Personal Information

Name	**Dr. Hazem Hiary, Prof.**
Place and date of birth	**Amman, 3/1/1979**
Faculty	**King Abdullah II School of Information Technology**
Department	**Computer Science**

Qualifications

Qualification	Specialization	University of donor rank	Date
PhD	Computer Science	Leeds University (United Kingdom)	2008
MSc	Computer Science	The University of Jordan (Jordan)	2004
BSc	Computer Science	The University of Jordan (Jordan	2001

Specialization and domain of interest

Specialization	**Digital Image Processing**
Domain of interest	Medical Imaging - Computer Vision - Image Processing - Information Hiding - Paper Watermarks - Computer Graphics - Multimedia Applications - Document Analysis & Recognition

Specialization and domain of interest

Title and abstract of the doctoral thesis (within 150 words)

Paper-based Watermark Extraction with Image Processing

This thesis presents frameworks for the digitisation, localisation, extraction and graphical representation of paper-based watermark designs embedded in paper texture. There is a growing need for this among librarians and antiquarians to aid with identification, wider accessibility, and providing a further level of document imaging for preservation. The proposed approaches are designed to handle manuscripts with interference such as recto and verso writing, and defects such as non-uniform paper structure, physical damage, etc.

A back-lighting scanning technique is used for capturing images of paper, followed by a selection of intelligent image processing operations, rather than alternatives such as radioactive techniques. This technique requires low cost equipment, and produces a fast and safe solution to capturing all details on paper, including watermarks, and laid and chain lines patterns.

Two approaches are presented: the first takes a bottom-up approach and deploys image processing operations to enhance, filter, and extract the watermark, and convert it into a graphical representation. These operations determine a suitable configuration of parameters to allow optimal content processing, in addition to the detection and extraction of chain lines. The second approach uses a model of the back-lighting effect to locate a watermark in pages of archaic documents. It removes recto information, and highlights remaining 'hidden' data, and then presents a statistical approach to locate watermarks from a known lexicon.

Work is further presented on reconstructing features of the paper mould by aggregating the success of the foregoing steps: this permits an analysis of 'twin' watermarks.

Results are presented from comprehensively scanned eighteenth and nineteenth century manuscripts, including two unusual copies of the Qur'an, an Islamic Prayer, and various historical manuscripts.

Career Experience

Job Title	Place of work	Date
Full Professor	The University of Jordan	2018–present
Associate Professor	The University of Jordan	2013–2018
Assistant Professor	The University of Jordan	2008–2013
Teaching Assistant	The University of Jordan	2002–2004

Administrative works and committees

Administrative work and committee	Date
Deputy Dean	2018 - 2020
Chairperson of Computer Science Dept.	2010 - 2012, and 2016 - 2017
Dean Assistant for Computer Labs	2009 – 2010

