Advances in Robotics (AIR 2017): 3rd Int. Conf. of Robotics Society of India

June 28-July 02, 2017

Venue: Lecture Hall Complex (LHC) 111, IIT Delhi

Final Programme

June 28, 2017 (Wednesday)		
Inauguration	9:30~10:30	Inauguration (Chief Guest: Dr. Girish Sahni, DG-CSIR)
	10:30~11:00	Group Photograph and Tea/Coffee Break
Tutorial I	11:00~12:50	1. Prof. Sunil Agarwal, Columbia University, USA
	Title	**Robotics for Training of Human Gait, Posture, and Balance**
	12:50~13:50	Lunch
Tutorial II	13:50~15:20	2. Prof. Shibata Tomohiro, Kyushu Institute of Technology Japan
	Title	**Reinforcement Learning and Robotics**
	15:20~15:40	Tea/Coffee Break
Workshop	15:40~17:30	3. TCS Workshop on Robotics for Waste Management

June 29, 2017 (Thursday)									
Time	09:30~10:30	10:30~11:30	11:30~11:50	11:50~12:50	12:50~13:50	13:50~15:20	15:20~15:40	15:40~17:30	17:30~19:00
Keynote Title and Speaker	**Robots for Society: Why we need robots?** Prof. Peter Corke, Queensland University of Technology, Australia								
Sessions	**Keynote 1**	TS 1: Dynamics and Simulation	Tea/ Coffee	TS 2: Systems, and Control	Lunch	R&D/ Industry Session 1	Tea/ Coffee	R&D/ Industry Session 2	RSI-GBM

June 30, 2017 (Friday)							
Time	09:30~11:30	11:30~11:50	11:50~12:50	12:50~13:50	13:50~15:20	15:20~15:40	15:40~17:30
Keynote Title and Speaker	**Recent Robotic Research Activities at IGM, RWTH Aachen University** Prof. Burkhard Corves, RWTH Aachen University, Germany						
Sessions	TS 3: Autonomous Robotics Systems	Tea/Coffee & Poster	**Keynote 2**	Lunch & Poster	TS 4: Control, and Kinematics	Tea/Coffee & Poster	TS 5: Haptics, and Medical Robotics
Banquet	**19:00-22:00 India International Centre, 40, Lodhi Gardens, Lodhi Estate, New Delhi** (Transportation from IIT Delhi will be available after the sessions)						

July 01, 2017 (Saturday)								
Time	9:30~11:30	11:30~11:50	11:50~12:50	12:50~13:50	13:50~15:20	15:20~15:40	15:40~16:40	16:40~17:30
Keynote Title and Speaker	**Sampling-Based Motion Planning: From Intelligent CAD to Crowd Simulation to Protein Folding** Prof. Nancy Amato, Texas A&M University, USA							
Sessions	TS 6: Haptics, and Design	Tea/ Coffee & Poster	**Keynote 3**	Lunch & Poster	TS 7: Systems, and Modeling	Tea/ Coffee Break	TS 8: Control Implement ation	Closing Session

July 02, 2017 (Sunday) Doctoral Symposium							
Time	09:30~11:30	11:40~12:30	12:30~13:20	13:30~15:30	15:40~16:30	16:35~17:15	17:15~17:30
Sessions	Session I Presentations	Session II Posters and Tea	Lunch	Session III Presentations	Session IV Posters and Tea	Invited Talk	Valedictory and Awards

Technical Sessions (TS)

Instructions: All presentations MUST be pre-loaded to the computer available in the room before the start of the corresponding session.

Oral Presentations (15 min each): 12 min presentation + 3 min Q&A;

Short Presentations (5 min each): 4 min presentation only + 1 min for change over.

Authors of Short Papers SHOULD put up of their paper posters on the day of their presentations in the designated area. They will explain to the participants during the Tea/Coffee and Lunch breaks. Poster should be removed at the end of the day.

June 29, 2017 (Thursday)

TS 1: Dynamics and Simulation 10:30~11:30 (60 min)

[Paper ID (4 Oral): 6, 12, 59, 62]

Oral Paper ID | Paper Title | Primary Author (12 min + 3 min Q&A)

6	**Dynamic modelling and simulation of a three-Wheeled Omnidirectional Mobile Robot: Bond graph approach**	**Ranjan, Saumya**
12	Balancing of 15-DOF Biped System	Patel, Vinay
59	RoboAnalyzer: Robot Visualization Software for Robot Technicians	Chittawadigi, Rajeevlochana
62	Integrating Mimic Joints into Dynamics Algorithms - Exemplified by the Hybrid Recupera Exoskeleton	Kumar, Shivesh

TS 2: Systems, and Control 11:50~12:50 (60 min)

[Paper ID (2 Oral): 22, 43]

Oral Paper ID | Paper Title | Primary Author (12 min + 3 min Q&A)

