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Marwan Torki, Assistant Professor

Education

Sep 2006 – Oct 2011 **Rutgers, The State University of New Jersey**
PHD, Computer science
New Brunswick, USA
Cumulative GPA: 3.92 / 4.0

Sep 2003 – Aug 2006 **Alexandria University**
MSc, Computer Engineering
Alexandria, Egypt
Cumulative GPA: 3.66 / 4.0

Sep 1998 – Jun 2003 **Alexandria University**
BSc, computer engineering
Alexandria, Egypt
Cumulative GPA: 3.68 / 4.0

Theses

Marwan Torki: *LEARNING THE MANIFOLDS OF LOCAL FEATURES AND THEIR SPATIAL ARRANGEMENTS*. 10/2011, Degree: PHD, Supervisor: Ahmed Elgammal

Marwan Torki: *TOWARDS EFFICIENT VIEW MAINTENANCE IN DATA WAREHOUSES*. 8/2006, Degree: M.Sc. , Supervisor: Nagwa ElMakky

Work Experience

Feb 2012 – present **Professor (Assistant)**
Alexandria University, Department of Computer and Systems Engineering
Alexandria, Egypt

Aug 2015 – Feb 2017 **Research Fellow**
Qatar University, QNRF-Funded Project. "Question Answering From Arabic Social Media"
Doha, Qatar

Jan 2008– Jun 2011 **Research Assistant**
Rutgers, The State University of New Jersey, Department of Computer Science
Piscataway, NJ, USA

Summer 2009 **Internship**
In Mitsubishi Electric Research Labs (MERL)
Cambridge, MA, USA.

Aug 2006 – Jan 2008 **Teaching Assistant**
Rutgers, The State University of New Jersey, Department of Computer Science
Piscataway, NJ, USA

Jul 2003 – Aug 2006 **Teaching Assistant**
Alexandria University, Department of Computer and Systems Engineering
Alexandria, Egypt

Grants

Mostafa Medhat – Si-Ware Systems, Amr Wassal – Cairo University and consulting for Si-Ware, Marwan Torki – Alexandria University "Spectrometer as a ubiquitous sensor for IoT applications targeting food quality", Alexandria University fund amount 216,000 EGP.

Mohamed E. Hussein and Marwan Torki, "Sign-Language Recognition from RGBD Data," Microsoft Research Advanced Technology Lab Cairo, Nov 2012-Oct 2013 fund amount 20,000 USD.

Awards

1. Visiting Research Fellow at RMIT, Australia from Dec. 3rd to Dec 23rd 2016.
2. Certificate of Acknowledgement, Egypt Innovate, Technology Innovation and Entrepreneurship Center, TIEC Graduation Project Competition, IBTIECAR 2014
3. Certificate of Acknowledgement, Egypt Innovate, Technology Innovation and Entrepreneurship Center, TIEC Graduation Project Competition, IBTIECAR 2012
4. Award from Google research for our research proposal "Putting Local Features on a Manifold for Image Annotation and Recognition" 2011
5. Travel Grant for CVPR 2010
6. Best project in computer vision class spring 2007
7. Best project in Artificial Intelligence class fall 2006
8. Graduation with grade excellent with Degree of Honor June 2003

Skills & Activities

Interests Machine Learning , Computer Vision, Information Retrieval, Artificial Intelligence

Scientific Memberships IEEE

Skills Proficient in Python C/C++ and Java.
Familiar with deep learning libraries like Keras, Gensim and Theano
Proficient with machine learning Library Scikit Learn in python
Familiar with Intel OPENCV
Developed simulator software with OPENGL
Familiar with Windows/Linux operating systems
Proficient with MATLAB.
Familiar with PTGRY software for Stereo vision.

Activities Reviewer for IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) (Impact Factor: 6:07)
Reviewer for IEEE Transactions on Systems, Man and Cybernetics: Systems (TSMC) (Impact Factor: 1.59)
Reviewer for Elsevier Image and Vision Computing Journal (Impact Factor: 1.76)
Reviewer for Elsevier Neurocomputing Journal (Impact Factor: 2.39)
Reviewer for Springer International Journal of Computer vision (IJCV) (Impact Factor: 4.72)
Reviewer for Springer The Visual Computer (TVC) (Impact Factor: 1.06)
Reviewer for MDPI Sensors and SPIE journals.
Reviewer for WACV, ECCV, ICPR
External reviewer for WSDM 2017, SIGIR 2017
External reviewer for CVPR, ECCV 2008-2013

Projects

Research Fellow at Qatar University Aug 2015-Feb 2017

My research fellowship at Qatar university was funded by NPRP project under the name of "Question Answering From Arabic Social Media".

