CURRICULUM VITAE

Maha CHARFEDDINE

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BIOGRAPHY

Maha CHARFEDDINE was born on 30th March 1981 and she has the Tunisian Nationality. She received the engineering diploma in computer sciences from the Tunisian engineering university ENIS-SFAX (National School of Engineers ENIS, University of Sfax, Tunisia) in June 2005. She received the Master degree, the Ph.D and the HABILITATION degree in Computer Sciences, respectively in 2007, 2013 and 2022, all from ENIS-SFAX.

Maha CHARFEDDINE has followed different trainings: ISO/IEC 27001 Foundation, Practitioner and Auditor, Certified Ethical Hacker CEH-V11, Agile Project Management with SCRUM, ISO/IEC 21500 Lead Project Manager, Oracle Primavera P6, ... She succeeded the PECB ISO/IEC 21500 Lead Project Manager exam, the PECB ISO/IEC 27001 Lead Auditor exam, the Certi-Trust ISO/IEC 27001 Foundation & Practitioner and the LPIC 1 exams.

She won the first prize during the National Hackathon “CYBERSECURITY & SMART FACTORY”. Currently, Maha CHARFEDDINE is a PECB trainer for ISO/IEC 27001 LA, IEEE SENIOR member, IEEE SPS Tunisia Chapter Chair and Assistant Professor in the department of computer sciences and applied mathematics at ENIS, University of Sfax.

She is also the Co-coordinator of the co-constructed master “Cybersecurity and Smart Industry” at the Faculty of Science of Sfax FSS, University of Sfax. The topics of training and taught courses are mainly Norms and standards, Cyber-security, Ethical hacking,

Implementation and Audit of an ISO 27001 Information Security Management, IT project management and Linux Operating System. She directed many undergraduate projects.

She is also a member of REGIM-Lab, the Research Groups on Intelligent Machines, (LR11ES48). She co-supervises graduate students in Master and PhD degrees. Main research activities focus on Copyright Protection, Traceability, Integrity Control, Tamper Localization and data-recovery after specific malicious attacks.

ACADEMIC CREDENTIALS

HABILITATION (Thesis) in Computer Engineering May 2022	National School of Engineers (ENIS), University of Sfax, Tunisia **Dissertation Title**: "Standard and sensitive data based digital watermarking: application to copyright protection, traceability, content characterization, integrity control, tamper localization and recovery"
Ph.D (Thesis) in Computer Engineering March 2013	National School of Engineers (ENIS), University of Sfax, Tunisia **Dissertation Title**: " New audio watermarking schemes for copyright protection applications based on preliminary MP3 study, neural network architecture and psychoacoustic model"
Master Diploma in Computer science June 2007	National School of Engineers (ENIS), University of Sfax, Tunisia **Dissertation Title**: "Survey and exploitation of psychoacoustic model in audio watermarking for copyright protection application"
Bachelor Degree (Engineer) Computer Engineering June 2005	National Engineering School of Sfax, Tunisia **Dissertation Title**: "Conception and development of an application of picture, audio and video watermarking for copyright protection application"
Certificate of access to engineering schools June 2002	Sfax Preparatory Engineering Institute (IPEIS), Sfax, Tunisia **Specialty:** Maths-Physics.
Mathematics Bac June 2000	Magida Boulila school, Sfax, Tunisia. **Specialty:** Maths

RESEARCH ACTIVITIES

KEY WORDS : Digital Watermarking, Human Psychoacoustic and Visual Models, Audio, Image and Video Standard coders and decoders, Copyright Protection, Traceability, Content Characterization, Integrity Control, Tamper Localization and Invertibility.

PHD CO-SUPERVISED STUDENTS:

Faten CHAABENE, "Hierarchical traceability of multimedia documents", 2013-2017.

Eya MEZGHANNI, "Audio analysis and classification for content characterization using digital watermarking", 2013-2018.

Salma MASMOUDI, "Protection and integrity control of audio and video contents by robust and invertible audio watermarking technique", since September 2017

Nesrine TARHOUNI, "Copyright protection, authentication and control Integrity of Digital sensitive content by invertible image watermarking scheme", Since September 2017.

MASTER CO-SUPERVISED STUDENTS:

Salma MASMOUDI, "Adaptative digital audio watermarking in transformed domain", 2009-2010.

