Shashank Pathak

CONTACT INFORMATION

Technion - Israel Institute of Technology
Post doctoral fellow, Autonomous Navigation & Perception Lab
Lady Davis
Technion City, Haifa 32000, Israel

Cell: (+972) 586729519
Tel: (+972) 4-829-3818
E-mail: @CS-IEEE,@IIT
Website: @IIT

RESEARCH INTERESTS

Formal Methods, Reinforcement Learning, Belief Space Planning & Cognition

RESEARCH STAYS

Visiting Scholar, Dept. of Computer Science, University of Oxford, March - August 2015.

Visiting student, Faculty of Computer Science RWTH-Aachen University, March - June 2014.

EDUCATION

Italian Institute of Technology, Genova, Italy

PhD, iCub Facility , April, 2015

- Thesis Topic: Towards verifiably-safe adaptive robotics
- Advisors: Girogio Metta , Armando Tacchella
- Area of Study: Artificial Intelligence, Formal Verification, Robotics

Warsaw University of Technology, Warsaw, Poland

M.S., Faculty of Electronics and Information Technology , October 2010

- Thesis Topic: Safe Reinforcement Learning for Control Tasks in Humanoids
- Advisors: Pawel Wawrzynski Armando Tacchella
- Area of Study: Artificial Intelligence, Neural Networks, Robotics
- Overall score: 4.37/5.0

University of Genoa, Genoa, Italy

M.S., Department of Computer and Informatics, June 2009

- Emphasis on Robotics
- Majority grades 'A'

Indian Institute of Technology, Delhi, New Delhi, India

B.Tech, Department of Mechanical Engineering, June 2007

- Specialization in Control Theory, thesis on application of Genetic Algorithms
- CGPA: 7.11/10.0

ACADEMIC ACHIEVEMENTS

Recognition	Acceptance rate
Awarded Asst. Prof. in Computer Science at IIIT-Allahabad, Dec. 2015	-na-
Outstanding postdoctorate 2016-17 Council of Higher Education, Israel	max 45 each year
Scholarship Lucia Winter School in AI and Robotics	30%
Scholarship by CNRS and CIRM (France)	-na-
Marktoberdorf Summer School	25%
IEEE-RAS/IFRR Scholarship	20%
Erasmus Mundus Scholarship EMARo	3 per country
Excellent Domain Knowledge, Manhattan Associates	-na-
Best Five Papers, National Technical Paper Session, Delhi 2005	16%
Runners Up Paper, National Technical Paper Session, Delhi 2004	7%
Merit-cum-mean Scholarship, IIT-Delhi	-na-
All India Entrance Ranks: IIT-JEE 657	0.3%
All India Entrance Ranks: DCE 39	0.04%
Top 5 Meritorious Student, Mathematics, Government of State	population 200mil
Extra-ordinary achievements, Head of ICSE	-na-

Professional Experience

LIRA-Lab, **IIT-Genova** Genoa, Italy

Research Assistant (LIRA-Lab) and Fellow(IIT-Genova) **Feb 2011 - April 2015**

Department of Informatics and Telecommunications, Genoa, Italy

Summer Intern, Mind Lab **July 2009 - Sept 2009**

Goldman Sachs, Bangalore, India

C++ Developer, Equity Prediction Team **Offered, July 2008**

Manhattan Associates, Bangalore, India

C++ Developer, Product Development Team **June 2007 - July 2008**

Carrier Aircon, Gurgaon, India

Summer Intern, Research and Engineering Facility **May 2006 - July 2006**

Papers

Shashank Pathak, Antony Thomas, Vadim Indelman. "Nonmyopic Data Association Aware Belief Space Planning for Robust Active Perception." IEEE International Conference on Robotics and Automation, (ICRA 2017).

Shashank Pathak, Antony Thomas, Vadim Indelman. "A Unified Framework for Robust Data association aware Belief Space Planning and Perception." International Journal of Robotics Research (*submitted*).

Shashank Pathak, Luca Pulina, Armando Tacchella. "Verification and Repair of Control Policies for Safe Reinforcement Learning." Springer Journal of Applied Intelligence (*submitted*).

Shashank Pathak, Sadegh Soudjani, Vadim Indelman, Alessandro Abate. "Formal and Data Association Aware Robust Belief Space Planning." 87 - 98, Frontiers in Artificial Intelligence and Applications, Volume 284: STAIRS 2016.

Shashank Pathak, Antony Thomas, Asaf Feniger, Vadim Indelman. "DA-BSP: Towards Data Association Aware Belief Space Planning for Robust Active Perception." Frontiers in Artificial Intelligence and Applications, Volume 285: ECAI 2016.

Pathak, Shashank, Antony Thomas, Asaf Feniger, and Vadim Indelman. "Towards Data Association Aware Belief Space Planning for Robust Active Perception." Long-term autonomy workshop, ICRA 2016.

Shashank Pathak, Luca Pulina, and Armando Tacchella. "Evaluating probabilistic model checking tools for verification of robot control policies." AI Communications Preprint: 1-13.

Shashank Pathak, Luca Pulina, and Armando Tacchella. *Testing a Learn-Verify-Repair Approach for Safe Human-Robot Interaction.* AI* IA 2015, Advances in Artificial Intelligence. Springer International Publishing, 2015. 260-273.

