

# Mohamed Moustafa, PhD

Machine learning and Biometric Expert,  
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## Education

- PhD (GPA 4/4) Electrical Engineering, The City University of New York, USA, 2001.
- MSc Electrical and Computer Engineering, Ain Shams University, Egypt, 1997.
- BSc Computer Engineering, with Honor degree, Ain Shams University, Egypt, 1993.

## Academic experience

- The American University in Cairo, *Associate Professor*, tenure, 2011 – present. Department of Computer Science and Engineering. Teaching courses in the area of computer vision, computational intelligence, pattern recognition, computer graphics, and multimedia analytics in addition to supervising undergraduate and graduate research theses.
- Ain Shams University, *Assistant Professor*, 2003 – 2010. Department of Computer and Systems Engineering.
- The City University of New York, City College, Manhattan, New York, USA, *Lecturer*, 1997 – 2000. Electrical Engineering Department.
- The City University of New York, Brooklyn College, Brooklyn, New York, USA, *Lecturer*, 1997 – 2000. Computer and Information Science Department.

## Industrial experience

- Safran Morpho, Paris France, and Bochum Germany (May 2003 – present) *Group Leader and Expert Biometric Research Consultant*. Conducting research in specific aspects of computer vision algorithms for human facial recognition in video, face detection, tracking, pose estimation, and iris detection and verification from a distance. Designed and implemented the first real-time face detection engine embedded in a digital camera (for a major Japanese manufacturer). Optimized many machine learning algorithms for real-time embedded platforms, include deep learning neural networks.
- Visionics/L1-ID (later acquired by Safran Morpho), New Jersey USA (May 1998 – May 2003) *Sr. Principal Research Scientist*. Leading multiple face detection research projects, invented an efficient way to estimate the face pose angle from a face image, built a 3D face model from a single face image, and enhanced iris segmentation accuracy.

## Current membership in professional organizations

- IEEE, since 1997.
- IEEE Computational intelligence society.
- IEEE Technical Committee on Pattern Analysis and Machine Intelligence.
- IEEE Technical Committee on Multimedia Computing.
- Founding member and vice chair of the IEEE computational intelligence society chapter.

## Recent Service Activities

- Director of the computer science and engineering (CSCE) graduate program at the American University in Cairo (AUC), 2014 – present.
- Reviewer for numerous international journals and conferences, including:
  - IET Computer Vision journal, 2014 – present.
  - IEEE Transactions on Systems, Man and Cybernetics, 2003 – present.
  - IEEE Transactions on Evolutionary Computation, 2007 – present.
  - Pattern Recognition Letters. Elsevier, 2008 – present.
- Appointed as chair as well as member of TPC in many international conferences including “IEEE International Conference on Image Processing”, “IEEE International Conference on Communications (ICC)” and “IEEE Global Telecommunications Conference (GLOBECOM)”.

## Recent Honors and Recognition

- Invited speaker in the workshop on Deep Learning for Autonomous Driving (DLAD 2017), Co-located with the 20th International Conference on Intelligent Transportation Systems (ITSC 2017), Yokohama, Japan, October 16-19, 2017
- First place in the Kinect track at the nationwide *IbTIECar competition* with the “Dream On” 3D system, 2014. Featured in the AUC news:  
<http://www.aucegypt.edu/news/stories/students-awarded-nationally-new-3d-system>
- Best oral presentation award, *International Conference on Machine Vision, ICMV 2013*, London, The United Kingdom, November, 2013.
- Best paper award, *Pacific-Rim Symposium on Image and Video Technology, PSIVT 2010*, Singapore, November 2010.
- Best IEEE Chapter Of The Year Award, *IEEE Computational Intelligence Society (CIS) Chapter*, 2010.