Faten CHAABENE, "Study and application of error correcting codes in digital audio watermarking operating in multiresolution domain", 2011-2012

Eya MEZGHANNI, "Detection and analysis of the silence in watermarked audio signal extracted from compressed video sequences", 2011-2012

PUBLICATIONS

MASTER & PHD

Charfeddine, M., "New audio watermarking schemes in transform domain based on preliminary MP3 study, neural network architecture and psychoacoustic model", **PHD**, National School of Engineers (ENIS), University of Sfax, Tunisia , March **2013**.

Charfeddine, M., "Survey and exploitation of psychoacoustic model in audio watermarking", **MASTER**, National School of Engineers (ENIS), University of Sfax, Tunisia, June **2007**.

INTERNATIONAL PUBLICATIONS' CITATIONS OF RESEARCH SECURITY PROJECTS

Google Scholar **h-index=11, Citations=**362

Journal papers**=9**

Conference papers**=22**

AFTER THE PHD THESIS

INTERNATIONAL JOURNALS

[J9] Tarhouni, N., Masmoudi, S., **Charfeddine, M.** & Ben Amar, C. Fake Videos Detector using a combined video and audio watermarking. Multimedia Systems Journal (2023). **(Q1, IF 3.9)**

[J8] Charfeddine, M., Mezghani, E., Masmoudi, S., Ben Amar, C. & Alhumyani, H. Audio Watermarking for Security and Non-Security Applications. IEEE Access (2022), vol 10, pp.12654-12677 https://doi.org/10.1109/ACCESS.2022.3145950 **(Q1, IF 3.9)**

[J7] Tarhouni, N., **Charfeddine, M.** & Ben Amar, C. Novel and Robust Image Watermarking for Copyright Protection and Integrity Control. Circuits Syst Signal Process 39, 5059–5103 (2020). https://doi.org/10.1007/s00034-020-01401-1 **(Q2, IF 1.976)**

[J6] Masmoudi, S., **Charfeddine, M.** & Ben Amar, C. A Semi-Fragile Digital Audio Watermarking Scheme for MP3-Encoded Signals Using Huffman Data. Circuits Syst Signal Process 39, 3019–3034 (2020). https://doi.org/10.1007/s00034-019-01299-4 **(Q2, IF 1.976)**

[J5] Chaabane, F., **Charfeddine, M.**, Puech, W. & Ben Amar, C. A two-stage traitor tracing scheme for hierarchical fingerprints. Multimed Tools Appl 76, 14405–14435 (2017).https://doi.org/10.1007/s11042-016-3749-8 **(Q1, IF 2.517)**

[J4] Mezghani, E., **Charfeddine, M.**, Nicolas, H. & Ben Amar, C., Speech/music discrimination-based audio characterization using blind watermarking scheme. Journal of Information Assurance and & Security, 2016, Vol. 11, issue 6, p 311-321.

[J3] Chaabane, F., **Charfeddine, M.**, Puech, W. & Ben Amar C. Novel two-level tracing scheme using clustering algorithm. Journal of Information Assurance & Security. 2016, Vol. 11 Issue 4, p179-189.

INTERNATIONAL CONFERENCES

[C22] Tarhouni, N., Fourati, R., **Charfeddine, M.**, Amar, C.B. (2023). ReVQ-VAE: A Vector Quantization-Variational Autoencoder for COVID-19 Chest X-Ray Image Recovery. In: Nguyen, N.T., et al. Computational Collective Intelligence. ICCCI 2023. Lecture Notes in Computer Science(), vol 14162. Springer, Cham. https://doi.org/10.1007/978-3-031-41456-5_57 **(Class B)**

[C21] Tarhouni, N., **Charfeddine, M.** & Ben Amar, C., A New Robust and Blind Image Watermarking Scheme in Frequency Domain Based On Optimal Blocks Selection, International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision (WSCG 2018), pp 78-86, https://doi.org/10.24132/CSRN.2018.2802.11 **(Class B)**

[C20] Mezghani ,E., **Charfeddine, M.**, Nicolas, H. & Ben Amar ,C., Speaker emotion recognition: from classical classifiers to deep neural networks", Proc. SPIE 10696, Tenth International Conference on Machine Vision (ICMV 2017), https://doi.org/10.1117/12.2309476 **(Class C)**

