Kais Belwafi

Ph.D in sciences and technologies of information and communication

PERSONAL DETAILS

Birth	May 10, 1985
Address	Office 215, Building M5, Sharjah University, Sharjah, UAE
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ACADEMIC QUALIFICATIONS

Ph.D. in Sciences and technologies of information and communication 2014-2017

Doctorat en sciences et technologies de l'information et de la communication,
Paris Seine University (Cergy Pontoise), Paris

Thesis Title: Design an adaptable embedded architecture for deploying brain-machine interface applications.
Graduated with the highest honor.

MSc. in Intelligent Communication Systems 2010-2012

College of Engineering of Sousse, Tunisia

Thesis Title: An embedded implementation of automatic censored target detection algorithms.
Graduated with the highest honor (top 1%).

Engineering degree in Real Time Systems 2007-2010

High Institute of Applied Sciences and Technologies of Sousse, Tunisia

Undergraduate project title: An embedded implementation of automatic censored target detection algorithms.
Graduated with the highest honor (top 1%).

HONORS AND AWARDS

- Get a PhD scholarship from the University of Sousse.
- Ranked in the top 1% in my master's degree.
- Ranked in the top 1% in my engineering degree.

PROFESSIONAL APPOINTMENT

Academia

Assistant professor (visiting) 01/2024-present

Computer engineering department, University of Sharjah, UAE

- Taught computer engineering courses (Digital Logic Design, Introduction to Cybersecurity, Special Topics in Software and Computer Applications (SCA).

Instructor 11/2022-09/2023

CTL center, Khalifa University, UAE

- Member of the continuous learning center.
- Taught courses (Advanced electronics, Windows, Database, VAST communication, tutorial to oriented object programming, etc.) for agents from Abu Dhabi Police.

Part-time Lecturer 09/2017-06/2020

Computer science department, College of Applied Studies and Community Service, KSU, Saudi Arabia

- Taught different courses in the computer science department: computer architecture, introduction to the operating system and basic software, PC applications, introduction to database, etc.
- Coordinator of some courses (introduction to the operating system and computer architecture).
- Prepare courses, exams, course reports, course learning outcomes, course specifications, etc.

Part-time Consultant and trainer 03/2017-08/2021

College of engineering, KSU, Saudi Arabia

- Taught courses (Arduino programming, micro-controller 1 & 2, robotics, cryptography, etc.) for students of the college of engineering.
- Permanent member of the engineering school's creativity and innovation students center.
- Supervise students in different national and international competitions (Shell Eco-Marathon, CanSat, Vex robotics, drones).

Part-time Lecturer 03/2012-06/2012

High school of engineering, Tunisia

- Taught Lab "Architecture and Security of Embedded Systems."
- Show students how to build customized real-time operating systems (RTOS) for different processor architectures (i386, Nios, ARM, SPARC, etc).

R&D

Research scientist 10/2021-12/2023

Electrical Engineering and Computer science department, C2PS center, Khalifa University,

- Managed two research projects: security of embedded systems and remote identification of drones using computer vision.
- Wrote research proposals, technical reports, and periodic and final research reports.
- Co-supervised graduate and undergraduate students (one Ph.D. student, two MSc students, four undergraduate students).

Researcher 10/2017-11/2021

Computer science department, CCIS, King Saud University (KSU),

- Conduct research in different areas: brain computer interface, machine learning, artificial intelligence, EEG signal processing, embedded implementation of brain computer interface, HW/SW co-design, etc.
- Co-supervise graduate and undergraduate students (one Ph.D student, four undergraduate students.)
- Co-I in three research projects in embedded systems and brain-computer interfaces domains.
- PI and Co-I of two research groups (RG-1441-524, RG-1440-109).
- Write research proposals, technical reports, and periodic and final research reports.

Project manager of KSU CubeSat 10/2018-08/2021

King Saud University (KSU), college of engineering

- Lead Educational satellite project of the college of engineering to launch a university CubeSat.
- Manage a team composed of academic staff and more than 100 students.
- Negotiate and sign contracts with the CubeSat suppliers, the satellite launch companies.
- Supervise students to program the payload.

Research Assistant 06/2011-03/2012

Prince Sultan Advanced Technology Research Institute (PSATRI),

- Prepare my master thesis in PSATRI.

- Design and develop a customized embedded real-time system for radar detection.
- Optimize signal processing algorithms (F-ACOSD, B-ACOSD, CA-ACOSD) for radar detection.

Project Manager 04/2012-08/2013

Technology and multidisciplinary engineering company,

- Video encryption system based on FPGA.
- Manage industrial tasks, and repair industrial machines.
- Manage a team of four technicians.

Embedded systems Engineer 07/2010-03/2011

Celeria (Eon-Motor)

- Design and development of Brushless controller, based on DsPIC microcontroller, and dashboard of an electric car based on STM32.
- Design and development of an embedded system to monitor the power collected from the solar panels and wind turbines in real time.
- Manage a team of two technicians.