## Funded Research Grants

- (Principal Investigator), “Humanized Digital Marketplace,” Sponsored by *ITIDA, Egypt* (March 2016 – November 2017). This project aims for applying custom machine-learning algorithms, which embrace “digital humanism” in recommender systems for e-commerce based on real-time analysis of human behaviors and cognitive processes.
- (Principal Investigator), “Human Pose Estimation from Video,” Sponsored by *Safran Morpho, France* (January 2015 – May 2016). We focused in this project on human body pose estimation and action recognition from one or more cameras. Applications of automatic “looking at people” are numerous and span wide areas, including health, security, and entertainment.
- (Principal Investigator), “Live traffic light management,” Sponsored by *Ericsson*, (November 2012 - November 2013). The objective of this project was to adapt the traffic light switching automatically based on the density of vehicles in road intersections. Based

on surveillance cameras installed at the traffic light pole, live automatic analysis can be performed and adjust the switching time period. This should help in multiple aspects, e.g.: a) retain a traffic balance in road intersections, b) help in collecting real information necessary for broadcasting traffic reports to drivers. Ultimate goal is to save commuting time, energy, and lowering pollution. <http://schools.aucegypt.edu/newsatauc/Pages/story.aspx?eid=1032>

- (Principal Investigator), “Gender classification from facial images using Mixture of experts,” Sponsored by *American University in Cairo*. (November , 2012).
- (Principal Investigator), “Face Verification in Embedded Systems under all illuminations conditions,” Sponsored by *XID Technologies PTE LTD., Singapore*. (August 2010 - May 2012). Featured in the AUC news: <http://www.aucegypt.edu/news/stories/mohamed-moustafa-computers-can-think-see-humans-near-future>

## Publications

### US Patents

- M. Braithwaite, M. Moustafa, A. Date, and J. Chaikin, “*Systems and Methods for Face Authentication or Recognition Using Spectrally and/or Temporally Filtered Flash Illumination*”, U.S. patent No. 9,256,794. Issued February 2016.
- M. Braithwaite, A. Date, M. Moustafa, and J. Chaikin, “*Systems and Methods for Illuminating and Identifying a Person*”, U.S. patent No. 8,831,416. Issued September 2014.
- M. Braithwaite, A. Date, M. Moustafa, and J. Chaikin, “*Systems and Methods for Illuminating and Imaging the Iris of a Person*”, U.S. patent No. 8,254,768. Issued August 2012.
- M. Moustafa, “*System and Method for Pose Angle Estimation*,” U.S. Patent No. 6,959,109. Issued October 2005.

### Refereed International Journals

- M. Raafat, B. Abdullah, M. Taher, and M. Moustafa, “Towards Privacy-Preserving Driver's Drowsiness and Distraction Detection: A Differential Privacy Approach,” *International Journal of Computing and Digital Systems*, vol. 5, No. 5, September 2016, pp. 365 – 374
- Dan-Ali, A. M. and M. N. Moustafa (2014), “What is the Right Illumination Normalization for Face Recognition?”, *International Journal of Advanced Research in Artificial Intelligence(IJARAI)*, vol. 3, pp. 24 – 28, December 2014, United Kingdom. <http://dx.doi.org/10.14569/IJARAI.2014.031204>
- Leithy, M. Moustafa, A. Wahba, “Multi-Cascade of Complementary Features for Fast and Accurate Pedestrian Detection”, *Trans. of Computer Vision and Applications*, Information Processing Society of Japan, vol. 4, pp. 20 – 39, March 2012.
- N. Houmani et al., “BioSecure Signature Evaluation Campaign: Evaluating online signature algorithms depending on the quality of signatures”, *Pattern Recognition*, Elsevier science, vol. 45, no. 3, pp. 993 – 1003, 2012.
- G. Gomah, A. Zakry, and M. Moustafa, “Implementation of a Complete GPS Receiver on the C6713 DSP through Simulink Receiver”, *Journal of Global Positioning Systems*, vol. 8,

no. 1, pp. 76 – 86, June 2009.