22	**Butterfly Inspired Multi-robotic Swarm for Signal Source Localization**	**Jada, Chakravarthi**
43	Robotic cloth manipulation for clothing assistance task using Dynamic Movement Primitives	Joshi, Ravi

June 29, 2017 (Thursday)

R&D and Industry Sessions (Presenter and time are subjected to change)

R&D/Industry Session 1 [13:50~15:20 (90 min)]
13:50~14:05: Dr. T A Dwarakanath, Div. Remote Handling & Robotics, BARC Mumbai Title: Parallel mechanism in robots: An approaching scenario
14:05~14:20 Dr. Bani Hazra, R&DE(E), Pune Title: Robotics Activities at R&DE(E)
14:20~14:35: Dr. S. Nandy, CSIR-CMERI, Durgapur Title: Robotics at CSIR-CMERI
14:35~14:50 Dr. Prabhu Rajagopal, CNDE-IIT Madras Title: Submersible robots for structural integrity assessments - CNDE-IITM perspectives
14:50~15:05: Prof. Krishnan Balasubramanian, CNDE-IIT Madras Title: Robotic based Inspection System Developments in CNDE: On the Ground and Above
R&D/Industry Session 2 [15:40~17:30 (110 min)]
15:40~15:55: Tata Consultancy Services
15:55~16:10: Hi-Tech Robotics Systemz Limited
16:10~16:25: IEEE Standards Association
16:25~16:40: MathWorks
16:40~16:55: Yaskawa
16:55~17:10: Beckhoff
To be decided

June 30, 2017 (Friday)

TS 3: Autonomous Robotics Systems 09:30~11:30 (120 min)

[Paper ID (6 Oral + 5 Short): 5, 30, 31, 33, 38, 107 + 24, 51, 55, 110, 140]

Oral Paper ID | Paper Title | Primary Author (12 min + 3 min Q&A)

5	**Robust tube-MPC based lane keeping system for autonomous driving vehicles**	**Murali Madhavan Rathai, Karthik**
30	Development of a Planar 3PRP Parallel Manipulator using Shape Memory Alloy Spring based Actuators	Singh, Yogesh
31	Bio-inspired Underwater Robot with Reconfigurable and Detachable Swimming Modules	Ravichandran, Santhosh
33	A Hyper-Redundant Robot Development for Tokamak Inspection	Dutta, Pramit
38	Design and Development of Robots for ABU Robocon 2016	Gupta, Varan
107	Development of Low-Cost Education Platform: RoboMuse 4.0	Singh, Rishabjit

Short Paper ID | Paper Title | Primary Author (4 min, No Q&A)

24	**A Review of Underwater Robotics, Navigation, Sensing Techniques and Applications**	**C, Swagat**
51	A Floor Cleaning Robot for Domestic Environments	Kakoty, Nayan M
55	DEVELOPMENT OF 4PRR-2P HYBRID ROBOTIC SYSTEM FOR SOFT MATERIAL CUTTING	Thomas, Mervin
110	Motion Planning for an Automated Pick and Place Robot in a Retail Warehouse	Jotawar, Sharath
140	Earthworm like modular robot using active surface gripping mechanism for peristaltic locomotion	Chowdhury, Anirban

TS 4: Control, and Kinematics 13:50~15:20 (90 min)

[Paper ID (4 Oral + 6 Short): 47, 53, 56, 80 + 28, 46, 50, 57, 63, 121]

Oral Paper ID | Paper Title | Primary Author (12 min + 3 min Q&A)

47	**Robust Control of Uncertain Euler-Lagrange Systems with Time-Varying Input Delay**	**Roy, Spandan**
53	Robust Trajectory Tracking Control for an Omnidirectional Mobile Robot	Alakshendra, Veer
56	Controller Design for a Skid Steered Robot and Mapping for Surveillance Applications	George, Anand
80	Design and Implementation of GA Tuned PID Controller for Desired Interaction and Trajectory Tracking of Wheeled Mobile Robot	Damodaran, Suraj

Short Paper ID | Paper Title | Primary Author (4 min, No Q&A)

28	**Motion Planning For A Four-Fingered Robotic Hand**	**Neha, Eram**
46	Imitation Learning in Industrial Robots: A Kinematics based Trajectory Generation Framework	Jha, Abhishek
50	Kinematic and Velocity Analysis of 3 DOF Parallel Kinematic Machine for Drilling Operation	Selvakumar , Dr. Arockia
57	An Optimization Based Inverse Kinematics of Redundant Robots Avoiding Obstacles and Singularities	Chembuly, V. V. M. J. Satish
63	Design and Analysis of a Bio-inspired Flapping Wing Robot	Moitra, Sourabh
121	Workspace Analysis of a Cable Driven Leg Exoskeleton for Gait Rehabilitation	Vashista, Vineet

