Shaping the Future of Robotics and Automation in Egypt

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IEEE RAS Egypt Chapter Founder and Chair

http://www.alaakhamis.org/
Outline

• Introduction to Robotics
• IEEE RAS – Egypt Chapter
• Robotics Education
• Research Support
• Outreach Programs
• Industry-Academia Collaboration
• Technology Transfer
Outline

• **Introduction to Robotics**

• IEEE RAS – Egypt Chapter

• Robotics Education

• Research Support

• Outreach Programs

• Industry-Academia Collaboration

• Technology Transfer
Introduction to Robotics

• Body-Brain Evolution
Introduction to Robotics

• Robotics Wave

Introduction to Robotics

• Robotics Everywhere
Introduction to Robotics

• The Evolutionary Stages

- Service Robots for Professional Use
- Service Robots for Personal Use
- Personal Robotics
- Industrial Robotics

Service Robotics
Introduction to Robotics

• Market Size

Google commits $1.36 billion for NASA facility, to house their robotics, space and flight technologies
Introduction to Robotics

Advantages:
• Repeatability
• Tighter quality control
• Waste reduction
• Working in hostile environment
• Increased productivity.

Disadvantages
• high initial costs
• increased dependence on maintenance.

Advantages/ Disadvantages?!
• Impact on employment
Introduction to Robotics

• Impact on Employment

Top 10 countries by robot density (industrial robots per 10,000 manufacturing workers)

There is a negative correlation between robot density and unemployment rate (-0.44)
Outline

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IEEE

- The world’s largest technical professional association fostering technological innovation and excellence for the benefit of humanity
- More than 400,000 members
- Includes 100,000 student members
- More than 150 countries
- Organized into 10 geographical regions
  - 38 societies and 7 technical councils
  - 330 sections
  - ~1900 student branches
  - ~2000 chapters
Robotics and Automation Society

• RAS has over **11,000 members in 110 countries**
  - Roughly half in the Americas
  - A quarter in Europe and the Middle East
  - A quarter in Asia and Oceania

• Students make up about **15%** of the RAS membership
  - Growing rapidly
  - Increased by 45% in 2011
Established in Sept. 2011 to become the meeting place of choice for the robotics and automation community in Egypt.
IEEE RAS – Egypt Chapter

IEEE Robotics and Automation Society– Egypt Chapter is the recipient of 2015 IEEE RAS Chapter of the Year Award
IEEE Robotics and Automation Society– Egypt Chapter has been selected as the winner of the 2012 Chapter of the Year Award in IEEE Region 8 (Europe, Middle East and Africa). Our chapter has obtained this most prestigious award for being especially engaged in humanitarian activities of national importance and for being able to put into practice the mission of IEEE, “...to foster technological innovation and excellence for the benefit of humanity.”
• **3 active IEEE RAS student branches** (Helwan University, Alexandria University and Tanta University)

• **3 IEEE RAS student branches with IEEE approval pending** (Cairo University, Benha University and El Zagazig University)

• **28 IEEE RAS student branches in process** of preparing the petition to be established soon.
IEEE RAS – Egypt Chapter

• Establishing a Student Chapter

1. Download the official petition available here: http://www.ieee.org/documents/student_branch_chapter_formation_2010.doc

2. Fill in the petition and get it signed by not less than 6 IEEE student members.

3. Get an advisor for your new student chapter. The advisor must be an IEEE member (not student member) and he/she must be also a member of IEEE RAS.

4. Get the petition approved by the Advisor and the IEEE Student Branch Executive Committee at your university

5. Email the petition to IEEE Member and Geographic Activities Administration Department at petition@ieee.org
IEEE RAS – Egypt Chapter

• Why Establishing a Student Chapter?
  ▪ e-subscriptions (RAS online member directory, RAS video library, RASeNews).
  ▪ Student travel award of $500 and waive of registration fee to attend ICRA.
  ▪ ICRA author travel award of $1000.
  ▪ Scholarship to attend Summer Schools.
  ▪ RAS chapter grant: $2000/year available for chapters to support local activities
  ▪ Distinguished Lecturer (DL): RAS pays up to $3000 for a DL
IEEE RAS – Egypt Chapter

Research Support

Outreach Programs

Robotics and Automation in Egypt

Educating People on Robotics and Automation

Industry-Academia Collaboration

Technology Transfer

Ecosystem

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Robotics Education
Robotics Education

- R&A Map in Egypt and Arab World

Map: [http://ras-egypt.org/map.html](http://ras-egypt.org/map.html)
Robotics Education

• “How to build a real robot” Course

The objective of this course is to teach students without any background in robotics how to build a real robot that can perceive the environment and acts accordingly in autonomous way.