Summer Internships 2004-2007

ERE Sfax; TELEOCM (Tunisie Telecom); DURALEC company; STEG (Societe Tunisienne d'electrcite et de Gaz, Tunisia)

- Six Months internships.
- Test and validation of the electronic and intelligent systems.
- Develop from scratch battery charger based on PIC24 micro-controller.

COMMITTEES

- Participate in the program committee of the 2021 3rd International Conference on Computer, Communications, and Mechatronics Engineering (CCME2021).
- Participate in the program committee of ReCoSoC 2018 "to the Special Session: Heterogeneous Multi/Manycore Processing for Energy-Efficient Execution PC".
- Participate in the program committee of the Twelfth International Conference on Bioinformatics, Biocomputational Systems and Biotechnologies BIOTECHNO 2020 to 2024.
- Reviewer in journals: Transactions on Biomedical Engineering, IEEE Access, Neuroscience and methods, Computers in Biology and Medicine, etc.

PROFESSIONAL DEVELOPMENT

- Certificate in active learning to improve learning outcomes.
- Three professional training in Labview from National Instrument.
- Training in Aeromodelling from OTEAS (Tunisian Aerospace organization).

PUBLICATIONS

Journals

[J1] A. Ahmed, A. Shoufan and **K. Belwafi**, "Light-Weight Security Protocol and Data Model for Chip-to-Chip Zero-Trust," in IEEE Access, vol. 11, pp. 60335-60348, 2023, doi: 10.1109/ACCESS.2023.3285630.

[J2] Gannouni, S.; Belwafi, K.; Aledaily, A.; Aboalsamh, H.; Belghith, A. Software Usability Testing Using EEG-Based Emotion Detection and Deep Learning. Sensors 2023, 23, 5147. https://doi.org/10.3390/s23115147

[J3] S. Gannouni, **K. Belwafi**, Nourah Alangari, Hatim AboAlsamh, and Abdelfettah Belghith. Classification Strategies for P300 Based BCI-Spellers Adopting The Row *Sensors*, 2022, 22(23), 9159; https://doi.org/10.3390/s22239159.

[J4] Sofien Gannouni, Arwa Aledaily, **Kais Belwafi**, Hatim Aboalsamh. Electroencephalography based emotion detection using ensemble classification and asymmetric brain activity. *Journal of Affective Disorders*, Volume 319, 15 December 2022, Pages 416-427, doi: 10.1016/j.jad.2022.09.054.

[J5] **K. Belwafi**, R. Alkadi, S. A. Alameri, H. A. Hamadi and A. Shoufan, "Unmanned Aerial Vehicles' Remote Identification: A Tutorial and Survey," in *IEEE Access*, vol. 10, pp. 87577-87601, 2022, doi: 10.1109/ACCESS.2022.3199909.

[J6] Gannouni S, **Belwafi K**, Al-Sulmi MR, Al-Farhood MD, Al-Obaid OA, Al-Awadh AM, Aboalsamh H, Belghith A. A Brain Controlled Command-Line Interface to Enhance the Accessibility of Severe Motor Disabled People to Personnel Computer. *Brain Sci.* 2022 Jul 15;12(7):926. doi: 10.3390/brainsci12070926.

[J7] **Belwafi, K.**; Gannouni, S.; Aboalsamh, H. Embedded Brain-Computer Interface: State-of-the-Art in Research. *Sensors* 2021, 21, 4293. doi: 10.3390/s21134293

[J8] Gannouni, S., Aledaily, A., **Belwafi, K**. et al. Emotion detection using electroencephalography signals and a zero-time windowing-based epoch estimation and relevant electrode identification. *Scientific Reports*, 11, 7071 (2021). doi: 10.1038/s41598-021-86345-5.

[J9] G. Bouallegue, R. Djemal, and **K. Belwafi**. Artificial EEG signal generated by a network of neurons with one and two dendrites. *Results in Physics*, 20:103699, jan 2021. doi: 10.1016/j.rinp.2020.103699

[J10] **K. Belwafi**, S. Gannouni and H. Aboalsamh, "An Effective Zeros-Time Windowing Strategy to Detect Sensorimotor Rhythms Related to Motor Imagery EEG Signals," in *IEEE Access*, vol. 8, pp. 152669-152679, 2020, doi: 10.1109/ACCESS.2020.3017888.

[J11] Gannouni, S.; **Belwafi, K.**; Aboalsamh, H.; AlSamhan, Z.; Alebdi, B.; Almassad, Y.; Alobaedallah, H. EEG-Based BCI System to Detect Fingers Movements. *Brain Science*. 2020, 10, 965. doi: 10.3390/brainsci10120965

[J12] S. Gannouni, A. Aledaily, **K. Belwafi** and H. Aboalsamh, "Adaptive Emotion Detection Using the Valence-Arousal-Dominance Model and EEG Brain Rhythmic Activity Changes in Relevant Brain Lobes," in *IEEE Access*, vol. 8, pp. 67444-67455, 2020, doi: 10.1109/ACCESS.2020.2986504.

[J13] **K. Belwafi**, Sofien Gannouni, Hatim Aboalsamh, Hassan Mathkour, Abdelfattah Belghith, A dynamic and self-adaptive classification algorithm for motor imagery EEG signals, *Journal of Neuroscience Methods*, Volume 327, 2019, 108346, ISSN 0165-0270, doi: 10.1016/j.jneumeth.2019.108346.