Department and Faculty committees	2008 - present

Recent Publications within last five years

Name of researcher	Research title, Publisher, Date
Rawan Zaghloul and **Hazem Hiary**	A fast single image fog removal method using geometric mean histogram equalization. International Journal of Image and Graphics, 2020. World Scientific. Accepted. DOI: 10.1142/S0219467821500017
Rawan Zaghloul, **Hazem Hiary**, and Moh'd Belal Al-Zoubi	A multifractal edge detector. Multimedia Tools and Applications, 79:5807–5828, 2020. Springer US. DOI: 10.1007/s11042-019-08420-4.
Bassam Qarallah, Bashar Al-Shboul, **Hazem Hiary**, Hamad Alsawalqah, Monther Tahat, Mohammad Al-Bsoul, and Yahia Othman	Remote sensing of cucumber powdery mildew using advanced unmanned vehicle and image processing techniques. Fresenius Environmental Bulletin, 28(12):9181–9185, 2019
Huthaifa Almogdady, Saher Manaseer, and **Hazem Hiary**	A flower recognition system based on image processing and neural networks. International Journal of Scientific & Technology Research, 7(11):166–173, 2018.
Hazem Hiary, Rawan Zaghloul, and Moh'd Belal Al-Zoubi	Single-image shadow detection using quaternion cues. The Computer Journal, 61(3):459–468, 2018. Oxford University Press. DOI: 10.1093/comjnl/bxy004.
Hazem Hiary, Heba Saadeh, Maha Saadeh, and Mohammad Yaqub	Flower classification using deep convolutional neural networks. IET Computer Vision, 12(6):855–862, 2018. The Institution of Engineering and Technology. DOI: 10.1049/iet-cvi.2017.0155.
Rawan Zaghloul, **Hazem Hiary**, and Moh'd Belal Al-Zoubi	Fast multifractal edge detection using anisotropic diffusion. Journal of Theoretical and Applied Information Technology (JATIT), 96(7):1787–1798, 2018. Little Lion Scientific.
Hazem Hiary, Rawan Zaghloul, Aryaf Al-Adwan, and Moh'd B. Al-Zoubi	Image contrast enhancement using geometric mean filter. Signal, Image and Video Processing (SIViP), 11(5):833–840, 2017. Springer-Verlag London. DOI: 10.1007/s11760-016-1029-8.
Sawsan Hiary, Iyad Jafar, and **Hazem Hiary**	An efficient multi-predictor reversible data hiding algorithm based on performance evaluation of different prediction schemes. Multimedia Tools and Applications, 76(2):2131–2157, 2017. Springer US. DOI: 10.1007/s11042-015-3161-9.

Mohammed Arabiat, Nael Al-Basheer, Khair Eddin Sabri, and **Hazem Hiary**	Homomorphic encryption in e-voting systems: The university of jordan case study. In Proc. NTIT: New Trends in Information Technology, pages 169–175, The University of Jordan, Amman, Jordan, 2017.
Bassam AL-Qarallah, Bashar Al-Shboul, **Hazem Hiary**, Asmaa Aljawawdeh, Hamad Alsawalqah, and Monther Tahat	An image processing approach for cucumber powdery mildew infection detection. In Proc. NTIT: New Trends in Information Technology, pages 144–148, The University of Jordan, Amman, Jordan, 2017.
Hazem Hiary, Khair Eddin Sabri, Mohammed S. Mohammed, and Ahlam Al-Dhamari	A hybrid steganography system based on LSB matching and replacement. International Journal of Advanced Computer Science and Applications (IJACSA), 7(9):374–380, 2016. The Science and Information Organization (SAI). DOI: 10.14569/IJACSA.2016.070951.
Hazem Hiary, Abdel Latif Abu Dalhoum, Alia Madain, Alfonso Ortega, and Manuel Alfonseca	Blind audio watermarking technique based on two dimensional cellular automata. International Journal of Security and Its Applications (IJSIA), 10(9):175–184, 2016. Science & Engineering Research Support Society (SERSC). DOI: 10.14257/ijsia.2016.10.9.18.
Khair Eddin Sabri and **Hazem Hiary**	Algebraic model for handling access control policies. Procedia Computer Science, 83:653–657, 2016. Elsevier. DOI: 10.1016/j.procs.2016.04.146.
Abdel Latif Abu Dalhoum, Alia Madain, and **Hazem Hiary**	Digital image scrambling based on elementary cellular automata. Multimedia Tools and Applications, 75(24):17019–17034, 2016. Springer US. DOI: 10.1007/s11042-015-2972-z.
Jamal Said and **Hazem Hiary**	Watermark location via back-lighting modelling and verso registration. Multimedia Tools and Applications, 75(10):5673–5688, 2016. Springer US. DOI: 10.1007/s11042-015-2532-6.

Scientific conferences and symposia

Conference Title	Place and date of conference	[1]Type of participation
New Trends in Information Technology (NTIT) conference	The University of Jordan, Amman, April 2017	Organizing committee

Training courses

Name of course	Date
N/A	

Teaching activities

Taught Courses	Bachelor	Graduate
Computer Graphics	✓	
Digital Image Processing		✓
Computer Skills (C++)	✓	
Pattern Recognition	✓	

Membership in scientific and professional bodies and societies

Name and place of scientific body and society	Date
N/A	

Awards

Name of Award	Donor and place of award	Date
N/A		