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Career Objectives

- Conducting world-class research and building an internationally renowned academic research group in computer vision and image understanding.
- Excellence in teaching: preparing students for the intellectual and business challenges of both academic and industrial environments.
- Delivering academic research results as successful products in collaboration with industry.

Research Interests

Computer vision, image processing, signal processing, machine learning, neural networks, and parallel processing.

Education

2001 — **Ph.D.** in Computer Science and Engineering, University of Louisville, KY, USA, GPA 4.0/4.0. Advisor: Prof. Aly Farag, Dissertation: "Zoom-lens Camera Calibration for an Active Vision System".

2000 — **Master of Science** in Computer Science, University of Louisville, KY, USA. GPA 4.0/4.0.

1996 — **Master of Science** in Electrical Engineering, School of Engineering, Assiut University, Egypt. GPA 4.0/4.0. Thesis: "Off-line Recognition of Handwritten Arabic Characters".

1993 — **Bachelor of Science** in Electrical Engineering, Major: Computer and Control Engineering, Distinction with highest honors, School of Engineering, Assiut University, Egypt. Rank: Top (Class Valedictorian). Total score percentage 97.67%. B.Sc. Graduation Project: "Computer Networks and Data Communication".

Professional Experience

06/2013 – Current — **Professor of Computer Engineering**, Electrical Engineering Department, Assiut University, Egypt.

- Teaching several undergraduate and graduate computer engineering courses
- Have founded the Computer Vision Group at Faculty of Engineering, Assiut University

- Have developed several new courses in line with the curriculum requirements of the department.
- Proposed robust algorithms to train artificial neural networks.

08/2011 – 07/2013	**Research Scientist**, Computer Vision and Image Processing (CVIP) Laboratory, University of Louisville, KY, USA.

- Co-developed a complete system for face recognition at a distance (FRAD).
- Co-developed a flexible system for 3D modeling of the human jaw from intra-oral images.
- Investigated techniques for terrain classification for robot navigation in unstructured environments using multiple sensors and various imaging modalities (e.g., video, polarization, light field).
- Designed features for 3D shape description and matching based on heat-equation.

07/2007 – 06/2013	**Associate Professor**, Electrical Engineering Department, Assiut University, Egypt.

- Taught several undergraduate and graduate computer engineering courses
- Proposed a new credit-hour computer engineering program at the department
- Developed several new courses in line with the curriculum requirements of the department.
- Supervised the theses of 9 MSc and 3 PhD students.
- Proposed techniques for utilizing prior Information for the segmentation, bias field correction and registration of MRI.
- Investigated methods for motion tracking and action recognition for visual surveillance.
- Developed levels set and variational methods for image analysis and 3D model reconstruction from images

05/2009 – 08/2009	**DAAD Visiting Scholar**, German Research Center for Artificial Intelligence (DFKI), the Image Understanding and Pattern Recognition (IUPR) group. Collaborator: Prof. Dr. Thomas Breuel.

- Participated in developing a system for the optical acquisition of books using a stereo head.

03/2007 – 03/2010	**Ad hoc Adjunct Professor**, Graduate School, University of Louisville, KY, USA.

- Served on the reading and examination committee of 3 PhD students

07/2007 – 04/2002	**Assistant Professor**, Electrical Engineering Department, Assiut University, Egypt.

- Taught several undergraduate and graduate computer engineering

courses
- Co-PI of $115K project to develop a new undergraduate Mechatronics educational program at Assiut University, funded by the Egyptian Ministry of Higher Education (HEEPF).
- Developed several new courses in line with the curriculum requirements of the department.
- Supervised the theses of 6 MSc and 1 PhD students.
- Proposed new methods for satellite image classification and object recognition using decision fusion and multi-classifier systems.
- Constructed several vision-guided autonomous vehicles.
- Devised robust training algorithms for artificial neural networks.
- Developed a system for 3D Acquisition of Egyptian archaeological heritage with a hand-held camera

01/1998 – 12/2001	**Research Assistant**, Computer Vision and Image Processing Lab, University of Louisville, KY, USA.

- Developed new methods for zoom-lens camera calibration with sub-pixel accuracy, and for correcting lens distortion.
- Co-developed the CardEye, a trinocular active vision system for 3D object modeling
- Co-developed a vision-guided automatic fueling system.
- Investigated techniques for motion tracking in active vision.

12/1993 – 12/1997	**Instructor/Assistant Lecturer**, Electrical Engineering Department, Assiut University, Egypt.

- Assisted teaching several undergraduate and graduate courses.
- Graded students' exam papers.
- Supervised and evaluated students' laboratory work.
- Developed a system for off-line Arabic handwriting recognition.