[C19] Chaabane F., **Charfeddine M.** & Ben Amar C., An Enhanced Hierarchical Traitor Tracing Scheme Based on Clustering Algorithms. In: Martínez de Pisón F., Urraca R., Quintián H., Corchado E. (eds) Hybrid Artificial Intelligent Systems (HAIS 2017). Lecture Notes in Computer Science, pp 379-390 vol 10334. Springer, Cham. https://doi.org/10.1007/978-3-319-59650-1_32 **(Class C)**

[C18] Mezghani, E., **Charfeddine, M.**, Nicolas, H & Ben Amar, C., Speaker gender identification based on majority vote classifiers, Ninth International Conference on Machine Vision (ICMV 2016), https://doi.org/10.1117/12.2268741 **(Class C)**

[C17] Mezghani, E., **Charfeddine, M.**, Nicolas, H. & Ben Amar, C., Multifeature speech/music discrimination based on mid-term level statistics and supervised classifiers, 2016 IEEE/ACS 13th International Conference of Computer Systems and Applications (AICCSA 2016), Agadir, pp. 1-8, https://doi.org/10.1109/AICCSA.2016.7945728. **(Class C)**

[C16] Chaabane, F., **Charfeddine, M.**, Puech, W. & Ben Amar C., An EM-based estimation for a two-level traitor tracing scheme, 2016 IEEE International Conference on Systems, Man, and Cybernetics (SMC 2016), Budapest, pp. 003594-003599, https://doi.org/ 10.1109/SMC.2016.7844791. **(Class B)**

[C15] Chaabane, F., **Charfeddine, M.**, Puech, W. & Ben Amar C., Clustering impact on group-based traitor tracing schemes, 2015 15th International Conference on Intelligent Systems Design and Applications (ISDA 2015), Marrakech, 2015, pp. 440-445, https://doi.org/ 10.1109/ISDA.2015.7489270. **(Class C)**

[C14] Mezghani, E., **Charfeddine, M.**, Nicolas, H. & Ben Amar, C., Audiovisual video characterization using audio watermarking scheme, 15th International Conference on Intelligent Systems Design and Applications (ISDA 2015), Marrakech, 2015, pp. 213-218, https://doi.org/10.1109/ISDA.2015.7489227. **(Class C)**

[C13] Chaabane, F., **Charfeddine, M.**, Puech, W., Ben Amar, C., Towards a Blind MAP-Based Traitor Tracing Scheme for Hierarchical Fingerprints. In: Arik S., Huang T., Lai W., Liu Q. (eds) Neural Information Processing. (ICONIP 2015). Lecture Notes in Computer Science, vol 9492. Springer, Cham. https://doi.org/10.1007/978-3-319-26561-2_60 **(Class A)**

[C12] Chaabane, F., **Charfeddine, M.**, Puech,W., Ben Amar, C., A QR-code based audio watermarking technique for tracing traitors, 23rd European Signal Processing Conference (EUSIPCO 2015), Nice, pp. 51-55, https://doi.org/10.1109/EUSIPCO.2015.7362343 **(Class B)**

[C11] Chaabane, F., **Charfeddine, M.**, Puech, W., Ben Amar C. , A multimedia tracing traitors scheme using multi-level hierarchical structure for Tardos fingerprint based audio watermarking, International Conference on Signal Processing and Multimedia Applications (SIGMAP 2014), Vienna, pp. 289-296, https://doi.org/10.5220/0005066602890296

[C10] Chaabane F., **Charfeddine, M.**, Puech ,W., Ben Amar ,C., A survey on digital tracing traitors schemes, 9th International Conference on Information Assurance and Security (IAS 2013), Gammarth, pp. 85-90, https://doi.org/10.1109/ISIAS.2013.6947738 **(Class C)**

[C9] Mezghani, E, **Charfeddine , M**., & Ben Amar, C., Audio silence deletion before and after MPEG video compression, International Conference on Computer Applications Technology (ICCAT 2013), Sousse, pp. 1-5, https://doi.org/10.1109/ICCAT.2013.6521969

BEFORE THE PHD THESIS

INTERNATIONAL JOURNALS

[J2] Charfeddine, M., El'arbi, M. & Ben Amar, C., A new DCT audio watermarking scheme based on preliminary MP3 study. Multimed Tools Appl 70, 1521–1557 (2014). https://doi.org/10.1007/s11042-012-1167-0 **(Q1, IF 2.517)**

