

# Souhaila DJAFFAL

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## PROFESSIONAL SUMMARY

I am a PhD student in AI with a growing focus on medical imaging. My current research explores deep learning and explainable AI for classifying histopathological images and analyzing handwriting patterns to support early detection of neurological diseases. I also work on OCR-related document analysis, developing intelligent systems for script identification. I hold a Google Data Analytics Certificate and actively apply machine learning to real-world health challenges.

## EDUCATION

- **PhD student in Computer Science** Tebessa, Algeria  
*Faculty of Exact, Natural and Life Sciences (FSESNV), Echahid Cheikh Larbi Tebessi University* 2021 - Present
  - Thesis: A Contribution for Script Identification from Handwritten and Printed Documents.
  - Supervisor: Prof. Chawki Djeddi.
- **Master's degree in Computer Sciences: Systems and Multimedia** Tebessa, Algeria  
*Faculty of Exact, Natural and Life Sciences (FSESNV), Echahid Cheikh Larbi Tebessi University* 2015 - 2017
  - Theme: Biometric Watermarking for Copyright Preservation.
  - Distinction: Very Good
- **Bachelor's degree in Computer Science: Information Systems and Software Engineering** Tebessa, Algeria  
*Faculty of Exact, Natural and Life Sciences (FSESNV), Echahid Cheikh Larbi Tebessi University* 2012 - 2015
  - Theme: Development of Mobile Application: Dictionnaire Assisté des Termes Informatique.
  - Distinction: Very Good

## PROJECTS

- **Automatic Handwriting and Printed Script Identification System:**  
*April 2021 - Present*
  - Proposed a multi-level multi-script identification system for machine-printed and handwritten documents using local image features.
  - Hierarchical Script Identification using Dense RootSIFT, Word2Vec-Enhanced BoVW, and Probabilistic Top-Down Contextualization.
  - Addressed class imbalance using Sampling techniques to improve classifier performance.
  - Developed a novel approach integrating a learned resizer with k-means clustering for adaptive image resizing, analyzed against traditional resizers to enhance hybrid word-level script identification.
  - Conduct research on machine unlearning's impact on scene-text script identification.
- **Breast Cancer Histopathological Image Classification:**  
*November 2023 - Present*
  - Investigated stain normalization techniques' critical role in improving feature extraction reliability across low-, mid-, and high-level features.
  - Developed a novel adaptive knowledge distillation (KD) approach for grading Invasive Ductal Carcinoma (IDC) histopathological images, achieving 98.08% accuracy with the KD technique.
  - Applied Grad-CAM for visualizing key areas in histopathological images influencing classification decisions.
  - Developed a novel knowledge distillation (KD) framework tailored for magnification-dependent grading of IDC.

## PUBLICATIONS

C=CONFERENCE, S=IN SUBMISSION

- [J] Yasmina Benmabrouk, Souhaila Djaffal, Gasmi Mohamed, Chawki Djeddi, Moises Diaz, Hakim Bendjenna. (2025). **Enhancing Breast Cancer Histopathological Image Classification: The Impact of Stain Normalization on Multilevel Feature Extraction**. Biomedical Signal Processing and Control. DOI: [10.1016/j.bspc.2025.107700](https://doi.org/10.1016/j.bspc.2025.107700)
- [C.1] Souhaila Djaffal, Yasmina Benmabrouk, Chawki Djeddi, Moises Diaz. (2025). **Breaking Boundaries: Enhancing Script Identification Using a Learnable MULLER Resizer**. In Antonacopoulos, A., Chaudhuri, S., Chellappa, R., Liu, CL., Bhattacharya, S., Pal, U. (eds) *Pattern Recognition. ICPR 2024. Lecture Notes in Computer Science, vol 15331*, pp. 222–236. Springer, Cham. DOI: [10.1007/978-3-031-78119-3\\_16](https://doi.org/10.1007/978-3-031-78119-3_16)
- [C.2] Souhaila Djaffal, Yasmina Benmabrouk, Chawki Djeddi, Moises Diaz. (2024). **Addressing Class Imbalance in Handwritten Script Identification Using Sampling Techniques..** In the 6th Mediterranean Conference on Pattern Recognition and Artificial Intelligence, *MedPRAI24*.
- [C.3] Yasmina Benmabrouk, Souhaila Djaffal, Gasmi Mohamed, Hakim Bendjenna. (2024). **Knowledge Distillation for IDC Grading: Magnification-Dependent Approach..** In the 6th Mediterranean Conference on Pattern Recognition and Artificial Intelligence, *MedPRAI24*.
- [C.4] Souhaila Djaffal, Yasmina Benmabrouk, Chawki Djeddi, Moises Diaz. (2024). **When Machine Unlearning Meets Script Identification**. In the 26th Irish Machine Vision and Image Processing Conference, Vol. 2024, Iss. 10, pp. 347–350. IET Conference Proceedings. DOI: [10.1049/icp.2024.3330](https://doi.org/10.1049/icp.2024.3330)
- [C.5] Yasmina Benmabrouk, Souhaila Djaffal, Gasmi Mohamed, Hakim Bendjenna. (2024). **Adaptive Knowledge Distillation for Invasive Ductal Carcinoma Grading using histopathological images..** In the 26th Irish Machine Vision and Image Processing Conference, Vol. 2024, Iss. 10, pp 339–342. IET Conference Proceedings. DOI: [10.1049/icp.2024.3328](https://doi.org/10.1049/icp.2024.3328)
- [S] Souhaila Djaffal, Chawki Djeddi, Moises Diaz, Abdelhakim Hannousse. (2024). **A Robust Analysis of Local Image Descriptors Using Bag of Visual Words Model for Multi-Level Script Identification in a Multi-Script Environment**. Manuscript submitted for publication in *Engineering Applications of Artificial Intelligence*. SSRN: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4912105](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4912105)



