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Data Scientist

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WORK EXPERIENCE

Business Intelligence Consultant — June 2023 - Now

Holistic Data Solutions

Develop tools for different clients, to help them understand and optimize their businesses.

- Developed a budget planning web app for an energy provider, offering real-time tracking of departmental budget validation, progress status, and key KPIs such as **EBITDA**. Board for the web app.
- Monte carlo simulations for optimizing stock portfolio of a small business company. Python (**pandas**, **numpy**, **SciPy** and **plotly**).
- Different *Tableau* dashboards made for a retail company to help them understand and improve their sales distribution on space and time.

Microsoft Azure and SQL for data ingestion (Connect platform with servers of the client) and python for **ETL**'s.

Data Scientist — August 2021 - May 2023

CaixaBank

Evaluate the economic feasibility of potential fraud prevention strategies and developed fraud detection models for different tasks.

- Detecting and reducing low risk false positives without increase on fraud rates. Using supervised machine learning models like **Support Vector Machines**, **Random Forests** and **Gradient Boosting Machines** (e.g., **XGBoost**, **LightGBM**).

Oracle DB and SQL for data modelling, data collection and data quality. **Python** for data processing and deal with imbalanced data (**Pandas**, **numpy**), exploratory data analysis (**matplotlib**, **seaborn** and **bokeh**), training models hyperparameter optimization and performance analysis (**confusion matrix**, **precision**, **recall**, **ROC-AUC**, **log-loss**) (**Sklearn**, **xgboost**, **lightgbm** and **Plotly**) to select the best model. And **Plotly** and **shap** visualisations to understand and explain to stakeholders.

- Detected an extra cost of 2 million € on coin transportation by looking to the Qlick Sense dashboards. To understand causes and reduce them we used unsupervised machine learning models like **KMeans**, **Hierarchical Clustering** and **DBSCAN**.

Microsoft Azure and SQL for data collection and data quality. Python for data processing, and data normalization (Pandas, numpy), exploratory data analysis (**matplotlib**, **seaborn** and **bokeh**). **Sklearn** for **PCA** dimensionality reduction and **KMeans** and **silhouette score** to decide best number of clusters. **Scipy** for hierarchical clustering by taking a look to the **dendrogram** of the hierarchical clustering and comparing them with the silhouette score for different k of k-means we have selected the best number of clusters. But used dbscan to see if it arises with different conclusions. **Plotly** to compare the clusters of the three models and some important visualisations like **silhouette score visualisation**, Within-Cluster Sum of Squares vs number of clusters (**elbow method**) and **dendogram visualisation**.
Related to work methodologies at Fraud & Operations Compliance Team we worked under **Agile methodologies** (Scrum)

Data Scientist — November 2022 - January 2023

Boston University

At the Keck Laboratory for Network Physiology Research Group

Analyse the interaction networks of myoelectrical rhythms across muscles and their evolution with accumulation of fatigue during exercise. Gathered electromyography (**EMG**) data from various muscle groups during diverse tasks. Used the **Discrete Fourier Transform** to analyze the signals, breaking them down into different frequency bands corresponding to specific muscle fiber types. Computed **correlations** between these frequency-specific signals, to assess how muscles coordinate during tasks, and how this coordination evolves with fatigue accumulation. Matlab for data processing, data transformation, correlations computation and networks visualisations.

EDUCATION

Mathematical Engineering on Data Science BEng. Pompeu Fabra University 2019-2024

Relevant courses:

Computer Science and Programming

- Object Oriented Programming
- Algorithm design

Data Infraestructure

- Networks Architecture
- Databases
- Introduction to Parallel and Distributed Programming
- Criptography and security

Statistics

- Probability
- Statistics
- Statistical Models

Machine Learning and Data Science

- Machine Learning
- Optimization Techniques
- Introduction to Network Science
- Massive Datasets Mining

Course in Artificial Intelligence and Data Science

Go to the course page

Artificial Intelligence text to image, starting from making **API requests** to **Midjourney**. Ending with the usage of deep learning open source **huggingface** models and **stable diffussion** models to generate images. Usage of **Pytorch** to load models, safetensors files and train LoRa models. Use of **open source** datasets, **google.colab** and **imjoy-elfinder** a python package that allows you to manage data on remote **jupyter** servers.

MOOC Elements of AI. University of Helsinki.