- M. Moustafa, I. Habib, and M. Naghshineh, “GAME based dynamic resource scheduling in QoS aware radio access networks”, *Soft Computing*, Springer-Verlag, Vol. 9, no. 2, pp 101-115, February 2005.
- M. Moustafa, I. Habib, and M. Naghshineh, “Efficient Radio Resource Control in Wireless Networks,” *IEEE Transactions On Wireless Communications*, vol. 3, no. 6, pp. 2385 – 2395, November 2004.
- M. Moustafa, I. Habib, M. Naghshineh, and M. Guizani, “QoS-Sensitive Broadband Mobile Access to Wireline Networks,” *IEEE Communications Magazine*, vol. 40, no. 4, April 2002.
- M. Moustafa, I. Habib, and M. Naghshineh, “Wireless Resource Management Using Genetic Algorithm for Mobiles Equilibrium,” *Computer Networks, The International Journal of Computer and Telecommunications Networking*, Elsevier Science, vol. 37, no.5, pp 631-643, November 2001.

### Refereed International Conference Proceedings

- H. Adly, and M. Moustafa, “A Hybrid Deep Learning Approach for Texture Analysis,” *The Second International Conference on Multimedia and Image Processing (ICMIP 2017)*, Wuhan, China, March 2017.
- Y. Abouelnaga, O. Ali, H. Rady, and M. Moustafa, “CIFAR-10: KNN-based Ensemble of Classifiers,” *The 2016 International Conference on Computational Science and Computational Intelligence (CSCI'16)*, Las Vegas, USA, December 2016.
- E. Ahmed and M. Moustafa, “House price estimation from visual and textual features ,” *8th International Conference on Neural Computation Theory and Applications, NCTA'16*, Porto, Portugal, November 2016.
- H.Eraqi, Y. EmadEldin, and M. Moustafa , “Reactive Collision Avoidance using Evolutionary Neural Networks,” *8th International Conference on Evolutionary Computation Theory and Applications, ECTA'16*, Porto, Portugal, November 2016.
- M. Tolba and M. Moustafa, “GAdaBoost: Accelerating Adaboost Feature Selection with Genetic Algorithms,” *8th International Conference on Evolutionary Computation Theory and Applications, ECTA'16*, Porto, Portugal, November 2016.
- M. Moustafa, “Applying deep learning to classify pornographic images and videos,” *7th Pacific Rim Symposium on Image and Video Technology (PSIVT 2015)*, Auckland, New Zealand, November 2015.
- N. Shaltout, M. Moustafa, A. Rafea, A. Moustafa, and M. Elhefnawi, “Comparing PCA to information Gain as a Feature Selection Method for Influenza-A Classification,” *International Conference on Intelligent Informatics and BioMedical Sciences, ICIIBMS 2015*, Okinawa, Japan, November 2015.
- A. Saad and M. Moustafa, “Interactive versus Passive 2D Face Spoofing Detection,” *The International Conference on Artificial Intelligence and Pattern Recognition (AIPR2014)*, pp. 99 – 103, Malaysia, November 2014.
- A. Abdelhady, M. Moustafa, “Unattended Vehicle Detection for Automatic Traffic Light Control”, *6th International Conference on Machine Vision –ICMV 2013*, London, The United Kingdom, November, 2013. (Best paper presentation award)
- Y. El-Din, M. Moustafa, H. Mahdi, “Landmarks-SIFT Face Representation for Gender Classification”, *International Conference on Image Analysis and Processing–ICIAP 2013*,

Naples, Italy, pp 329-338, September 2013.

