

Zeineb DAOUD

Ph. D, Engineer in Computer Systems Engineering

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 Address: Road Mahdia Km 2.5, 3099 Sfax, Tunisia

Born on 24 / 06 / 1993 Sfax, Tunisia

Married, 1 child



Educational background

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|--------------------|---|
| 2018 – 2023 | Ph. D in Computer Systems Engineering (ISI) and Computer Science , <i>National School of Engineers of Sfax (ENIS), University of Sfax, Tunisia.</i>
Diploma obtained with the grade of « Very Honorable » |
| 2014 – 2017 | National Diploma in Computer Science Engineering , <i>National School of Engineers of Sfax (ENIS), University of Sfax, Tunisia.</i>
Diploma obtained with the grade of « Excellent » |
| 2012 – 2014 | Preparatory Cycle in Mathematics and Physics , <i>Preparatory Institute for Engineering Studies (IPEIS), University of Sfax, Tunisia.</i> |
| 2011 – 2012 | Baccalaureate Diploma in Mathematics , <i>Secondary School Majida Boulila, Sfax, Tunisia.</i>
Diploma obtained with the grade of « Good » |

Research activities

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| January 2018 –
December 2023 | Doctoral Thesis in Computer Systems Engineering

Research unit: REsearch Group on Intelligent Machines (REGIM-Lab), <i>National School of Engineers of Sfax (ENIS), University of Sfax, Tunisia.</i>

Title: Fire recognition approaches based on computer vision techniques and deep learning networks in video surveillance context

Supervisor: Pr. Chokri Ben Amar, Professor, National School of Engineers of Sfax (ENIS), University of Sfax, Tunisia

Co-supervisor: Dr. Amal Ben Hamida, Assistant professor, Faculty of Sciences of Sfax (FSS), University of Sfax, Tunisia

Abstract: The work presented in this thesis aims to develop innovative and effective fire recognition approaches, for the environmental protection and people's safety, especially in the video surveillance context. A video fire detection system, based on computer vision techniques, is firstly designed to detect flame regions in video sequences. Hand-crafted features of fire colors and motion are extracted. To automatically extract them, deep learning models are employed to develop a complete fire recognition system. Its general scheme is as follows: classification of fire frames and videos, followed by the detection and tracking of flame regions. For this purpose, two deep convolutional neural networks are proposed. The first one is dedicated to the |
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classification of fire images. It is then extended to a three-dimensional network incorporating spatio-temporal analysis to recognize fire in surveillance videos. Once a video sequence is classified as fire, the subsequent step is the flame regions' localization, where a deep fire detector is built. Since the tracking-by-detection paradigm is adopted, a novel tracker is then associated to the proposed detector. It intends to adjust the detected fire areas and accurately estimates their positions. The proposed approaches are assessed based on different evaluation metrics, including accuracy, recall and precision. The performance of the designed models proves their effectiveness in detecting fires.

Keywords: Fire recognition, Video surveillance, Deep Learning, Fire classification, Fire detection, Fire tracking

Pedagogical experiences

2024 / 2025 **Contractual assistant** at *Faculty of Sciences of Sfax, University of Sfax, Tunisia*.

Taught Subjects:

- Operating Systems I (Course)
- Java Programming (TP)
- Distributed Applications Development (TP)
- Operating Systems I (TP)
- Operating Systems II (TP)

2023 / 2024 **Part-time teacher** at *Faculty of Sciences of Sfax, University of Sfax, Tunisia*.

Taught Subject:

- Databases (Course)

2022 / 2023 **Part-time teacher** at *Faculty of Sciences of Sfax, University of Sfax, Tunisia*.

Taught Subject:

- Web programming (TP)

2021 / 2022 **Contractual assistant** at *Faculty of Sciences of Sfax, University of Sfax, Tunisia*.

Taught Subjects:

- Signal Processing Introduction (TP)
- Algorithmics and Programming II in C (TD)

2020 / 2021 **Part-time teacher** at *Faculty of Sciences of Sfax, University of Sfax, Tunisia*.

Taught Subjects:

- Signal Processing Introduction (TP)
- Operating Systems II (TP)

Internships and professional experiences

May 2025 **Reviewer** for Signal, Image and Video Processing journal

Since December 2023 **Reviewer** for Neural Computing and Applications journal

July 2022 **Reviewer** for International journal of Machine Learning and Cybernetics

November 2021 **Participation at AVSS conference**, *The 17th IEEE International Conference on Advanced Video and Signal-based Surveillance (AVSS)*, Virtual.