My roles in the project includes:

- Design and implement novel algorithms for text classification and question answering. We introduced novel text features based on word embedding and covariance descriptors.
- Write research papers for conferences and journal.
- Prepared tutorial sessions for research team at Qatar University on Word embedding and text classification in python.
- Develop research plans for research assistants involved in the project. As well as following up the implementation of these plans.
- Lead communication with external parties from the University of Maryland in United States and the University of RMIT in Australia during the submission of our joint question answering system for LiveQA2016 task in TREC 2016 conference.
- Travelling to collaborating sites and work with worldwide teams.

Supervising master and PHD students' research Nov 2013-Present

The focus was on the **Interactive Image Segmentation** and **Facial Expression Recognition** problems.

- Our group contributed two novel algorithms to the literature in the Interactive Image Segmentation problem.
  1. The **Seeded Lapalcaian** algorithm that approximate the eigenvector solution to the graph Laplacian. This approximation is achieved by looking at the eigenfunctions. The approximation is known to best approximate the original eigenvector solution for large N. Where N is the number of pixels in the image. (ICIP15)
  2. The **Multi-Modality Feature Transform** is the second contributed algorithm by our group. We embed the scribbles provided by the user into a more discriminative embedding. We then learn a linear transformation that keeps the multiple modalities in the data. We use this transformation to classify the pixels into foreground and background. We apply self-learning strategy to enhance the results.(BMVC15)
- We also proposed a novel approach to fuse the 2D and 3D face features coming from Kinect to better classify a given frame for its expression. The 2D and 3D feature fusion is done using a dual kernel approach which improves over other single kernel approaches. My Co-supervised PHD student defended successfully her dissertation on Sept 23rd 2016 at Virginia Tech, VA, USA .

Grant From Microsoft Research ATLC (Cairo) Nov 2012 –Nov 2013

The focus was on action classification and detection from skeletal data. In this work we contributed two descriptors for the skeleton data namely **Covariance of 3D joint locations** and **Histogram of Oriented Displacements**. Both descriptors are published in two separate publications in IJCAI 2013. Later, we addressed the more challenging problem for action detection from skeletal data. We proposed a multi-scale (real time) action detection algorithm in WACV 2015.

PHD research work Spring 2008 –summer 2011

The focus was on embedding local features and the applications that might benefit from a unified framework for embedding features from different images/ sequences collectively.

"Feature Matching Through Embedding"
I have developed a new framework for feature matching between two point sets depending on the spatial arrangement in each set and the feature similarity across different sets.

"Putting Local Features on a Manifold"
I used the feature embedding in the context of Object Recognition and Localization and I obtained superior results compared to the state-of-the-art for object recognition.

"Learning A Joint Manifold Representation From Multiple Data Sets"
I used the common embedding idea to embed many instances belonging to same manifold from multiple datasets jointly.

"Regression From Local Features for Viewpoint Estimation"
I learned a regression function from the local features representation of images for the task of category view point estimation. We introduced a supervised way

to learn the conceptual view manifold and the estimation of the view point was solved as a regression problem on the learned manifold.

Internship at MERL Summer 2009

In Mitsubishi Electric Research Labs (MERL) Cambridge, MA, USA.

I developed -with the assistance of my hosts Dr. Oncel Tuzel and Dr. Fatih Porikili – a simulator using OPENGL for moving object in 3D in a restricted environment. Using the simulator we used generated simulated data for one of MERL projects.

I designed features and learned classifiers based on layered classifiers that combine the highly discriminative classifiers with the temporal modeling using Hybrid SVM/CRF architecture. (C/C++ and MATLAB project)

Spring 2008-Spring 2010

"Decision Support for Smart Trauma-Resuscitation Room : TRU-IT: Trauma Resuscitation Unit -- Information Technology"

As a research assistant in the project I helped in designing the environment that enable us to use the Stereo vision for applications of object detection and tracking objects that participate in the room.
I helped in developing tracker for faces by working in the face detection step including training classifiers using Haar features.

