# MCAP - Profile-Activity Matching System 📊



A Python package designed for optimal profile-to-activity assignment based on skills matching, developed by Abdel YEZZA (Ph.D). This solution employs advanced algorithms to maximize the correspondence between required activity competencies and available profile skills.

It is designed to provide a comprehensive solution for profile-activity matching, offering multiple models, flexible scaling options, complete web application, streamlit web interface, a robust logging system, a detailed validation of input data, and customizable processing of MCAP functions (sum, mean, Euclidean and any custom function).

This project is built on the two following non-technical articles:

1. [UN NOUVEAU MODELE POUR AFFECTER LES PROFILS ADEQUATS](https://www.linkedin.com/feed/update/urn:li:activity:7057629409758846976/) - by Abdel YEZZA (Ph.D) - 2024
2. [UNE NOUVELLE FAÇON D'AFFECTATION DES PROFILS AUX ACTIVITES](https://www.linkedin.com/feed/update/urn:li:activity:6853567958246027265/) - by Abdel YEZZA (Ph.D) - 2022

# 🎯 Key Features

* **Skills Matrix Analysis**: Process and analyze competency-activity (MCA) and competency-profile (MCP) matrices
* **Multiple Model Support**: Five different matching models available (model1 through model5 or any custom function)
* **Flexible Scaling**: Support for different scale types (0-1, free)
* **Web Interface**: Built-in web application using FastAPI and Streamlit
* **Detailed Logging**: Comprehensive logging system for tracking operations
* **Data Validation**: Robust input validation and error handling
* **Customizable Processing**: Support for different MCAP functions (sum, mean, euclidean and any custom function)

# 🛠️ Installation

1. Clone the repository:

git clone [repository-url]

cd profiles\_assignment

1. Create and activate a virtual environment (recommended):

# install venv on Linux/MacOS:

python -m venv venv

source venv/bin/activate

# to activate on Windows:

venv\Scripts\activate

Install dependencies:

pip install -r requirements.txt

# 📦 Dependencies

* streamlit >= 1.24.0
* pandas >= 1.5.0
* scikit-learn
* matplotlib
* fastapi >= 0.104.0
* uvicorn >= 0.24.0
* python-dotenv >= 1.0.0
* python-multipart >= 0.0.6
* sqlalchemy >= 2.0.23

# 🚀 Usage

## Command-Line Interface

Basic usage:

python main.py

Advanced usage with custom parameters:

python main.py --mca path/to/mca.csv --mcp path/to/mcp.csv --model model\_name --scale scale\_type --mcap mcap\_function

**Example:**

python main.py --mca .\data\input\mca.csv --mcp .\data\input\mcp.csv --model model5 --scale 0-1 --mcap sqrt

## 📋 Command Line Arguments (Console case)

* --mca: Path to the MCA (Matrix Competency-Activity) file
* --mcp: Path to the MCP (Matrix Competency-Profile) file
* --model: Model selection (model1, model2, model3, model4, model5 or your own model function)
* --scale: Scale type (0-1 or free)
* --mcap: MCAP function type (sum, mean, sqrt or a custom MCAP function)

## 📋 Input File Formats

**MCA (Competency-Activity Matrix)**

Activity,Comp1,Comp2,Comp3

Activity1,0.8,0.6,0.7

Activity2,0.5,0.9,0.4

**MCP (Competency-Profile Matrix)**

Profile,Comp1,Comp2,Comp3

Profile1,0.7,0.8,0.6

Profile2,0.9,0.5,0.8

## 📋 Streamlit demo application

streamlit.cmd run .\src\streamlit\app.py

You should have three menu items:

1. Start page
2. Test application
3. Interactive application

## 📋 Web application

### 1. Backend

# go to backend folder

cd web/backend

# Install dépendancies if any

pip install -r requirements.txt

# Run the serveur with uvicorn

uvicorn main:app --reload --log-level debug

### 2. Frontend

# go to frontend folder

cd web/frontend

# Install dépendancies if any

npm install

# Run the dev server

npm start

You should get a message like:

You can now view mcap-frontend in the browser.

Local: http://localhost:3001

On Your Network: http://192.168.1.19:3001

The web main interface looks like this:

Une image contenant texte, capture d’écran, nombre, Police

Le contenu généré par l’IA peut être incorrect.

Depending on made options and input CSV matrices (mca and mcp), results look like this:

Une image contenant texte, nombre, capture d’écran, Police

Le contenu généré par l’IA peut être incorrect.

Une image contenant texte, capture d’écran, ligne, Tracé

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Une image contenant diagramme, origami

Le contenu généré par l’IA peut être incorrect.

# 📁 Project Structure

Une image contenant texte, capture d’écran, menu, Police

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