Available at: http://www.ras-egypt.org/course/index.html
Robotics Education

• “How to build a real robot” Course

Available at: http://www.ras-egypt.org/course/index.html
Robotics Education

• The Future of UAV Technology
Robotics Education

- Optimization with Engineering Applications
  - Optimization Theory
  - Deterministic Optimization
  - Trajectory-based Stochastic Optimization
  - Population-based Stochastic Optimization
  - Project Presentation and Discussion
Robotics Education

• Seminars: Networked Robot Systems

Lecture about **Networked Robot Systems** by Prof. Dr. rer. nat Klaus Schilling, Professor and Chair of Robotics and Telematics Lab, Julius-Maximilians-University Wurzburg, Germany and Consulting Professor at Stanford University, Department of Aeronautics and Astronautics, USA. 19 September 2011
Robotics Education

- Seminars: Social Robotics

Prof. Dr. Miguel A. Salichs, Director of RoboticsLab, Department of Systems Engineering and Automation, Carlos III University of Madrid, Spain.

Robotics Education

• Seminars: Pico-Satellites

Distinguished lecture entitled **Pico-Satellites for Education and Research in Networked Space Systems** by: Prof. Dr. rer. nat Klaus Schilling, Professor and Chair of Robotics and Telematics Lab, Julius-Maximilians-University Wurzburg, Germany.


Robotics Education

• Seminars: Cooperative Multirobot Systems

This seminar has been organized by IEEE RAS – Egypt chapter and given by Dr. Alaa Khamis, associate professor at German University in Cairo and Egypt chapter founder and chair in Faculty of Computer and Information Sciences, Ain Shams
Robotics Education

• Seminars: Robots Moving Closer to Humans

Bruno Siciliano, Professor of Control and Robotics, and Director of the PRISMA Lab in the Department of Computer and Systems Engineering at University of Naples Federico II. He is the Past-President of the IEEE Robotics and Automation Society
Robotics Education

• Panel Discussion: Robotics Education
  ▪ Robotics at school initiatives
  ▪ Robotics at University initiatives
  ▪ School to University linkage through robotics programs
  ▪ Research to industry linkage programs
  ▪ The impact of robotics education on research and industry

Robotics Education

• Webinars

  ▪ **Mobile Robot Locomotion and Positioning Systems** by Dr. Alaa Khamis, IEEE RAS Egypt Chapter Chair.

  ▪ **Buried Mine Detection** by Dr. Hisham El-Sherif, German University in Cairo.

  ▪ **Machine Vision** by Dr. Mohamed Salem, Ain Shams University.

  ▪ **Perception and Navigation of Autonomous Vehicles** by Prof. Dr. Howard Li, Director of COllaboration Based Robotics and Automations (COBRA) Group, University of New Brunswick, Canada.

  ▪ **Wireless Communication for Teleoperated/Autonomous Vehicles** by Dr. Ahmed Madian, Egyptian Atomic Energy Authority.

  ▪ **Construction and Control of an Unmanned Quadrotor** by Amr Nagaty, University of New Brunswick, Canada.

Download: [http://landminefree.org/webinars](http://landminefree.org/webinars)
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Research Support

• Robotics & Autonomous Systems (RAS) Research Group
  ◊ Environment Perception Focus Group
  ◊ Service Robotics Focus Group
  ◊ Industrial Automation Focus Group
  ◊ Cooperative Intelligent Systems Focus Group

For more info: http://www.ras-lab.com/
Research Support

◊ **RAS Talks**: Informal, wide range of topics but must be related to robotics and automation. Talks to be pitched at a level that could be understood by a non-specialist. We are not looking for proofs or slides filled with equations.

◊ **Format of talks**: Can be very varied in nature, normally a 30min presentation followed by 10 to 20 minutes of question period at the end.