TS 5: Haptics, and Medical Robotics 15:40~17:30 (110 min)

[Paper ID (6 Oral): 106, 109, 115; 9, 10, 117]

Oral Paper ID | Paper Title | Primary Author (12 min + 3 min Q&A)

106	**Virtual Rebar bending training environment with haptics feedback**	**Menon, Balu**
109	Design of a novel Three-Finger haptic grasping system: Extending a Single point to Tripod grasp	Ravindran, Rahul
115	Android based augmented reality as a social interface for low cost social robots	E.K, Subin
9	Stability and Transparency in Bilateral Teleoperation of a Surgical Robot: A case study	Annamraju, Srikar
10	Designing spatio-temporal filter using adaptive sliding window for single trial EEG based BCI	Talukdar, Upasana
117	EEG-EMG based Hybrid Brain Computer Interface for Triggering Hand Exoskeleton for Neuro-Rehabilitation	Chowdhury, Anirban

July 01, 2017 (Saturday)

TS 6: Haptics, and Design 09:30~11:30 (120 min)

[Paper ID (4 Oral + 8 Short): 113, 124, 129, 130 + 49, 54, 63, 65, 67, 90; 112, 126]

Oral Paper ID | Paper Title | Primary Author (12 min + 3 min Q&A)

113	Dynamics and Control of a Vehicle-Manipulator System	Abhishek, Vishal
124	Development of Portable Gait Characterisation System	Vashista, Vineet
129	Autonomous Leader-Follower Architecture of A.R. Drones in GPS Constrained Environments	Das, Kaushik
130	A hybrid image based visual servoing for 6-D manipulator using Kinect	Raja, Rekha

Short Paper ID | Paper Title | Primary Author (4 min, No Q&A)

49	Workspace Optimization of 3PRR Parallel manipulator for drilling operation using Genetic Algorithm	Kumar, Prabhat
54	Design and Simulation of a Robot Balancing on a Sphere with Reduced Height	Johnson, Joe
65	Development of Actively Steerable In-pipe Inspection Robot for Various Sizes	Gargade, Atul
67	Design of a Compact ROV for River Exploration.	Sahoo, Avilash
90	Development of a NAO Humanoid based Medical Assistant	Kumar, Aditya
112	Visualization of Grasping Operations based on Hand Kinematics measured through Data Glove	Kakoty, Nayan M
126	Towards an Open Source Haptic Kit to teach basic STEM concepts	Koul, Majid

TS 7: Systems, and Modeling 13:50~15:20 (90 min)

[Paper ID (5 Oral + 2 Short): 58, 116, 118; 68, 69 + 72, 112]

Oral Paper ID | Paper Title | Primary Author (12 min + 3 min Q&A)

58	Small obstacle detection using stereo vision for autonomous ground vehicle	Gupta, Krishnam
116	Advanced KSOM based Redundancy Resolution of a Mobile Manipulator System for Motion on an Uneven Terrain	Hailu, Beteley
118	Terrain Adaptive Posture Correction in Quadruped for Locomotion On Unstructured Terrain	Pareekutty, Nahas
68	Identification of robot dynamic parameters of a robot using equimomental systems	Hayat, Abdullah Aamir
69	Impact Modeling and Estimation for Multi-Arm Space Robot while Capturing a Tumbling Orbiting Objects	Raina, Deepak

Short Paper ID | Paper Title | Primary Author (4 min, No Q&A)

72	**Force/Position Control of 3 DOF Delta Manipulator with Voice Coil Actuator**	**Udai, Arun Dayal**
122	Graph Based Visual Servoing for Object Category	Pandya, Harit

TS 8: Control Implementation 15:40~16:40 (60 min)

[Paper ID (4 Oral): 18, 93, 100, 138]

Oral Paper ID | Paper Title | Primary Author (12 min + 3 min Q&A)

18	**Robust Non-singular Fast Terminal Sliding Mode Task-Space Position Tracking Control of an Underwater Vehicle-Manipulator System**	**Patre, Balasaheb**
93	Implementation of an OROCOS based Real-Time Equipment Controller for Remote Maintenance of Tokamaks	Rastogi, Naveen
100	Distortion correction algorithm for remote navigation of Unmanned Ground Vehicle	Agrawal, Annapurna
138	Chance constraint based multi agent navigation under uncertainty	Gopalakrishnan, Bharath

Advances in Robotics (AIR2017)