## PROFESSIONAL EXPERIENCE

- **Echahid Cheikh Larbi Tebessi University**  Sep 2019 - May 2020 & Sep 2022 - Dec 2022 & Sep 2023 - Dec 2024  
Adjunct Professor Tebessa, Algeria
  - Department: Mining Engineering
- **The Sparks Foundation**  November 2021 - December 2021  
Computer Vision and IOT intern Remote
  - Program: The Graduate Rotational Internship Program (GRIP)
- **KPMG, Forage**  September 2021  
Data Analyst Remote
  - Program: Data Analytics Consulting Virtual Internship

## SKILLS

- **Programming Languages:** Python, C++, R
- **Machine Learning Frameworks:** OpenCV, Pandas, Scikit-learn, Numpy, Seaborn, Matplotlib, TensorFlow, Keras
- **Specialized Area:** Script Identification, Document Analysis, Histopathological Image Classification, Medical Imaging, Machine Unlearning, Explainable AI, Knowledge Distillation.
- **Languages:** Arabic, English, French

## SCHOOLS & WORKSHOPS

- **2025 Middle East and North Africa Machine Learning Winter School "MenaML"** February 2025  
Doha, Qatar 
  - A six-day intensive program offering a unique blend of keynotes, lectures, and hands-on practical sessions. Lectures and lab sessions are taught by local and international AI experts from leading institutes such as Google DeepMind, Qatar Computing Research Institute (QCRI), HBKU, and others.
- **Artificial Intelligence for Smart Agriculture Workshop "Smart Agri-Tech"** February 2023  
University of El Oued, Algeria
  - The event focused on leveraging advanced digital technologies such as artificial intelligence, the Internet of Things, and cloud computing to enhance agricultural production efficiency and connectivity.
- **30 Days of ML Challenge** August 2021  
Kaggle 
  - Completed the 30 Days of ML challenge: Python, Intro to ML, and Intermediate ML courses and competed in a special competition.

## ACADEMIC SERVICES

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- **Reviewer for:** Engineering Applications of Artificial Intelligence Journal *Feb 2025 - April 2025*
- **Reviewer for:** Biomedical Signal Processing and Control Journal *May 2024 - March 2025*
- **Reviewer for:** The 27th International Conference on Pattern Recognition (ICPR 2024) *July 2024*
- **Reviewer for:** The 2nd International Conference on Artificial Intelligence, Blockchain (AIBThings 2024) *Jun 2024*

## CERTIFICATIONS

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- **Issued by Google and Coursera:** [Google Data Analytics Professional Certificate](#) *June 2022*
- **Issued by NVIDIA DL Institute:** [Fundamentals of Deep Learning](#) *February 2022*
- **Issued by Kaggle:** [Python Course](#) *August 2021*
- **Issued by Kaggle:** [Intro to Machine Learning](#) *August 2021*
- **Issued by Kaggle:** [Intermediate Machine Learning](#) *August 2021*

## REFERENCES

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1. **Prof. Chawki Djeddi**  
Full Professor, Department of Mathematics and Informatics  
Echahid Cheikh Larbi Tebessi University, Tebessa, Algeria  
Email: c.djeddi@univ-tebessa.dz  
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