[J14] **Kais Belwafi**, Olivier Romain, Sofien Gannouni, Fakhreddine Ghaffari, Ridha Djemal, Bouraoui Ouni, An embedded implementation based on adaptive filter bank for brain–computer interface systems, *Journal of Neuroscience Methods*, Volume 305,c2018, Pages 1-16,cISSN 0165-0270, doi: 10.1016/j.jneumeth.2018.04.013.

[J15] Gannouni, S., Alangari, N., Mathkour, H., Aboalsamh, H., and **Belwafi, K.** (2017). BCWB: A P300 Brain-Controlled Web Browser. *International Journal on Semantic Web and Information Systems (IJSWIS)*, 13(2), 55-73. doi 10.4018/IJSWIS.2017040104

[J16] **Belwafi, K.**, Ghaffari, F., Djemal, R. et al. A Hardware/Software Prototype of EEG-based BCI System for Home Device Control. *Journal Signal Processing System* 89, 263–279 (2017). doi: 10.1007/s11265-016-1192-8

[J17] Djemal, R.; Bazyed, A.G.; **Belwafi, K.**; Gannouni, S.; Kaaniche, W. Three-Class EEG-Based Motor Imagery Classification Using Phase-Space Reconstruction Technique. *Brain Science*. 2016, 6, 36. doi: 10.3390/brainsci6030036

[J18] Djemal, R., Belwafi, K. and Alshebeili, S. An adaptive CFAR embedded system architecture for target detection. *Design Automation Embedded System*, 17, 109–127 (2013). doi: 10.1007/s10617-013-9121-6

[J19] R. Djemal, **K. Belwafi**, W. Kaaniche, and S. A. Alshebeili. A novel hardware/software embedded system based on automatic censored target detection for radar systems. AEU - *International Journal of Electronics and Communications*, 67(4):301–312, Apr. 2013. doi: 10.1016/j.aeue.2012.09.001

Conferences

[C1] **K. Belwafi**, H. Alshamsi, A. Ahmed and A. Shoufan, "Enhancing Circuit Authentication Through Secure Isolation," 2023 IEEE International Symposium on Circuits and Systems (ISCAS), Singapore, 2023, accepted.

[C2] **K. Belwafi**, H. Alshamsi, A. Ahmed and A. Shoufan, "Zero-Trust Communication between Chips," 2023 IFIP/IEEE 31st International Conference on Very Large Scale Integration (VLSI-SoC), Dubai, United Arab Emirates, 2023, pp. 1-5, doi: 10.1109/VLSI-SoC57769.2023.10321927.

[C3] S. Alshamsi, M. Y. Alhashmi, K. Belwafi and A. Shoufan, "A Low-Power Remote Identification Module for Drones," 2023 IEEE International Symposium on Circuits and Systems (ISCAS), Monterey, CA, USA, 2023, pp. 1-5, doi: 10.1109/ISCAS46773.2023.10181592.

[C4] A. Aledaily, S. Gannouni, H. Aboalsamh, and **K. Belwafi**. A framework for usability testing using EEG signals with emotion recognition. In Intelligent Human Systems Integration (IHSI 2022) Integrating People and Intelligent Systems. AHFE International, 2022.

[C5] **K. Belwafi**, R. Djemal, F. Ghaffari, O. Romain, B. Ouni, and S. Gannouni. Online adaptive filters to classify left and right-hand motor imagery. In Proceedings of the 9th International Joint Conference on Biomedical Engineering Systems and Technologies. SCITEPRESS - Science and Technology Publications, 2016.

[C6] **K. Belwafi**, F. Ghaffari, O. Romain, and R. Djemal. An embedded implementation of home devices control system based on brain-computer interface. In 2014 26th International Conference on Microelectronics (ICM). IEEE, Dec. 2014.

[C7] **K. Belwafi**, R. Djemal, F. Ghaffari, and O. Romain. An adaptive EEG filtering approach to maximize the classification accuracy in motor imagery. In 2014 IEEE Symposium on Computational Intelligence, Cognitive Algorithms, Mind, and Brain (CCMB). IEEE, Dec. 2014.

[C8] R. Djemal, **K. Belwafi**, W. Kaaniche, and S. A. Alshebeili. An FPGA-based implementation of HW/SW architecture for CFAR radar target detector. In ICM 2011 Proceeding. IEEE, Dec. 2011.

TEACHING INTEREST

Computer Architecture and Organization, Computer programming
Intelligent systems, Embedded systems, Real-time systems, Hardware security, Cryptography, Signal Processing.
Operating Systems, Computer Networks, Database,

TECHNICAL SKILLS

C/C++, Java, Python,	Advanced
Assembly, VHDL, Verilog,	Advanced
Matlab, R,	Advanced
Simulink, Eagle, Proteus (ISIS & ARES)	Advanced

LANGUAGE

English	Professional
French	Professional
Arabic	Professional

REFERENCES

Available upon request.