificial Neural Networks, 3 times, since 2018.
- (Teacher Assistant) Machine Learning, 3 times, since 2017.
- (Teacher Assistant) Fundamentals of Operations Research, 3 times, since 2017.
- (Laboratory Assistant) Mathematics, 1 time, in 2014.

Federico Santa María Technical University (UTFSM)

RESEARCH ASSISTANT AT CHILEAN VIRTUAL OBSERVATORY (CHIVO)

Santiago, Chile

Jul. 2017 - May 2018

- Professional practice as research assistant on different astroinformatics projects.
- **Technologies:** Jupyter Notebook, FITS, Python and Slurm.
- Working on the astronomical data reduction of ALMA and ESO observatories, and the creation of astronomical datasets.

Farmacia Las Rosas S.A.

FRONT-END & BACK-END DEVELOPER

- Industrial practice as a desktop application developer.
- **Technologies:** Python, QT and Excel.
- Some operational functions of the pharmacy were automated.

Santiago, Chile
Jan. 2017 - Mar. 2017

Honors & Awards

2022	PhD Scholarship , RPTU in Kaiserslautern	2022-present
2019	Incentive Program for Scientific Initiation (PIIC) , Federico Santa María Technical University	2019-2020
2018	Master program scholarship , Federico Santa María Technical University	2018-2020
2013	Honor Roll , <i>Institutional excellence</i> , Federico Santa María Technical University	2013

Research funding

2020	Investigator , DGIP PI_M_17_6, Federico Santa María Technical University (UTFSM)	Chile
2019	Research Assistant , BASAL FB-0008, Advanced center for Electrical & Electronic Engineering (AC3E)	Chile
2017-2018	Research Assistant , FONDEF IT15I10041, Chilean Virtual Observatory (ChiVO)	Chile

Publications

PEER-REVIEWED ARTICLES IN JOURNAL

Common practices and taxonomy in deep multiview fusion for remote sensing applications	<i>IEEE JSTARS</i>
FRANCISCO MENA, DIEGO ARENAS, MARLON NUSKE, ANDREAS DENGEL DOI 10.1109/JSTARS.2024.3361556	Feb. 2024
On the quality of deep representations for Kepler light curves using variational auto-encoders	<i>MDPI Signals</i>
FRANCISCO MENA, PATRICIO OLIVARES, MARGARITA BUGUEÑO, GABRIEL MOLINA, MAURICIO ARAYA DOI 10.3390/signals2040042	Oct. 2021
Harnessing the power of CNNs for unevenly-sampled light-curves using Markov transition field	<i>Astronomy and Computing</i>
MARGARITA BUGUEÑO, GABRIEL MOLINA, FRANCISCO MENA, PATRICIO OLIVARES, MAURICIO ARAYA DOI 10.1016/j.ascom.2021.100461	Mar. 2021
Interpretable and effective hashing via Bernoulli variational auto-encoders	<i>Intelligent Data Analysis</i>
FRANCISCO MENA, RICARDO ÑANCULEF, CARLOS VALLE DOI 10.3233/IDA-200013	Dec. 2020
Collective annotation patterns in learning from crowds	<i>Intelligent Data Analysis</i>
FRANCISCO MENA, RICARDO ÑANCULEF, CARLOS VALLE DOI 10.3233/IDA-200009	Dec. 2020
Classical machine learning techniques in the search of extrasolar planets	<i>CLEI Electronic Journal</i>
FRANCISCO MENA, MARGARITA BUGUEÑO, MAURICIO ARAYA DOI 10.19153/cleiej.22.3.3	Dec. 2019

PEER-REVIEWED CONFERENCE PROCEEDINGS

Impact assessment of missing data in model predictions for Earth observation applications	<i>IGARSS, IEEE</i>
FRANCISCO MENA, DIEGO ARENAS, MARCELA CHARFUELAN, MARLON NUSKE, ANDREAS DENGEL https://arxiv.org/abs/2403.14297	Oct. 2024
A comparative assessment of multi-view fusion learning for crop classification	<i>IGARSS, IEEE</i>
FRANCISCO MENA, DIEGO ARENAS, MARLON NUSKE, ANDREAS DENGEL DOI 10.1109/IGARSS52108.2023.10282138	Oct. 2023
Self-supervised Bernoulli autoencoders for semi-supervised hashing	<i>CIARP, Springer</i>
RICARDO ÑANCULEF, FRANCISCO MENA, ANTONIO MACALUSO, STEFFANO LODI, CLAUDIO SARTORI DOI 10.1007/978-3-030-93420-0_25	Jan. 2022
Revisiting machine learning from crowds a mixture model for grouping annotations	<i>CIARP, Springer</i>
FRANCISCO MENA, RICARDO ÑANCULEF DOI 10.1007/978-3-030-33904-3_46	Oct. 2019
A binary variational autoencoder for hashing	<i>CIARP, Springer</i>
FRANCISCO MENA, RICARDO ÑANCULEF DOI 10.1007/978-3-030-33904-3_12	Oct. 2019
Refining exoplanet detection using supervised learning and feature engineering	<i>CLEI, IEEE</i>
MARGARITA BUGUENO, FRANCISCO MENA, MAURICIO ARAYA DOI 10.1109/CLEI.2018.00041	Oct. 2018

Skills

Computer Python, Keras, PyTorch, Jupyter Notebook, LaTeX, , C++, C, R, Sony Vegas
Supervision Three Master theses, five student projects
Communication Lecturer role at University, numerous presentations in conferences and workshops
Personal Teamwork, planning and organization, responsibility, collaboration
Languages Spanish (Native), English (IELTS 7.0)

References

Diego Arenas diego.arenas@dfki.de, *Smart Data & Knowledge Services*, German Research Centre for Artificial Intelligence.
Andreas Dengel andreas.dengel@dfki.de, *Department of Computer Science*, University of Kaiserslautern-Landau.
Ricardo Nanculef jnancu@inf.utfsm.cl, *Informatics Department*, Federico Santa María Technical University.
Mauricio Araya mauricio.araya@usm.cl, *Electronics Department*, Federico Santa María Technical University.
Claudio Sartori claudio.sartori@unibo.it, *Department of Computer Science and Engineering*, University of Bologna.