

FEDERICO MANZELLA

Symbolic Machine Learning Researcher

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ABOUT ME

I work as a freelance data scientist and AI specialist under the name [ferdiu AI Solutions](#) with a lot of experience in the industry. My passion for technology and innovation drives me to deliver cutting-edge solutions that help businesses harness the full potential of their data.

Every day, I am driven by the challenge of pushing technological boundaries while delivering practical solutions that meet my clients' needs.

While I work as a freelance I do research in [Symbolic Machine Learning](#) at the [ACL\[AI\] Lab](#) at the University of Ferrara (Italy), where I graduated in Computer Science, since my first year of bachelor's degree. There I am contributing in both the theoretical and implementation part of algorithms for data analysis and machine learning and in the design and implementation of a framework for Symbolic Machine Learning in Julia programming language.

I held the triple role of [DevOps Engineer](#), [Software Architect](#) and [AI Scientist](#) at [IN MM S.r.l.](#) where I blended my expertise in development, operations, and artificial intelligence to drive innovative projects forward. I worked there until I realized that I wanted to start my own business, later creating my current main activity: [ferdiu AI Solutions](#).

But my first love, and the reason I started studying computer science, is [Videogame Development](#). I started when I was 13, copying and modifying code around the web until I designed, developed and published various games on many digital distribution services.

I am looking forward to making all of these worlds, the machine learning on the one hand and game development on the other, collapse into one.

EXPERIENCE

Freelance Data Scientist and AI Specialist

[ferdiu AI Solutions](#)

21st Dec 2024 – Ongoing

- research and development;
- AI integration and development;
- data management and intelligent analysis;
- AI model development and deployment;
- risk management and mitigation;
- project planning and management and technical leadership;
- performance management and resource allocation;
- requirements gathering and customer focus.

DevOps Engineer, Lead Developer and AI Scientist

[IN MM S.r.l. \(In Manibus Meis\)](#)

4th Mar 2024 – 20th Dec 2024

MY LIFE PHILOSOPHY

"Behind every problem there is an opportunity."

cit. Galileo Galilei

"The only way to go fast is to go well."

cit. Uncle Bob

"Formal education will make you a living; self-education will make you a fortune."

cit. Jim Rohn

STRENGTHS

Self-taught

Eye for detail

Fast learner

Problem solving

LANGUAGES

Italian

● ● ● ● ●

English

● ● ● ● ●

Spanish

● ● ● ● ●

EDUCATION

M.Sc. in Artificial Intelligence, Data Science and Big Data

[University of Ferrara](#)

Sept 2023 – Ongoing

Topics: artificial intelligence, machine learning, data analysis, computer vision, NLP.

B.Sc. in Computer Science

[University of Ferrara](#)

Sept 2020 – March 2023

Grade: 109 / 110

Thesis: The Voice of COVID-19: Breath and Cough Recording Classification with Temporal Decision Trees and Random Forests **Topics:** computability and computational complexity, computer graphics, database, data structures, software engineering.

Advanced training course in Game Design and Development

[ECIPAR Bologna](#)

- project planning and management and technical leadership;
- research and development;
- software architecture and design;
- AI integration and development;
- data management and intelligent analysis;
- data gathering with real time applications;
- AI model development and deployment;
- team mentoring and collaboration;
- problem solving and troubleshooting;
- code development, reviews and quality assurance;
- workflow definition and implementation (CI/CD);
- risk management and mitigation;
- continuous improvement;
- performance management and resource allocation;
- requirements gathering and customer focus.

Symbolic Machine Learning Researcher

ACLA1 (Applied Computational Logic and Artificial Intelligence)

📅 2021 – Ongoing

- research and study of transparent intelligent systems;
- research and study of feature selection methods;
- study of temporal data of physiological origin (EEG, ECG) and audio;
- design and development of a machine learning framework [Sole.jl](#) and study of unstructured data with symbolic methods in the Julia programming language.