Go to the course page

Political and Administration Sciences BA. University of Barcelona

LANGUAGES

- Catalan (Native)
- Spanish (Native)
- English (B2)
- French (B1)

PROJECTS

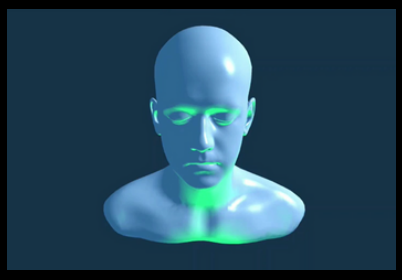
NBA Talent Detection Webapp

[Go to NBA careers streamlit webapp]

Developed a tool to evaluate the success of NBA players' careers. To collect and build the datasets for predicting NBA player careers, we used the **nba-api** (python package) and pandas. Supplemented with data scraped from Basketball Reference using **beautiful soup**, **json**, and **lxml**. To combine data coming from two different sources **requests** with **SPARQL** queries to the WikiData query service were used. For **data quality** we used two approaches rule-based and validation dataset. More details on our Towards Data Science article. Third, for target variable computation (Career Outcome) **tidyverse** and **dplyr** R packages were used to first rescale stats in NBA seasons with fewer games played to ensure fair comparisons. And then compute the season outcome and career outcome for each player. You can see the code here

Finally, three supervised models were used (**Random Forest** with **sklearn**, **lightgbm** and **xgboost**) to predict the career outcome of a player. Performance metrics were analysed and the model with better performance (xgboost) was stored in a **pickle** file with all the encoders. Plotly and shap were used for explainability plots. And player images were obtained with **request** to the NBA cdn and displayed with **pillow**. **Streamlit cloud** and **github** were used for hosting.

Human Figure Recreation through 3D Graphics Engine

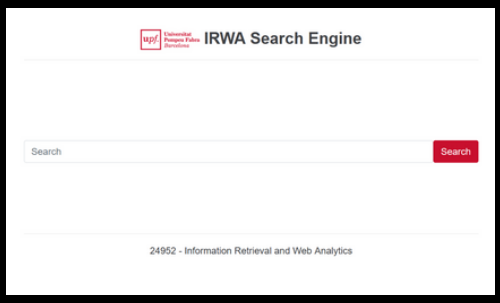


[Short demonstration video]

[Go to the github repository]

The project begins with **CPU-rendered** basic shapes, evolving into **GPU-driven 3D scene** painting with a focus on **rasterization**, **sampling**, and **antialiasing**. The project also touches on **virtual reality** considerations, providing a comprehensive understanding of computer graphics encompassing rendering, lighting, modeling, animation, and advanced theoretical frameworks. To do that we used the following tools and libraries: **C++**, **SDL** to have keyboard access and move the camera, **OpenGL** to interact with the computer graphics hardware, including the usage of a **mesh** that defines the object's 3D structure and a **shader** a **GPU** program for determining the visual appearance.

Search Engine (Information Retrieval and Web Analysis Course)

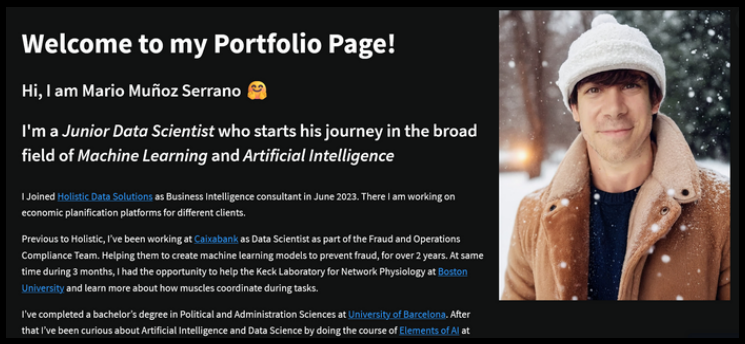


[Go to the github repository]

The project involves the creation of a search engine **Flask** web app that extensively incorporates **NLP** techniques to enhance its functionality and performance, integrating an **optimized search** algorithm that considers the intersection of query terms for improved accuracy. The search algorithm includes functions for term preprocessing, **TF-IDF** index creation, and document ranking, with a results page displaying documents in calculated order. A detailed view option for each document is implemented, providing comprehensive information. **Web analytics** are incorporated, collecting data on **HTTP requests**, clicks, sessions, and user context. The analytics dashboard visualizes collected data, offering insights into user behavior, query frequency, and session statistics. The project also addresses algorithmic inefficiencies, optimizing the speed of ranking and index calculation to enhance overall performance.

To do that we used the following tools and libraries: **Python**, **os**, **datetime**, **JSONEncoder**, **random**, **geopy**, **httpagentparser**, **nltk**, **Flask**, **emoji**, **regex**, **uuid**, **json**, **pickle**, **requests**, **Faker**, **stopwords**, **collections.defaultdict**, **array**, **PorterStemmer**, **math**, **numpy**, **collections**, **time**, **pandas**, **seaborn**, **wordcloud**, **counter** and **matplotlib**.

[Click Here and discover more projects on my Project Portfolio web page]



Where I use different tools like:

Html, **css**, **javascript**, **xpath selectors**, **scrapy** and **selenium** for web scrapping and web development. **Math**, **scipy**, **sklearn** and **surprise** python libraries to build a recommendation engine. **Isolation forests** for anomaly detection. **Apyori** for association rule mining, **jaccard similarity** and shingling to find near-duplicates in text data. **Ggplot** and **rayshader** R packages to build 2D and 3D visualizations.

Currently working on a ***Real-Time Twitter Stream Processing*** with **AWS S3**, **Docker**, and **DynamoDB** for the Large Scale and Distributed Systems subject.