[J1] El'Arbi, M., Koubaa, M., **Charfeddine, M.** & Ben Amar, C., A dynamic video watermarking algorithm in fast motion areas in the wavelet domain. Multimed Tools Appl 55, 579–600 (2011). https://doi.org/10.1007/s11042-010-0580-5 **(Q1, IF 2.517)**

INTERNATIONAL CONFERENCES

[C8] Charfeddine, M., Mezghani, E., & Ben Amar ,C., Modified video watermarking scheme using audio silence deletion, Proceedings ELMAR-2013, Zadar, (ELMAR 2013), pp. 203-206

[C7] Chaabane, F., **Charfeddine, M.** & Ben Amar,C., The impact of error correcting coding in audio watermarking, 2011 3rd International Conference on Next Generation Networks and Services (NGNS 2011), Hammamet, pp. 90-95, https://doi.org/10.1109/NGNS.2011.6142556

[C6] El'Arbi, M., **Charfeddine, M.**, Masmoudi, S., Koubaa, M. & Ben Amar, C., Video watermarking algorithm with BCH error correcting codes hidden in audio channel, in Proceedings of the, IEEE Symposium Series in Computational Intelligence. Paris (SSCI 2011), pp. 164–17

[C5] Masmoudi,S., **Charfeddine, M.** & Ben Amar,C., A robust audio watermarking technique based on the perceptual evaluation of audio quality algorithm in the multiresolution domain, The 10th IEEE International Symposium on Signal Processing and Information Technology, (ISSPIT 2010) Luxor, pp. 326-331, https://doi.org/10.1109/ISSPIT.2010.5711803

[C4] Charfeddine, M., El'Arbi,M., Koubaa,M.& Ben Amar,C., DCT Based blind audio watermarking scheme, 2010 International Conference on Signal Processing and Multimedia Applications (SIGMAP 2010), Athens, 2010, pp. 139-144, https://doi.org/10.5220/0002922101390144

[C3] Masmoudi,S., **Charfeddine, M.** & Ben Amar,C., "Two Audio Watermarking Schemes using the Least Significant Bit in the transform domains", International IEEE Workshop on Multimedia Computing and Communications (MCC 2010), ETH Zurich, Switzerland, 2 – 5 August, 2010.

[C2] Charfeddine, M., Masmoudi, S., Belaaj, M., & Ben Amar, C. , Un schéma aveugle de tatouage audio numérique opérant sur les bits les moins significatif dans le domaine fréquentiel utilisant un code correcteur d'erreurs, 6èmes Ateliers de Traitement et

Analyse de l'Information : Méthodes et Applications (TAIMA 2009), pp. 371-377, Hammamet Tunisie, 4-9 Mai, 2009.

[C1] Charfeddine, M., El'Arbi, M.& Ben Amar, C., A blind audio watermarking scheme based on neural network and psychoacoustic model with error correcting code in wavelet domain, *2008 3rd* International Symposium on Communications, Control and Signal Processing, St Julians, (ISCCSP 2008), pp. 1138-1143, https://doi.org/10.1109/ISCCSP.2008.4537396

PEER-REVIEWER

Review of several conference papers: "ISCC 2023: International Symposium on Computers and Communications", "CW2023: 22th International Conference on Cyberworlds as Information and Circuit Journals", "AMCAI 2023: IEEE Afro-Mediterranean Conference on Artificial Intelligence", "SINCONF 2022T: he 15th IEEE International Conference on Security of Information and Networks", "ITSIS2022 International Conference on Information Technology & Smart Industrial Systems"MECBME 2018:Middle East Conference on Biomedical Engineering" and different journal papers for " Circuits, Systems & Signal Processing (CSSP) Journal"