- S. Bedawi, M. Moustafa, M. Kamel, “Urban Land-Cover Classification From High Resolution Remote Sensing Imagery”, *IEEE International Geoscience and Remote Sensing Symposium –IGARSS*, Melbourne, Australia, July 2013.
- Y. El-Din, M. Moustafa, H. Mahdi, “Gender Classification Using Mixture of Experts from Low Resolution Facial Images”, *11th International Multiple Classifier Systems Workshop, MCS*, Nanjing, China, pp 49-60, May 2013.
- M. Moustafa, H. Mahdi, “A simple evaluation of face detection algorithms using unpublished static images”, *10th International Conference on Intelligent Systems Design and Applications (ISDA)*, 2010, pp.1–5, December 2010.
- A. Leithy, M. Moustafa, A. Wahba, “Cascade of Complementary Features for Fast and Accurate Pedestrian Detection”, *The 4th Pacific-Rim Symposium on Image and Video Technology (PSIVT 2010)*, Singapore, pp.343–348, November 2010. (Best paper award)
- A. Leithy, M. Moustafa, A. Wahba, “Fast and Accurate Pedestrian Detection Using a Cascade of Multiple Features”, *Asian Conference on Computer Vision Workshops (ACCV 2010)*, New Zealand, pp.153–163, November 2010.
- K. Khallaf, M. Moustafa, Y. Dakroury, “Application Layer Protocol In Multimedia Networks”, *International Conference on Computer Engineering and Systems*, pp. 495 –500, December 2009.
- T. Ghanem, M. Moustafa, H. Shahein, “Gabor Wavelet Based Automatic Coin Classification”, *IEEE International Conference on image processing, ICIP’09*, pp. 305–308, November 2009.
- M. Khalil, M. Moustafa, H. Abbas, “Enhanced Dtw Based On-Line Signature Verification”, *IEEE International Conference on image processing, ICIP’09*, pp. 2713–2716, November 2009.
- M. Elshakankiri, M. Moustafa, Y. Dakroury, “Energy Efficient Routing protocol For Wireless Sensor Networks”, *International Conference on Intelligent Sensors, Sensor Networks and Information Processing*, pp 393–398, Sydney, Australia, December 2008.
- A. Hamada, M. Moustafa, H. Shahein, “Software Quality Model Analysis Program”, *International Conference on Computer Engineering and Systems*, pp. 296 – 300, November 2008.
- M. Moustafa, A. Mamoun, M. Amr, “Bilingual Real-Time Handwritten Numeral Strings Recognition”, *6th conference on Language Engineering*, pp. 11 – 18, October 2006.
- M. Moustafa, I. Habib, and M. Naghshineh, “GAME based dynamic resource scheduling in QoS aware radio access networks,” *Springer-Verlag Soft Computing Journal*, Vol. 9, no. 2, pp. 101–115, January 2005.
- M. Moustafa, I. Habib, and M. Naghshineh, “Efficient Radio Resource Control for Manhattan Street Environments,” *IEEE International Conference on Communications (ICC2002)*, New York City, NY, USA, April 2002.
- M. Moustafa, I. Habib, and M. Naghshineh, “GAME Based Radio Resource Management in Wideband CDMA Networks,” *IEEE Global Telecommunications Conference (GLOBECOM 2001)*, San Antonio, TX, USA, November 2001.
- M. Moustafa, I. Habib, and M. Naghshineh, “Efficient Resource Management in Microcellular CDMA Systems,” *IEEE Vehicular Technology Conference Fall 2001 (VTC*

*F'01*), Atlantic City, NJ, USA, October 2001.

- M. Moustafa, H. Habib, and M. Naghshineh, “Wireless Resource Management using Genetic Algorithm for Mobiles Equilibrium,” *Sixth IEEE Symposium on Computers and Communications (ISCC 2001)*, Tunisia, July 2001.
- M. Moustafa, I. Habib, and M. Naghshineh, “GAME Based QoS Provisioning in Multimedia Wideband CDMA Networks,” *IWQoS 2001, Lecture Notes on Computer Science*, Springer-Verlag, Karlsruhe-Germany, June 2001.
- M. Moustafa, H. Habib, and M. Naghshineh, “Genetic Algorithm for Mobiles Equilibrium Applied to Video Traffic,” *QoS-IP 2001, Lectures Notes on Computer Science*, vol. 1989, Springer-Verlag, Genoa-Italy, pp. 381—390, January 2001.
- M. Moustafa, I. Habib, M. Naghshineh, “Genetic Algorithm for Mobiles Equilibrium,” *IEEE Conference On Military Communications (MILCOM 2000)*, Los Angeles, CA, USA, October 2000.

### **Book Reviews in International Professional Newsletters**

Moustafa, M. N. (2013), A Review of *Feature Extraction & Image Processing for Computer Vision, 3rd Edition* by Mark S. Nixon and Alberto S. Aguado, New York, USA: The International Association for Pattern Recognition (IAPR) newsletter, review: *Feature Extraction & Image Processing for Computer Vision, 3rd Edition*, 35, 25-26. <http://www.iapr.org/docs/newsletter-2013-04.pdf>