Shashank Pathak, Erika Ábrahám, Nils Jansen, Armando Tacchella, and Joost-Pieter Katoen. *A Greedy Approach for the Efficient Repair of Stochastic Models.* In NASA Formal Methods, pp. 295-309. Springer International Publishing, 2015.

Shashank Pathak,Giorgio Metta, Armando Tacchella. *Is verification a requisite for safe adaptive robots?.* IEEE International Conference on Systems, Man, and Cybernetics 2014.

Shashank Pathak,Luca Pulina, Armando Tacchella. *Evaluating Probabilistic Model Checking Tools for Verification of Robot Control Policies.* 21st RCRA International Workshop on "Experimental Evaluation of Algorithms for solving problems with combinatorial explosion" 2014.

Shashank Pathak among others. *Engineering Approaches and Methods to Verify Software in Autonomous Systems.* 13^{th} International Conference on Intelligent Autonomous Systems 2014.

Shashank Pathak,Luca Pulina, Giorgio Metta, Armando Tacchella. *Ensuring safety of policies learned by reinforcement: Reaching objects in the presence of obstacles with the iCub.* IEEE/RSJ International Conference on Intelligent Robots and Systems, (IROS 2013).

Shashank Pathak,Luca Pulina, Giorgio Metta, Armando Tacchella. *How to Abstract Intelligence?(If Verification Is in Order).* AAAI Fall Symposium 2013.

Giorgio Metta, Lorenzo Natale, Shashank Pathak, Luca Pulina, Armando Tacchella. *Safe and Effective Learning: Case Study.* IEEE International Conference on Robotics and Automation, (ICRA 2010).

Giorgio Metta, Lorenzo Natale, Shashank Pathak, Luca Pulina and Armando Tacchella. *Safe learning with real-time constraints: a case study.* Appeared in 23th International Conference On Industrial, Engineering & Other Applications of Applied Intelligent Systems (IEA-AIE 2010).

Shashank Pathak. Student related Optimization, National Technical Paper Session,Delhi 2005

Shashank Pathak, Saurabh Suman. Tacoma Narrows Bridge: Learnings, National Technical Paper Session,Delhi 2004

Technical Skills

Applications: MATLAB Extensive use, alongwith advanced toolboxes, Scilab,ADAMS, NX

Tools: LaTeX, Emacs, GDB, Visual Studio Enterprise, OpenCV,Gimp, Fluid(FLTK), SVN

Operating Systems: Linux,Microsoft Windows NT2003,AIX,QNX

Languages: C/C++, Java, SML, Scheme, Perl, Python, CORBA, mySQL, x86 programming

Languages(2): fluent: English, Hindi beginner: Italian, Sanskrit

Relevant Courses

Computer Science: Introduction to Algorithms, Data Structures, Computer Vision, Neural Networks, Artificial Intelligence, Real-time Operating System, Embedded System

Mathematics: Linear Programming, Probability and Stochastic Processes, Differential Equations, Numerical Methods, Optimization

Robotics: Mobile robots, Vision-Aided Navigation (*guest lecturer* at Technion), Multi-variable control, Non-linear control, Control of Manipulators, Multi-body systems, Advanced Mechanical Design, Biorobotics, Biomechanics

Relevant PhD/Masters Schools

Lucia Winter School in AI and Robotics, Örebro, Sweden winter 2013

Learning: EuCogIII Member's Conference in conjunction with PASCAL2, Palma De Mallorca (Spain) summer 2013.

Modelling and Verifying Parallel processes (MOVEP), winter 2012, Luminy (Marseille), France

Summer School Marktoberdorf 2012, Engineering Dependable Software Systems, Munich, Germany. Sponsored DAAD, NATO.

Interdisciplinary Methods Spring school: A. Cangelosi(University of Plymouth),B. Scassellati (Yale), Michael A. Arbib (USC) (spring, 2011 Budapest,Hungary)

Embodiment: Fad or future: Martin Buss(TUM), Rolf Pfeifer(ETH), Gregor Schner(Bremen) (spring,2011 Thessaloniki, Greece)

Regularization Methods for high dimensional learning: Lorenzo Rosasco (MIT and IIT) and Francesca Odone (DISI) (summer, 2011 Genova,Italy)

Social and Cognitive Robotics: Adrian Stoica (JPL,NASA), Paulo Fiorini (University of Verona and JPL), Ossuma Khatib (Stanford) (summer,2010 Iasi Romania)

Memberships

IEEE Graduate Student Member #90722871

IEEE Systems,Man, & Cybernetics Society IEEE Computer Society IEEE Robotics and Automation Society IEEE Computational Intelligence Society IEEE Communications Society
European Network for the Advancement of Artificial Cognitive Systems, Interaction and Robotics

Other activities in past

Member, National Service Scheme

House Representative for Board of Student Publication, IIT- Delhi

NSE Certificates in Financial Markets

Member, Pragya, NGO for education to poor

General Secretary, Literary and Cultural Academy

Youngest Chess Champion (school level, at the age of 13)

Personal Information

Birth: 18^{th} May,1985 at Allahabad, INDIA

Nationality: Indian

Date and Sign

January 29, 2017