Indie Game Developer and Designer

📅 Month 2019 – Ongoing

- [Book Hunter](#) - designed, developed and published a stealth adventure game on Steam;
- [Thats Why You Always Lose Your Keys](#) - designed, developed and published an humorous strategic game on itch.io;
- [Staring](#) - designed, developed and published an humorous puzzle game on itch.io;
- [Poing Jump](#) - designed, developed and published an hyper casual game on Google Play Store;
- currently developing a platformer game based on pseudo-realistic magnet physic using Godot 4 Game Engine (previously in Unity);
- currently developing a rhythm game for Android with Godot 4 Game Engine (based on the idea from a game developed for a [Game Jam](#));
- currently designing and developing an online board game in Node.js.

Research Scholarships and Collaborations

- July 1st 2025 – September 30th 2025 - *Supporto alla gestione e analisi dati survey per il progetto TINKER – Economia Circolare e Innovazione* ([Sel. 03/2025/BR - DEM - UNIFE](#))
- January 1st 2025 – June 30th 2025 - *Studio di componenti intelligenti per l'analisi testuale ed estrazione di conoscenza da essi* ([Sel. 4/2024/BR - DMI - UNIFE](#));
- June 1st 2023 – December 31st 2023 - *Sistemi intelligenti per l'analisi delle conversazioni ed estrazione di conoscenza da esse* ([Sel. 1/2023/BR - DMI - UNIFE](#));

📅 Nov 2019 – Dec 2020

Topics: game design, level design, game development, game production, workflow organization (Slack, Git), C# programming language, Unity (game engine), Unreal Engine 4 (the basics), video games history.

DRIVER'S LICENSE

Car: B

PROGRAMMING

Bash/Shell	●	●	●	●	●
Julia	●	●	●	●	●
Python	●	●	●	●	●
C/C++	●	●	●	●	●
C#	●	●	●	●	●
GDScript	●	●	●	●	●
LaTeX	●	●	●	●	●
Java	●	●	●	●	●
Kotlin	●	●	●	●	●
Vala	●	●	●	●	●
MATLAB	●	●	●	●	●
R	●	●	●	●	●
Prolog	●	●	●	●	●
Rust	●	●	●	●	●
Fortran	●	●	●	●	●
Swift	●	●	●	●	●
Ruby	●	●	●	●	●

TypeScript/JavaScript	●	●	●	●	●
HTML/CSS	●	●	●	●	●
PHP	●	●	●	●	●
SQL	●	●	●	●	●

CG	●	●	●	●	●
GLSL	●	●	●	●	●
HLSL	●	●	●	●	●
Godot Shading Language	●	●	●	●	●

MY TOOLBOX

- **OS:** Fedora GNU/Linux.
- **Editor/IDE:** Kate/KDevelop, Atom/Pulsar, VS Code/VS Codium, NeoVim, Zed.
- **Teamwork and Workflow:** Git, GitHub, GitLab, Slack, Discord, Microsoft Sharepoint.
- **Machine Learning:** Sole.jl, MLJ, TensorFlow, Keras, scikit-learn.
- **Game Engine:** Godot 4, Unity, Unreal Engine.
- **Audio Editing:** Audacity, LMMS, FMOD, Wwise, Ardour 7/8, Guitar Pro 6/7/8, VCV Rack.

- November 2023 - *Studio del problema della consistenza e permanenza dei giudizi neuroestetici* ([Sel. 3/2023 - DMI - UNIFE](#));
- November 2022 - *Analisi di segnali EEG con strumenti di apprendimento simbolico* ([Sel. 8/2022 - DMI - UNIFE](#)).

PUBLICATIONS

Journal Articles

- M. Coccagna, **F. Manzella**, S. Mazzacane, G. Pagliarini, V. Sironi, A. Gatti, E. Caselli, and G. Sciavico, "Towards an objective theory of subjective liking: A first step in understanding the sense of beauty," *Plos one*, vol. 18, no. 6, e0287513, 2023. DOI: 10.1371/journal.pone.0287513.
- **F. Manzella**, G. Pagliarini, G. Sciavico, and I. E. Stan, "The voice of COVID-19: breath and cough recording classification with temporal decision trees and random forests," *Artificial Intelligence in Medicine*, vol. 137, p. 102486, 2023. DOI: 10.1016/J.ARTMED.2022.102486.