Computer Vision - Spring 2007

"Automatic Image Annotation using Neural Networks"
As a team of two students of Prof. Pavlovic Computer Vision course we developed and implemented a system that is able to automatically annotate images with keywords. The project gave the best results for the class in Spring 2007. (MATLAB Project)

Artificial Intelligence –Fall 2006

"Ninjas Versus Pirates"
Game created by myself and other students of Prof. Kulikowski AI course. The game is playable as two-player game and we developed many agents for different techniques, again the project got the best project award in that course. (Java project)

Master Thesis Aug 2006

"TOWARDS EFFICIENT VIEW MAINTENANCE IN DATA WAREHOUSES"
My Master's thesis in which a new algorithm for incremental view maintenance was given that can support both single view structure and hierarchical view structure. The overall time complexity of the algorithm outperformed the state-of-the-art algorithms (C/C++ project).

Graduation Project Jul 2003

"Personalized Online Bookstore"
A system is built by me and group of five undergraduate students at Alexandria University. We built the system of an online book store and provided the personalized search results using data mining techniques like sequential pattern mining and clustering methods (Java and Database Project)

Teaching

Under Graduate Courses

Numerical Analysis Spring 2012, Spring 2013
Introduction to Computer Vision Spring 2013, Spring 2014, Spring 2015.

Operating Systems Spring 2012.
Multimedia Systems Spring 2012, Summer 2014, Spring 2015.
Pattern Recognition Fall 2013, Spring 2014, Fall 2014.
Data Structures Summer 2011, Spring 2012.
Artificial Intelligence Fall 2011, Spring 2013.
Introduction to Computers Fall 2011, Fall 2012, Fall 2013, Fall 2014.

Graduate Courses

Digital Image Processing at AlexU (Fall 2013)
Directed Reading on Computer vision with Prof. Mohamed Ismail at AlexU (Spring 2013, Spring 2015)
Directed Reading on Computer vision with Prof. Mohamed Hussein at VT-MENA (Fall 2011)

Publications

Book Chapters

Ahmed Elgammal, Marwan Torki: *Learning Image Manifolds from Local Features*. Manifold Learning Theory and Applications, Edited by Yun Fu, 11/2011: chapter 10: pages 233-252; CRC Press., ISBN: 978-1-4398-7109-6

Journal Publications

1. Chan-Su Lee, Ahmed Elgammal, Marwan Torki: *Learning representations from multiple manifolds*. Pattern Recognition 08/2015; 50. DOI:10.1016/j.patcog.2015.08.024
2. Ahmed Taha, Marwan Torki: *Seeded Laplaican: An Eigenfunction Solution for Scribble Based Interactive Image Segmentation*. Submitted to IEEE-Transactions on Feb. 2017. Pre-print available at https://arxiv.org/pdf/1702.00882.pdf

Conference Proceedings

1. Ameer Albaham, Maram Hasanain, Marwan Torki, Tamer Elsayed *QweetFinder: Real-time Finding and Filtering of Question Tweets* 2017 39th European Conference on Information Retrieval ECIR 2017.
2. Rana Malhas, Marwan Torki, Rahma Ali, Evi Yulianti, Tamer Elsayed *Real, Live, and Concise: Answering Open-Domain Questions with Word Embedding and Summarization.* TREC 2016; 11/2016
3. Moustafa Meshry, Mohamed E. Hussein, Marwan Torki: *Linear-time Online Action Detection From 3D Skeletal Data Using Bags of Gesturelets*. 2016 IEEE Winter Conference on Applications of Computer Vision; 03/2016
4. Sherin A. Aly, Lynn Abbott, Marwan Torki: *A Multi-modal Feature Fusion Framework for Kinect-based Facial Expression Recognition using Dual Kernel Discriminant Analysis (DKDA)*. 2016 IEEE Winter Conference on Applications of Computer Vision ; 03/2016
5. Reem Suwaileh, Maram Hasanain, Marwan Torki, Tamer Elsayed: *QU at TREC-2015: Building Real-Time Systems for Tweet Filtering and Question Answering.* TREC 2015; 11/2015