Robotics and Autonomous Systems

RAS TALKS

THE BEST WAY TO LEARN SOMETHING IS TO TEACH IT!

Open Research Forum

More info: [http://ras-egypt.org/activities.html](http://ras-egypt.org/activities.html)
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Outreach Programs

*Minesweepers: Towards a Landmine-free World* as the first international outdoor robotic competition on humanitarian demining [http://www.landminefree.org/].
Outreach Programs

• Organizers

• Technical Sponsors

IEEE RAS Special Interest Group on Humanitarian Technology (RAS-SIGHT)

• Community Partners

• Media Partner
Outreach Programs
Outreach Programs

• Egyptian World Robotics Olympiad

Eng. Marwa Soudi, IEEE RAS Egypt Chair of Junior Activities with the winners
Outreach Programs

• **AFRON: Africa Robotics Research Network**


The Suckerbot, one of the winners
Outreach Programs

- Remotely Operated Vehicle (ROV) Egypt

IEEE RAS – Egypt Chapter sponsors the ROV Egypt Competition (~http://www.rovegypt.org/~).
Outreach Programs

• Remotely Operated Vehicle (ROV) Egypt
Outreach Programs

• National Science and Engineering fair

Nile University
Outreach Programs

Fab Lab Egypt
Learn. Make. Share!

Egyptian Engineering Day
Made in Egypt

FIRST® LEGO® League

VEX Robotics Competition
Outreach Programs

- Egyptian Engineering Day (EED)

Best Automation Award

Best Robotics Award
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Industry-Academia Collaboration

- ICET 2012 and 2014

Welcome

The International Conference on Engineering and Technology (ICET 2012) is held in conjunction with the German University in Cairo (GUC) 10th year anniversary in the beautiful city of Cairo, Egypt. ICET is technically sponsored by the IEEE. It aims at providing a platform for researchers, engineers, academics and industrial professionals to present their recent research work and to explore future trends in various areas of engineering and technology. ICET 2012 will feature plenary speeches, industrial panel sessions, funding agency panel sessions, poster sessions, and invited/special sessions. Contributions are expected from academia, industry, and government agencies. All articles will undergo a rigorous review process. Accepted papers will be published in the conference memory stick and on the IEEE Xplore. Extended version of selected papers will be recommended for publication in special issues in refereed journals.

http://www.icet-guc.org/2012/
Industry-Academia Collaboration

- IAC2014 and 2015

http://www.iacconf.com/
Industry-Academia Collaboration

- IAC2014 and 2015

**KEYNOTE SPEECHES**

**Dr. Alaa Khamis**

*The Role of Cooperation in Multirobot Systems*

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IEEE Robotics and Automation Society - Egypt Chapter Chair
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**ROBOTICS AND ARTIFICIAL INTELLIGENCE TRACK**
Industry-Academia Collaboration

- IAC2014 and 2015
Industry-Academia Collaboration

- IAC2014 and 2015
Industry-Academia Collaboration

• IAC2014 and 2015
Industry-Academia Collaboration

• IAC2014 and 2015
Call For Papers (CSCC 2015)

The 19th International Conference on Circuits, Systems, Communications and Computers (CSCC 2015) is an international forum for scientists, engineers, and practitioners. The Conference has a distinguished Organizing Committee, Steering and Program Committee with extensive academic qualifications, ensuring that the conference maintains high scientific standards and has a broad international coverage. All the papers are subject to thorough, strict peer review by committees’ members or 2 or 3 additional reviewers. The names of the Organizing Committee, Steering and Program Committee members and reviewers always appear in the Proceedings (CD and Books).

As in the last year 2014, extended versions of all the accepted papers will be published in Springer Verlag Books (Indexed in ISI) as well as in a variety of ISI and SCOPUS Journals.


http://www.cscc.co/
CEIT 2015

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• Technology and Entrepreneurship Day
Outreach Programs

• Techne Summit

Machine Intelligence: Promises and Challenges
Outreach Programs

- Google I/O

Eng. Heba Elkholy, IEEE RAS Egypt Women Activities co-Chair
IEEE RAS – Egypt Chapter

For more information about Chapter activities, visit:
http://www.ras-egypt.org/
IEEE RAS – Egypt Chapter

https://www.facebook.com/IEEEERASEgypt/
Thank you for your attention

Questions?