Conference Proceedings

- L. Balboni, M. Ghiotti, **F. Manzella**, M. Milella, G. Pagliarini, A. Paradiso, G. Sciavico, and I. E. Stan, "Symbolic learning workflows in Sole.jl," in *Julia Programming Language Convention (JuliaCon 2024)*, 2024. [Online]. Available: <https://www.youtube.com/live/f7CLxthbZes?feature=shared&t=11699>.
- L. Balboni, M. Ghiotti, **F. Manzella**, M. Milella, G. Pagliarini, A. Paradiso, G. Sciavico, and I. E. Stan, "Third millennium symbolic learning with Sole.jl," in *Julia Programming Language Convention (JuliaCon 2023)*, 2023. [Online]. Available: <https://www.youtube.com/watch?v=HTRhOmQIObg>.
- P. Cavina, **F. Manzella**, G. Pagliarini, G. Sciavico, and I. E. Stan, "(un)supervised univariate feature extraction and selection for dimensional data," in *Proceedings of the 2nd Italian Conference on Big Data and Data Science (ITADATA 2023)*, Naples, Italy, September 11-13, 2023, ser. CEUR Workshop Proceedings, vol. 3606, CEUR-WS.org, 2023. [Online]. Available: <https://ceur-ws.org/Vol-3606/paper51.pdf>.
- D. Del Fante, **F. Manzella**, G. Sciavico, and I. E. Stan, "A post-modern approach to automatic metaphor identification," in *Proceedings of the 9th Italian Conference on Computational Linguistics*, Venice, Italy, November 30 - December 2, 2023, ser. CEUR Workshop Proceedings, vol. 3596, CEUR-WS.org, 2023. [Online]. Available: <https://ceur-ws.org/Vol-3596/short10.pdf>.
- M. Ghiotti, **F. Manzella**, G. Pagliarini, G. Sciavico, and I. E. Stan, "Evolutionary explainable rule extraction from (modal) random forests," in *ECAI 2023 - 26th European Conference on Artificial Intelligence*, September 30 - October 4, 2023, Kraków, Poland - Including 12th Conference on Prestigious Applications of Intelligent Systems (PAIS 2023), ser. Frontiers in Artificial Intelligence and Applications, vol. 372, IOS Press, 2023, pp. 827-834. DOI: 10.3233/FAIA230350.
- **F. Manzella**, G. Pagliarini, G. Sciavico, and I. E. Stan, "Efficient modal decision trees," in *22nd International Conference of the Italian Association for Artificial Intelligence (AlxIA 2023)*, Springer Nature Switzerland, 2023, pp. 381-395. DOI: 10.1007/978-3-031-47546-7_26.

- **Image Editing:** GIMP, Adobe Photoshop, Krita, Inkscape, Aseprite, Spine.
- **Database:** MySQL, SQLite, PostgreSQL, MongoDB, Liquibase.
- **Data visualization:** Matplotlib, Seaborn, Plotly, ggplot2, Vega-Lite, Grafana.
- **Planning and organization:** Vikunja, ClickUp, Trello, Notion, Asana, Jira.

- M. Coccagna, **F. Manzella**, S. Mazzacane, G. Pagliarini, and G. Sciavicco, "Statistical and symbolic neuroaesthetics rules extraction from EEG signals," in *Artificial Intelligence in Neuroscience: Affective Analysis and Health Applications - 9th International Work-Conference on the Interplay Between Natural and Artificial Computation, IWINAC 2022, Puerto de la Cruz, Tenerife, Spain, May 31 - June 3, 2022, Proceedings, Part I*, ser. Lecture Notes in Computer Science, vol. 13258, Springer, 2022, pp. 536–546. DOI: 10.1007/978-3-031-06242-1_53.
- **F. Manzella**, G. Pagliarini, G. Sciavicco, and I. E. Stan, "Interval temporal random forests with an application to COVID-19 diagnosis," in *28th International Symposium on Temporal Representation and Reasoning, TIME 2021, September 27-29, 2021, Klagenfurt, Austria*, ser. LIPIcs, vol. 206, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2021, 7:1–7:18. DOI: 10.4230/LIPICS.TIME.2021.7.

MY HOBBIES

- music writer;
- play guitar (electric and acoustic);
- play piano;
- home automation: Raspberry Pi, Arduino UNO, Home Assistant and custom services;
- game development;
- running;
- share my open-source with the community.