Course Teaching

- Computer Vision
- Image Processing
- Pattern Recognition
- Artificial intelligence
- Computer Graphics
- Microprocessors
- Android Programming

- Introduction to Mechatronics
- Mechatronics System Design
- Computer Networks
- Computer Programming
- Operating Systems
- Digital Signal Processing
- Database Systems

Skills

Operating systems: Android, SGI Unix, Solaris Unix, Ubuntu, RedHat Linux, Windows 2000/XP/7/8 and MS-DOS.

Programming: Python, C/C++, Visual Studio, OpenCV, Matlab, Java, JavaScript, OpenGL, Motif, Prolog, Pascal, Fortran, QBasic, Intel x86 Assembly, Motorola 68000 Assembly, Parallel programming, Threads

and RMI.

<u>Software Packages:</u> Matlab, Maple, Oracle.

<u>Hardware devices:</u> A/D, D/A, motor controllers (PMAC, OptiStep..), Interface Chips (UART, 8255 Parallel Port, 8254 Timer, 8259A Interrupt Controller, MC6850 ACIA, 68230 PI/T, etc.), Microcontrollers (PIC, ATMEL, Motorola, and Intel Families).

Professional Activities

- Member of the committee supervising Assiut University Network (http://www.aun.edu.eg).

- Director of the Engineering Education Development Center, Faculty of Engineering, Assiut University, Egypt, 2005-2010.

- Coordinator of information technology/security area in the Japanese-Egyptian Scientific and Technological Year (JESTY-08), 2008.

- Founder of the Computer Vision Group at Faculty of Engineering, Assiut University.

- Member of the team proposing and supervising the new credit-hour program at the Faculty of Engineering, Assiut University on Mechatronics and Robotics Engineering, which started in the academic year 2006-07.

- Member of the management and implementation team of the HEEPF funded project "Developing Mechatronics Courses for Undergraduate Program", April 2004 – March 2006, (http://www.aun.edu.eg/mechatronics/mecha.htm/).

- Co-manager of the ICTP project "Assiut University Network Infrastructure Enhancement Project",

    (http://www.aun.edu.eg/aisep/index.htm/)

- Founding member of the Environmental Training Center at Assiut University (ETCA).

- Area Chair and Special Session Co-Chair, the IEEE International Conference on Image Processing (ICIP'09), Cairo, Egypt, 7-11 Nov. 2009 (http://www.icip2009.org/).

- Member of the Program Technical Committee, the annual International Computer Engineering Conference, co-sponsored by IEEE, Cairo, Egypt.

- Member of the Program Technical Committee, International Conference on Computer Vision Theory and Applications (VISAPP2006), Portugal, Feb. 2006, (http://www.visapp.org/visapp2006 /).

- Technical reviewer for Fulbright Commission (Commission for Educational and Cultural Exchange between the USA and Egypt)

since 2004.

– Regular Reviewer for several journals and conferences (e.g., IEEE Transaction on Image Processing, IEEE Trans. Pattern Analysis and Machine Intelligence (PAMI), Pattern Recognition Letters, IET Computer Vision and IEEE International Conference on Image Processing).

– Member of the PhD examination committee for several students at University of Louisville, KY, USA.

– Head of the committee for Students' Sport and Athletic Activities, Faculty of Computers and Information, Assiut University, 2003-2007.

Sample Publications

[1] **Moumen El-Melegy**, "Model-wise and Point-wise Random Sample Consensus for Robust Regression and Outlier Detection," Neural Networks (Elsevier), Vol. 59, pp. 23–35, Nov. 2014. **(IF=2.076)**

[2] **Moumen El-Melegy**, "Random Sampler M-Estimator Algorithm with Sequential Probability Ratio Test for Robust Function Approximation via Feed-Forward Neural Networks," IEEE Transactions on Neural Networks and Learning Systems, Vol. 24, No. 7, pp. 1074 - 1085, July 2013. **(IF=4.370)**

[3] **Moumen Ahmed El-Melegy** and Aly Farag, "Nonmetric Lens Distortion Calibration: Differential methods and robust estimation", IEEE Transactions on Image Processing, Vol. 14, No. 8, Aug. 2005. **(IF=3.111)**

[4] Aly Abdelraheem, Aly Farag, Shireen Elhabian and **Moumen El-Melegy**, "Shape-from-Shading using Sensor and Physical Object Characteristics Applied to Human Teeth Surface Reconstruction," IET Computer Vision, Vol. 8, No. 1, pp. 1-15, Feb. 2014. **(IF=0.758)**

[5] **Moumen El-Melegy**, and Hashim Mokhtar, "Tumor Segmentation in Brain MRI Using a Fuzzy Approach with Class Center Priors", EURASIP Journal on Image and Video Processing, Vol. 21, pp. 1-14, April 2014. **(IF=0.662)**