6. Ahmed Taha, Marwan Torki: *SEEDED LAPLACIAN: AN INTERACTIVE IMAGE SEGMENTATION APPROACH USING EIGENFUNCTIONS*. IEEE International Conference on Image Processing ICIP, Canada; 09/2015
7. Moustafa Meshry, Ahmed Taha, Marwan Torki: *Multi-Modality Feature Transform: An Interactive Image Segmentation Approach*. BMVC 2015, Swansea City, UK; 09/2015
8. Amr Sharaf, Marwan Torki, Mohamed E. Hussein, Motaz El-Saban: *Real-Time Multi-scale Action Detection from 3D Skeleton Data*. 2015 IEEE Winter Conference on Applications of Computer Vision (WACV); 01/2015
9. Tarek El-gaaly, Marwan Torki, Ahmed Elgammal: *Spatial-Visual Label Propagation for Local Feature Classification*. ICPR 2014; 08/2014
10. Mohammad A. Gowayyed, Marwan Torki, Mohamed E. Hussein, Motaz El-Saban: *Histogram of Oriented Displacements (HOD): Describing Trajectories of Human Joints for Action Recognition*. International Joint Conference on Artificial Intelligence (IJCAI), Beijing, China; 08/2013
11. Mohamed E Hussein, Marwan Torki, Mohammad A. Gowayyed, Motaz El-Saban: *Human Action Recognition Using a Temporal Hierarchy of Covariance Descriptors on 3D Joint Locations*. International Joint Conference on Artificial Intelligence (IJCAI), Beijing, China; 08/2013
12. Tarek El-Gaaly, Marwan Torki, Ahmed Elgammal, Maneesh Singh: *RGBD Object Pose Recognition using Local-Global Multi-Kernel Regression*. International Conference on Pattern Recognition (ICPR), 21st conference of IAPR; 11/2012
13. Marwan Torki, Ahmed M. Elgammal: *Regression from local features for viewpoint and pose estimation*. IEEE International Conference on Computer Vision, ICCV 2011, Barcelona, Spain, November 6-13, 2011; 11/2011
14. Marwan Torki, Ahmed M. Elgammal: *One-Shot Multi-Set Non-rigid Feature-Spatial Matching*. The Twenty-Third IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2010, San Francisco, CA, USA, 13-18 June 2010; 12/2010
15. Marwan Torki, Ahmed M. Elgammal, Chan-Su Lee: *Learning a Joint Manifold Representation from Multiple Data Sets*. 20th International Conference on Pattern Recognition, ICPR 2010, Istanbul, Turkey, 23-26 August 2010; 08/2010
16. Marwan Torki, Ahmed M. Elgammal: *Putting Local Features on a Manifold*. The Twenty-Third IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2010, San Francisco, CA, USA, 13-18 June 2010; 06/2010

Workshop Papers

1. Rana Malhas, Marwan Torki, and Tamer Elsayed. 2016. *QU-IR at SemEval-2016 Task 3: Learning to rank on Arabic community question answering forums with word embedding*. In Proceedings of the 10th International Workshop on Semantic Evaluation, Sem-Eval '16, San Diego, CA.
2. Reham Mohamed, Maha Ragab, Heba Abdelnasser, Nagwa M El-Makky, Marwan Torki: *Al-Bayan: A knowledge-based system for Arabic answer selection.* . In Proceedings of the 9th International Workshop on Semantic Evaluation, Sem-Eval '15.
3. Heba Abdelnasser, Reham Mohamed, Maha Ragab, Alaa Mohamed, Bassant Farouk, Nagwa El-Makky, Marwan Torki: *Al-Bayan: An Arabic Question Answering System for the Holy Quran*. ANLP; 01/2014
4. Tarek El-Gaaly, Marwan Torki, Ahmed Elgammal, Maneesh Singh: *RGBD Pose Recognition using Local-Global Multi-kernel Regression*. 2nd GNY Area Multimedia and Vision Meeting; 06/2012

5. Tarek El-Gaaly, Marwan Torki, Ahmed Elgammal, Maneesh Singh: *Multi-Modal RGBD Sensors for Object Grasping and Manipulation*. IEEE/RSJ International Conference on Intelligent Robots and Systems, Workshop on; 10/2012

Technical Reports

1. Moustafa Meshry, Mohamed E. Hussein, Marwan Torki: *Action Detection From Skeletal Data Using Efficient Linear Search*.
2. Mohamed E. Hussein, Marwan Torki, Ahmed Elsallamy, Mahmoud Fayyaz: *AlexU-Word: A New Dataset for Isolated-Word Closed-Vocabulary Offline Arabic Handwriting Recognition*.
3. Marwan Torki, Mohamed E. Hussein, Ahmed Elsallamy, Mahmoud Fayyaz, Shehab Yaser: *Window-Based Descriptors for Arabic Handwritten Alphabet Recognition: A Comparative Study on a Novel Dataset*.

References

1. Prof. Ahmed Elgammal, Associate Professor at CS department at Rutgers University, NJ, USA elgammal@gmail.com
2. Prof. Lynn Abbott, Associate Professor at ECE department at Virginia Tech, VA, USA abbott@vt.edu
3. Prof. Mohamed Hussein, Assistant Professor at Egypt-Japan University of Science and Technology, and Alexandria University mehussien@gmail.com