Doctoral (PhD) Symposium
Programme Schedule: July 2, 2017

Venue: Seminar Hall, IIT Delhi

Time	Details
09:30 to 11:30	Session I: Oral Presentations of Researchers 1.1 to 1.10
11:40 to 12:30	Session II: Poster Session of Researchers 1.1 to 1.10 for detailed discussions with expert panel and audience over a cup of tea
12:30 to 13:30	Lunch
13:30 to 15:30	Session III: Oral Presentations of Researchers 2.1 to 2.10
15:40 to 16:30	Session IV: Poster Session of Researchers 2.1 to 2.10 for detailed discussions with expert panel and audience over a cup of tea
16:35 to 17:15	Invited Talk
17:15 to 17:30	Valedictory Session, Awards and Feedback

Sl. No.	Topic	PhD Scholar	Supervisor(s)
1.1	Multiple Mobile Robot Navigation and Coordination	Buddhadeb Pradhan	Nirmal Baran Hui Department of Mechanical Engineering, National Institute of Technology Durgapur Diptendu Sinha Roy Department of Computer Science and Engineering National Institute of Technology Meghalaya, Shilong
1.2	Modelling and Analysis of Multi-Link Flexible Manipulator	Prasenjit Sarkhel	Nilotpal Banerjee and Nirmal Baran Hui Department of Mechanical Engineering National Institute of Technology Durgapur
1.3	Mechanics of robotic grasping	Dharbaneshwer S J	Sankara J. Subramanian Department of Engineering Design Indian Institute of Technology, Madras
1.4	Locomotion Control of Biped Humanoid Robot	Manish Raj	G.C.Nandi Indian Institute of Information Technology, Allahabad
1.5	M-HULL: An Automated Underwater Inspection Robot With Split Hull	Vishakh S Kumar	Prabhu Rajagopal Department of Mechanical Engineering Indian Institute of Technology, Madras
1.6	Design and development of a novel six degrees-of-freedom parallel manipulator for medical rehabilitation	Anirban Nag	Sandipan Bandyopadhyay Department of Engineering Design Indian Institute of Technology Madras
1.7	Dynamics of Underwater Vehicle-Manipulator Systems	Anil Kumar Sharma	Subir K. Saha Department of Mechanical Engineering Indian Institute of Technology Delhi, New Delhi
1.8	Kinematic Studies of A Four-Fingered Tendon Actuated Robotic Hand	Eram Neha	Mohd. Suhaib Mechanical engineering Department Jamia Millia Islamia, New Delhi Sudipto Mukherjee Department of Mechanical Engineering Indian Institute of Technology Delhi, New Delhi
1.9	Design and Analysis of Robotic Exoskeleton for Human Upper Limb Rehabilitation	Akash Gupta	Mukul Kumar Gupta Electronics Instrumentation and Control Department University of Petroleum and Energy Studies, Dehradun
1.10	Dynamics and Control of Unmanned Underwater Vehicle Manipulator Systems	Aparna Pandharkar	Subir K. Saha Department of Mechanical Engineering Indian Institute of Technology Delhi, New Delhi

Advances in Robotics (AIR2017)

Doctoral (PhD) Symposium
Programme Schedule: July 2, 2017

2.1	Visual Feedback based Object Detection and Manipulation	Shraddha Chaudhary	Sumantra Dutta Roy Department of Electrical Engineering Indian Institute of Technology Delhi, New Delhi
2.2	Collision Avoidance Under Uncertainty	Bharath Gopalakrishnan	K. Madhava Krishna and Arun Kumar Singh International Institute of Information Technology Hyderabad
2.3	Visual Servoing Across Object Instances	Harit Pandya	K. Madhava Krishna International Institute of Information Technology Hyderabad
2.4	Towards Ontology and Semantic Mapping for Multi Agent Autonomous Robots	Abhijit Boruah	Tazid Ali Dibrugarh University, Dibrugarh Nayan M Kakoty Tezpur University, Tezpur
2.5	Investigations on adaptive multiple suction chamber control system for wall climbing applications	G. Muthukumaran	Uppu Ramachandraiah Hindustan Institute of Technology and Science, Chennai
2.6	Agile Aerial Manipulation - Modelling and Control	Ranjan Dasgupta	Shubhendu Bhasin Department of Electrical Engineering Indian Institute of Technology Delhi, New Delhi
2.7	A Robotic Algae Harvesting System for Efficient Algae Collection	Swagat C	Dhanapati Deka and Dr. Nayan M Kakoty Tezpur University Tezpur, Assam, India
2.8	Smart Technique For Minimally Invasive Automatic Suturing Robot	Varnita Verma	Mukul Kumar Gupta Electronics Instrumentation and Control Department University of Petroleum and Energy Studies, Dehradun
2.9	Novel Approach towards safety in backhoe with haptics	Meera C S	Mukul Kumar Gupta Electronics Instrumentation and Control Department University of Petroleum and Energy Studies, Dehradun
2.10	Navigation Techniques for Autonomous Mobile Service Robot	Nippun Kumaar A.A.	Sudarshan T.S.B. Department of Computer Science and Engineering Amrita Vishwa Vidyapeetham University, Bangalore