ASSESSMENT/AUDIT OF PROFESSIONAL SECURITY PROJECTS

Project 1 May To December 2023	**Project Title**: "Machine learning system Deployment improving advanced threat detection capabilities and security data analysis", **Actia engineering services**
Project 2 February To December 2023	**Project Title**: "Cyber Threat Intelligence platform detecting sensitive data and services exposed on all web layers (Surface, Deep and Dark) ", **SECURAS**
Project 3 February To September 2023	**Project Title** : "Smart Web Application Attacks Detection Using Machine Learning Techniques", **SECURAS**
Project 4 February To September 2023	**Project Title**: " Integration of a proprietary machine learning (byo-ml) in microsoft sentinel", **DefensyLab**
Project 5 February To June 2023	**Project Title**: "DevSecOps Solution on a cloud architecture", **DefensyLab**
Project 6 February To June 2023	**Project Title**: "Automated cybersecurity Awareness Platform", **DefensyLab**

Project 7 February To May 2023	**Project Title**: " Security Chatbot for Incident Management and Response", **Hat Web Security**
Project 8 February To September 2022	**Project Title**: "Audit and evaluation of security measures for a travel agency sales application", **Sunshine Holiday Group**
Project 9 February To September 2022	**Project Title**: "Web platform for the management of ISMS compliance with the ISO/IEC 27001 standard", **DefensyLab**
Project 10 May To September 2022	**Project Title**: "Web platform for the conformity of an information security management system ISMS", **Hat Web Security**
Project 11 January to June 2022	**Project Title**: "Intrusion Detection System based on Synthetic Minority Oversampling Technique and Machine Learning Models", **W.A. IT Advisory**
Project 12 October 2021 to April 2022	**Project Title**: "Audit and evaluation of security and Cyber-security measures in an Industrial environment", **SOTRAPIL**

INTERNATIONAL TRAININGS

- **Since May 2023:** PECB Certified trainer

INTERNATIONAL TRAINING PARTICIPATION

- **March 20th to 31th 2023**

Cert-trust ISO/IEC 27001-2022 Foundation , Practitioner training courses

- **February 21th to 24th 2022**

PECB ISO/IEC 21500 Lead Project Manager training course

- **August 30th to September 3rd 2021**

Huawei HCIA Security

- **August 23th to 27th 2021**

Certified Ethical Hacker CEH- V11

- **August 16th to 20th 2021**

PECB ISO/IEC 27001 Lead Auditor training course

- **July 15th to 16th 2021**

Agile Project Management with SCRUM

INTERNATIONAL CERTIFICATION EXAM

- **July 2023**

Certi-trust ISO/IEC 27001 Practitioner

- **July 2023**

Certi-trust ISO/IEC 27001 Foundation

- **July 2022**

PECB ISO/IEC 27001 Lead Auditor

- **Mai 2022**

PECB ISO/IEC 21500 Lead Project Manager

- **Avril 2012**

Linux Professional Institute - LPIC-1 Linux Certification

SOCIAL ACTIVITIES

MEMBERSHIP AFFILIATIONS

- IEEE SENIOR Member
- IEEE SPS Tunisia Chapter Chair
- IEEE Computational Intelligence Society Member
- IEEE Computer Society Member
- IEEE Signal Processing Society Member
- IEEE Women in Engineering Member
- Member of REGIM Lab: REsearch Groups on Intelligent Machines regim.org/

SOCIAL SKILLS

- **September 9th 2023**

Computer security trainer in "iDSS 2023", at the Faculty of Sciences of Sfax, organized by the IEEE CIS Tunisia Chapter.

- **May 2023:**

Contribution to the conception, realization and monitoring of the Accepted Saudi Project project entiteled "Protecting and Recovering X-Ray images based on Watermarking and Vector Quantized Variational Autoencoder (VQ-VAE)" from 25-05-2023 to 25-05-2024.Deanship of Scientific Research, Princess Nourah bint Abdulrahman University, through the Program of Research Project Funding After Publication, grant No (44- PRFA-P- 81)

- **May 2023:**

Contribution to the conception, realization and monitoring of the MIXED TUNISIAN-MAURITANIAN project (submitted May 2023): “Resource allocation in Fog Computing”.

- **December 23th 2022**

Moderator of the event "Cybersecurity for industrie 4.0: Risks and Challenges, I-PROTECT V5" at the Digital Research Center of Sfax, organized by IEEE Tunisa Section

- **October 29th to 30th 2022:**

First prize during the Hackathon “CYBERSECURITY & SMART FACTORY” in its 1st edition at the Neotex Technopole Monastir, Tunisia.

- **October 15th 2022:**

Moderator of the event "Personally Identifiable Information: Risks and Challenges" at the Faculty of Sciences of Sfax, organized by the ENIS and FSS Securinet clubs.