Thesis co-supervisor

- E. Favale, "TRAMA: Caso di studio per design e sviluppo di applicazioni real-time," Bachelor's Thesis, 2024.
- G. Linguerri, "Uso, interazione e didattica con il robot NAO," Bachelor's Thesis, 2024.
- G. Nella, "Manipolazione di oggetti con il robot NAO," Bachelor's Thesis, 2024.
- E. Samaritani, "Analisi intelligente di dati applicata allo studio della consistenza e della permanenza della memoria: Un caso di neurofisiologia," Bachelor's Thesis, 2024.
- L. Serrentino, "Decodificare la percezione estetica: Estrazione di regole logico-simboliche da eye-tracking e pupillometria per un'explainable AI nella neuroestetica," Bachelor's Thesis, 2024.
- D. Carbini, "A new automatized method for the analysis of eeg recordings," Bachelor's Thesis, 2023.
- P. Cavina, "Estrazione e selezione delle features (non) supervisionata univariata per dati dimensionali," Bachelor's Thesis, 2023.
- M. Ghiotti, "Un pacchetto di analisi post-hoc di modelli di apprendimento modali simbolici," Bachelor's Thesis, 2023.
- M. Specchia, "Metodi simbolici per l'estrazione di conoscenza da elettroencefalogrammi," Bachelor's Thesis, 2023.
- L. Balboni, "Analisi del segnale elettroencefalografico: Un metodo per la selezione automatica di variabili dimensionali," Bachelor's Thesis, 2022.

PROJECTS

Sole.jl

 Dec 2020 – Ongoing

A framework for symbolic, transparent, and interpretable machine learning!

Godot Easing Functions

 Feb 2020 – Ongoing

Bring the powerful easing functions to Godot Game Engine.

SimpleCaching.jl

📅 Dec 2020 – Ongoing

A Julia package providing macros to cache result(s) of function calls.

docthing

📅 Oct 2024 – Ongoing

A simple language-agnostic tool written in Python to extract high-level documentation from the projects.

Ferdiu Engine

📅 Feb 2023 – Ongoing

I'm building a Game Engine from scratch in C++. I started this project for Computer Graphics exam project but I was having so much fun while doing it that I decided to go further with it.

NVIDIA Optimus Tools for Linux

📅 Jun 2020 – Ongoing

I developed, forked and trying to maintain as often as possible some tools to make it simple to use NVIDIA Optimus technology on Linux (mostly for Debian GNU/Linux), including:

- [optimus-indicator](#): simple indicator for the system tray with Bumblebee and nvidia-xrun support;
 - [nvidia-xrun](#): utility to run separate X with discrete nvidia graphics with full performance;
 - [nvrund](#): makes the coexistence of bumblebee and nvidia-xrun comfortable.
-

Embedded Controller Tools for MSI Laptop for Linux

📅 Sep 2022 – Ongoing

I developed, forked and trying to maintain as often as possible some tools to make up for the lack of tools for GNU/Linux systems to control the Embedded Controller of MSI laptops (e.g. *Dragon Center* and *MSI Center*), including:

- [isw](#): Ice-Sealed Wyvern (forker to add support for MSI Katana GF66 12UG);
 - [isw-indicator](#): an Indicator app for my version of isw.
-

WWiser Launcher

📅 Sep 2022 – Ongoing

A set of BASH and Python scripts for Linux which aims to replace the Wwise Launcher. This was achieved reverse-engineering the original launcher and the application protocol it use to fetch informations and assets from Audiokinetic servers.

SRTranslate

📅 Jul 2021 – Ongoing

Translate a subtitles *.srt file to any language using Google Translate API. Before translating any line of the subtitle file, this application tries to join some adjacent lines to give the translator some context to outputs more accurate translations.

React-Native MDs - Movesense library

📅 Jun 2024 – Ongoing

A library for React Native to easily allow to develop mobile apps that interact with the heart rate monitor band by Movesense.

- I give consent to process my data with the purpose of the recruitment process, in accordance to the Regulation of the European Parliament 679/2016, regarding the protection of natural persons and free movement of such data.

- I, the undersigned, declare that I have been informed, pursuant to Legislative Decree No. 196/2003 and GDPR 679/16 – 'European Regulation on Personal Data Protection,' that the personal data collected will be processed, including through electronic means, exclusively for the purposes of the procedure for which this declaration is made and for all related obligations.