[6] Matthew P. Eklund, Aly A. Farag, and **Moumen T. El-Melegy**, "Robust Correspondence Methods for Stereo Vision", International Journal of Pattern Recognition and Artificial Intelligence, Vol. 17, No. 7, 1059-1079, Nov. 2003. **(IF= 0.558)**

[7] **Moumen Ahmed** and Aly Farag, "A Neural Approach to Zoom-lens Camera Calibration From Data With Outliers", Image and Vision Computing, Vol. 9-10, 2002. **(IF=1.581)**

[8] Mostafa Soliman, **Moumen El-Melegy** and Abdulmajid Al-Junaid, "Cycle Accurate Models for Investigating the Scalability of Mat-Core Processor," International Journal of Neural, Parallel and Scientific Computations, Vol. 21, No. 1, pp. 87-110, Feb. 2013. ISSN: 1061-5369. **(SJR=0.17)**

[9] Shuaiby Shuaiby, Mohsen. Hassan, and **Moumen El-Melegy**, "Modeling and Simulation of the Action Potential in Human Cardiac Tissues using Finite Element Method," Journal of Communications and Computer Engineering, Vol. 2, No. 3, pp. 21-27, 2012.

[10] **Moumen El-Melegy**, "Radial Lens Distortion Calibration from Spheres: Theory and Method," International Journal of Computing and Digital Systems, Vol. 2, No. 1, pp. 39-46, Jan. 2013.

[11] **Moumen El-Melegy** and Nagi Al-Ashwal, "A Multi-view 3D Shape Reconstruction System using Level Sets", International Journal of Computing and Digital Systems, Vol. 1, No. 1, pp. 31-40, Sept. 2012.

[12] Amr Elsayed, Ahmed Abo-Ismail, Mohammed ElTaib and **Moumen El-Melegy**, "Characteristcs of Smart Piezoelectric Actuators for Precise Motion Applications," Journal of Engineering Sciences, Assiut University, Vol. 37, No. 6, pp. 1423-1432, Nov. 2009.

[13] Aly Abdelrehim, Aly Farag, Ahmed Shalaby, and **Moumen El-Melegy**, "2D-PCA shape models: application to 3D reconstruction of the human teeth from a single image, "Medical Computer Vision: Large Data in Medical Imaging, Lecture Notes in Computer Science, Springer, LNCS 8331, pp. 44-52, 2014.

[14] **Moumen El-Melegy** and Nagi Al-Ashwal, "A PDE Method to Segment Image Linear Objects with Application to Lens Distortion Removal", Progress in Computer Vision and Image Analysis, H. Bunke, J. Villanueva, G. Sanchez, X. Otazu (Eds.), Series in Machine Perception and Artificial Intelligence, Vol. 73, World Scientific Publishing, pp. 495-517, 2009, ISBN-10 981-283-445-1.

[15] **Moumen El-Melegy**, Mohammed H. Essai and Amer A. Ali, "Robust Training of Artificial Feedforward Neural Networks," Foundations of Computational Intelligence, Vol 1: Learning and Approximation, A. Hassanien, A. Abraham, A. V.Vasilakos, and W. Pedrycz (Eds.), Springer Studies in Computational Intelligence, pp. 217-242, Jan. 2009, ISBN-10 978-3-642-01081-1.

[16] **Moumen El-Melegy** and Safaa Ahmed, "Neural Networks in Multiple Classifier Systems for Remote-Sensing Image Classification," Soft Computing in Image Processing: Recent Advances, Springer-Verlag Series: Studies in Fuzziness and Soft Computing , Vol. 210, Nachtegael, M.; Van der Weken, D.; Kerre, E.E.; Philips, W. (Eds.), pp. 65-91, 2007, ISBN-10: 3-540-38232-1.

[17] **Moumen El-Melegy** and Nagi Al-Ashwal, "Lens Distortion Calibration Using Level Sets," Lecture Notes in Computer Science, N. Paragios et al. (Eds.)., Springer-Verlag, Berlin, LNCS 3752, pp. 356 – 367, 2005.

[18] AlaaEldin Sleem, **Moumen Ahmed**, and Anup Kumar, "Enhancing Genetic Algorithms Performance Using Parallel and Distributed Computing Approaches", International Journal of Computers and Their Applications, Vol. 10, No. 3, Sept. 2003.

[19] Elsayed Hemayed, **Moumen Ahmed** and Aly Farag, "The CardEye: A trinocular Active Vision System," Lecture Notes in Computer Science, Bernt Schiele, Ed., Springer-Verlag, Berlin, pp. 155-173, 2001.