- **October 12th 2022:**

Computer security trainer in “Introduction to cybersecurity”, online training organized by the ENIS Securinet clubs

- **December from 3rd to 4th 2020:**

Contribution to the fulfillment of the action plan of the National Cyber-Security Strategy 2020-2025

- **February 29th 2020:**

Computer security trainer in “Ethical Hacking Workshop”, in Digital Research Center of Sfax, Tunisia

- **August 26th 2020:**

Computer security trainer in “After work of JCI GREMDA”, in Oliviers Palace HOTEL of Sfax, Tunisia

- **2019-2020:**

Contribution to the conception, realization and monitoring of the approved project PAQ-4C entitled "Implementation of training and certification actions in favor of the employability of the ENIS graduates" accepted under the code PAQ-4C 2019-2020.

EVENT ORGANIZATION

- **December from 23th to 26th 2022**

Chair of “I-PROTECT V5”, in Digital Research Center of Sfax, Sfax, Tunisia

- **December from 26th to 28th 2021**

Chair of “I-PROTECT V4”, in Marhaba Palace Hotel, Sousse, Tunisia

- **July from 17th to 19th 2020**

Chair of "I-PROTECT V3", in Concorde Hotel, Sfax Tunisia

- **March from 22th to 24th 2019**

Chair of "I-PROTECT V2", in Marhaba Royal Salem Hotel, Sousse, Tunisia

- **March from 18th to 20th 2018**

Chair of "I-PROTECT V1", in Marhaba Royal Salem Hotel, Sousse, Tunisia

- **November 10th 2018**

Chair of "SECURIDAY", in National School of Engineers ENIS, University of Sfax, Tunisia

EVENT CO-ORGANIZATION

- **December from 4th to 5 th 2021**

Workshop chair of "iDSS 2021", Faculty of science of Sfax (FSS), Tunisia

- **December 8th 2019**

Co-organizer of "Hult Prize", in Business Success, Sfax , Tunisia

- **November 13th 2019**

Co-organizer of "Job Fair Sfax #"مع بعضنا, in National School of Engineers ENIS, University of Sfax, Tunisia

- **February 23th and April 20th 2019**

Co-organizer of "Enis Industrial / Academic Forum ", in National School of Engineers ENIS, University of Sfax, Tunisia

- **March from 12th to 13 th 2019**

Workshop chair of "iDSS 2019", Faculty of science of Sfax (FSS), Tunisia

- **March 23th 2018**

Workshop chair of "iDSS 2018", Faculty of science of Sfax (FSS), Tunisia

PROFESSIONAL TEACHING EXPERIENCE

2013-Now **Assistant Professor** in Computer Science	National School of Engineers of SFax, Tunisia **Taught courses**: Cyber-security, Norms and standards, IT project management, Linux environment, image processing and pattern recognition Faculty of Science of Sfax FSS, Tunisia Co-coordinator of the co-constructed master "Cybersecurity and Smart Industry" **Taught course**: Implementation and Audit of an ISO 27001 Information Security Management System

2011-2013 **Assistant** in Computer Science	National School of Engineers of Sfax, Tunisia **Taught courses** : UNIX environment, digital image processing. Security basics
2010-2011 **Assistant** in Computer Science	Faculty of Arts and Humanities of Sousse, Tunisia **Taught courses**: Computer and Internet Certificate training C2i, data bases.Security basics
2009-2010 **Contractual Assistant** in Computer Science	National School of Engineers of Sfax, Tunisia **Taught courses**: Multimedia development, Computer architecture. Security basics
2008-2009 **Contractual Assistant** in Computer Science	Gafsa Faculty of Science, University of Gafsa, Tunisia. **Taught courses** : Data bases, Compilation, C langage**,** Security basics
2007-2008 **Contractual Assistant** in Computer Science	National School of Engineers of Sfax, Tunisia **Taught courses**: Computer network, Multimedia standards, Advanced web
2006-2007: **Technologist assistant** in Computer Science	Superior institute of the technological studies of Bizerte, Tunisia **Taught courses**: Operational research, Algorithmic 1, C language, Data bases, Security basics

LANGUAGES

Arabic: mother tongue

French: fluent spoken and written

English*:* good speaking, writing and reading ability