	Presentation at AVSS conference, 16 – 19 November 2021. « A Fire Detection Model Based on Tiny-YOLOv3 with Hyperparameters Improvement »
July 2021	Reviewer for IEEE Systems, Man, and Cybernetics Society SMC, 17-20 October 2021, <i>Virtual, Malbourne, Australia.</i>
April 2021	Reviewer for International journal of Machine Learning and Cybernetics
March 2021	Participation in the third edition of the study day on medical image processing and analysis
February 2021	Participation in the Doctoral Days at the National School of Electronics and Telecommunications of Sfax (ENETCOM), Sfax, Tunisia.
December 2020	Participation in the 1st Tunisian Forum on Artificial Intelligence, Sfax, Tunisia.
May 2019	Participation at WSCG conference, International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision (WSCG), Plzen, Czech Republic. Presentation at WSCG conference, 27 – 31 May 2019. « Automatic video fire detection approach based on PJF modeling and spatio-temporal analysis»
April 2019	Participation in two seminars of the complementary training on « Intellectual Property and Patent Writing », National School of Engineers of Sfax, University of Sfax, Tunisia.
March 2019	Best Poster Award at WIMTA'31 Workshop, <i>Monastir, Tunisia.</i> « Automatic Real-Time Fire Detection »
December 2018	Participation in the training « How to Learn from Review », Sousse, Tunisia.
November 2018	Participation in the cybersecurity workshop, National School of Engineers of Sfax, University of Sfax, Tunisia.
March – July 2017	PFE internship, Laboratoire Bordelais de Recherche en Informatique (LaBRI), University of Bordeaux, France. Development of an approach for tracking and counting small moving objects in videos. Technology/Environment: C++, OpenCV 3.2.0, Visual Studio 2017, Matlab2015
June – August 2016	Second year internship, NextPlus (Startup), Sfax, Tunisia. Development of a mobile application for children's education. Technology/Environment: Java, Android native, Android Studio 2.0.1, SQLite, XML
February – May 2016	Internship PFA, Tunisia Telecom, Sfax, Tunisia. Development of a web application for switching subscribers to the next generation NGN network (All IP). Technology/Environment: Java, J2EE, Eclipse, Tomcat, jsp, servlet, sql, JQuery
July 2015	First year internship, Tunisia Telecom, Sfax, Tunisia. Customer and internal communication

Computer skills

Development language	Programming: Python, C/C++, JAVA, JavaScript, JQuery. Technology: JEE Web: HTML5, CSS, XML, PHP5 SGBD: MySQL, Oracle SQL Server
Modeling language	UML and Merise
IDE	Tools: JetBrains PyCharm, Matlab, PhpStorm, Eclipse, Android Studio, NetBeans, Code Blocks, Visual Studio SGBD: Xamp, Wamp Server Computer vision library: OpenCV
Operating systems	Windows, Linux
Project management	Agile Scrum

Affiliations

Member of ReGIM-Lab: REsearch Groups in Intelligent Machines (LR11ES48), University of Sfax, National School of Engineering, Tunisia

Member of the Institute of Electrical and Electronics Engineers (IEEE)

Publications

Publications in journals

Daoud, Z., Ben Hamida, A., Ben Amar, C. & Miguët, S., “A one stream three-dimensional convolutional neural network for fire recognition based on spatio-temporal fire analysis”. *Evolving Systems* 15, 2355–2381 (2024). <https://doi.org/10.1007/s12530-024-09623-3>

Daoud, Z., Ben Hamida, A. & Ben Amar, C., “Fire Object Detection and Tracking Based on Deep Learning Model and Kalman Filter”. *Arab J Sci Eng* (2023). <https://doi.org/10.1007/s13369-023-08127-7>

Daoud, Z., Ben Hamida, A. & Ben Amar, C., “FireClassNet: a deep convolutional neural network approach for PJF fire images classification”. *Neural Comput & Applic* (2023). <https://doi.org/10.1007/s00521-023-08750-3>

Communications in international conferences

Daoud, Z., Hamida, A. B., & Amar, C. B., “A Fire Detection Model Based on Tiny-YOLOv3 with Hyperparameters Improvement”, In 2021 17th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS) (pp. 1-8). IEEE (November 2021). 10.1109/AVSS52988.2021.9663822.

Daoud, Z., Ben Hamida, A., Ben Amar, C., “Automatic video fire detection approach based on PJF color modeling and spatio-temporal analysis”, *Journal of WSCG*. vol. 27, no. 1, pp. 27-36 (2019). 10.24132/JWSCG.2019.27.1.4

Languages

Arabic	Mother Tongue
French	Well (reading, written, spoken)
English	Well (reading, written, spoken)