

Marwan A Torki

CONTACT INFORMATION

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RESEARCH INTEREST

Computer Vision, Image Understanding, Feature Matching, Activity Recognition, Manifold Learning, Object Recognition, Detection and Tracking.

EDUCATION

Rutgers, the State University of New Jersey, NJ USA Fall 2006 -Present
Ph.D Student (**Post Qualifier**), Computer Science
Cumulative GPA: 3.92 / 4.0

Alexandria University, Alexandria, Egypt Fall 2003-Summer 2006
M. Sc., Computer Science
Alexandria University, Computer Science & Automatic Control Department
Cumulative GPA: 3.66 / 4.0

Alexandria University, Alexandria, Egypt Fall 1998- Spring 2003
B.Sc., Computer Science
Alexandria University, Computer Science & Automatic Control Department.
Cumulative GPA: 3.68 / 4.0
Grade: Excellent With Degree of Honor

WORK AND RESEARCH EXPERIENCE

Spring 2008 - Present

Research Assistant in the Department of Computer Science Rutgers University and during the spring 2008 I joined the project of

Decision Support for Smart Trauma-Resuscitation Room

TRU-IT: Trauma Resuscitation Unit -- Information Technology

- 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.

My core research (**Summer 2008-Present**) is focusing on embedding 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.
- I extended the research to handle the case of multiple sets of feature points.
- Using this piece of research I passed the qualifier exam in May 2009.
- The work resulted in a publication for CVPR 2010.

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.
- The work resulted in a publication for CVPR 2010.

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.
- The work resulted in a paper for ICPR 2010.

Summer 2009

Internship in Mitsubishi Electric Research Labs (**MERL**) Cambridge, MA, USA.

- I developed -with the assistance of my hosts Dr. Oncel Tuzel and Dr. Fatih Prokili - 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 ([name and description of the project is hidden for intellectual property agreement](#)).
- I designed features and learned classifiers based on layered classifiers that combines the highly discriminative classifiers with the temporal modeling.

Fall 2006-Fall 2007

Teaching Assistant in the Department of Computer Science Rutgers University.

- **Fall 2006- Spring 2007:** TA for CS111 "Introduction to computer Science"
- **Summer 2007-Fall 2007:** TA for CS205 "Discrete Structure I"

In addition to be a Teaching Assistant I did **research work** and experiments with my advisor: Prof. Ahmed Elgammal, elgammal@cs.rutgers.edu.

- Representing images using its feature points as graphs using SIFT feature points as vertices and feature-to-feature similarities as weights. I have built soft and hard correspondences between image features across different point sets using "Scott and Longuet-Higgins algorithm".

Fall 2003- Summer 2006

Teaching Assistant in the Department of Computer and Systems Engineering Alexandria Univ., Egypt

I assisted in Teaching these courses during that period

Engineering Statistics, Automatic Control (II and III), Numerical Analysis, Programming, Performance Evaluation and Digital Fundamentals.

Master Student and my master thesis titled "**TOWARDS EFFICIENT VIEW MAINTENANCE IN DATA WAREHOUSES**" 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.

RELEVANT COURSE WORK

"Computer Vision", "Machine Learning", "Robust Computer Vision", "Artificial Intelligence", "Computational Geometry", "Algorithms I", "Numerical Analysis", and "Optimization Methods with Multidisciplinary Applications".

COURSE WORK PROJECTS

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.

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.

COMPUTER SKILLS

- Proficient in **C/C++** and Java.
- Familiar with Intel **OPENCV**
- Developed simulator software with **OPENGL**
- Familiar with Windows/Linux operating systems
- Developed web applications using HTML, XML and Java Script
- Proficient with **MATLAB**.
- Familiar with **PTGRY** software for Stereo vision.

AWARDS & HONORS

- Best project in computer vision class spring 2007
- Best project in Artificial Intelligence class fall 2006
- Graduation with grade excellent with Degree of Honor June 2003

ACTIVITIES

- Reviewer for IEEE CVPR **2008-2010**
- Reviewer for ECCV **2010**

REFERENCES

- 1- Prof. Ahmed Elgammal Associate Professor of Computer Science, Rutgers University.
- 2- Prof. Vladimir Pavlovic, Associate Professor of Computer Science, Rutgers University.
- 3- Prof. Casimir Kulikowski Professor of Computer Science, Rutgers University.
- 4- Dr. Fatih Porikli, Senior research scientist, Mitsubishi Electric Research Labs (MERL).
- 5- Dr. Oncel Tuzel, Research scientist, Mitsubishi Electric Research Labs (MERL).

PUBLICATIONS

- 1- Marwan Torki and Ahmed Elgammal, “**One-Shot Multi-Set Non-rigid Feature-Spatial Matching**” CVPR 2010 , 27%
- 2- Marwan Torki and Ahmed Elgammal, “**Putting Local Features on A Manifold**”, CVPR 2010 , 27%
- 3- Marwan Torki , Ahmed Elgammal and Chan-Su Lee “**Learning A Joint Manifold Representation From Multiple Data Sets**”, ICPR 2010.
- 4- Marwan Torki, “**Towards Efficient View Maintenance In Data Warehouses**”, M.Sc. thesis, Faculty of Engineering, University of Alexandria. August 2006.

PRESENTATIONS & POSTERS

- 1- Spectral consistent matching. **The 3rd annual perceptual science forum, Rutgers University, NJ May 2009.**
- 2- Spectral Multi-Set Spatially Consistent Feature Matching. **Qualifier Exam, Rutgers University, NJ may 2009.**