

THE ROBOTICS SOCIETY



AT A GLANCE..



Report on Winter School on Robotics and Autonomous systems at IIT Kanpur



Report on ICAARS at PSG college of Technology, Coimbatore



Guidelines for starting students chapter of The Robotic Society, India



TRS Student chapter : RCCIT, Kolkata



Doctoral Symposium at AIR 2019, IIT Madras

EDITOR SPEAKS...

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- Inviting articles related to robotics activities of your institution for publication in RSI newsletter.
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REPORT ON WINTER SCHOOL ON ROBOTICS AND AUTONOMOUS SYSTEMS

A Winter School on "Robotics and Autonomous Systems" was organized by Centre for Continuing Education and Centre for Mechatronics IIT Kanpur during April 01-05, 2019 at IIT Kanpur. It was supported by CDTE IIT Kanpur, The Robotics Society (India) and IEEE RAS (UP chapter). The course was inaugurated by Prof. P. Venkitanarayanan, Head of ME Dept, IIT Kanpur together with Dr. P. K. Pal, retired Scientist (BARC) and Dr. Anjali Kulkarni.

Faculty and students from various academic, engineering and technical institutions, industry and national laboratories participated in this workshop. Participants were from different parts of India: COE Tiruvananthapuram, NIT Warangal, GCOE Kota, IIT Kanpur, DEBEL, DRDO, PEC, etc. The main objectives of this course was to first give the participants an introduction to the basic kinematics and dynamics of Robotic systems and then focus on advanced topics related to autonomous robotic systems applications. Each day had a focused single theme - Introduction to Robotics, Medical Robotics and Exoskeletons, Robot Hardware and Software, Unmanned Systems, Machine Learning and AI. Six plenary lectures, twelve subject based lectures and four laboratory sessions were held during the workshop. Several of the invited speakers were Prof. Asokan T., Dr. P.K. Pal, Prof. S.K.Saha, Prof S. Hazarika, Prof. G.C. Nandi, application engineers from Math-Works, etc. Robotics laboratory sessions were held at Centre for Mechatronics, Helicopter laboratory, hands-on robotics software using RoboAnalyzer developed by IIT Delhi and Robotics Hardware-Software Interface using Matlab. The final schedule of the course is given at the following link: <http://iitk.ac.in/qip/robotics-and-autonomous-systems/>. A valedictory function was held at the end of the workshop where Prof. Shyamanta Hazarika of IIT Guwahati, addressed the participants.



E-Learning

TOWARDS DIGITAL INDIA, TOWARDS BETTER INDIA....

In this post Dr S.K Saha shares his experience on e-learning activities



Recently, I had opportunities to conduct two online sessions with the help of 2-3 of my Ph.D students to teach the basics of robotics and clear doubts on concepts like DH parameters, Forward and Inverse Kinematics, Dynamics, etc. The sessions were held for the UG students of Lovely Professional University (LTU) at Jalandhar (2 hours)

on March 16th 2019, and for the participants of the Winter School at IIT Kanpur (1 hour) on April 03, 2019. We have used Google Hangout which allows 10 people to connect together. For the sessions of about 30, we divided a session into nine groups with a group coordinator who was logged into Google Hangout. That way, I and nine groups (a total of 10) were able to conduct the sessions to clarify doubts and interact online. Of course, at the beginning I made a .ppt presentation of 15-20 mins by sharing my screen. This presentation was shown at the other end on a big screen by connecting an LCD projector to one of the group coordinators. In addition, RoboAnalyzer (a teaching-learning software developed by IIT Delhi since 2009, <http://www.roboanalyzer.com>) was used to show the animations and demonstrate how it can help in understanding the concepts of DH parameters, Inverse kinematics, etc. The

software was downloaded in advance in each of the laptops by the participants. Small assignments were also given. For example, find out inverse kinematics of a three revolute-jointed planar robot arm, and write the first character of the name of a participant using Virtual Robot Module of the RoboAnalyzer software. In order to evaluate how the participants were doing their screens were shared, and we could see at our end to comment. During a session, chat mode was used to take questions from the participants while my presentation was going on or while I was answering other questions. At the end, the participants were asked to give online feedback (both good and bad) to the website of the software, which I felt was EXTREMELY important to make the software more and more useful to the learning community. It was a great experience for all of us! I thank both LTU and IIT Kanpur to provide me with such opportunities which I certainly like to continue in the future as well.

Given the demand by the students of the country, I found it an effective way to impart knowledge and share our experiences with the younger generation (both faculty and student) who are interested in Robotics. I would request every senior faculty in the country to use such technologies to share their knowledge and experience for the benefit of our student community.

Happy online learning!

SK Saha, IIT Delhi

REPORT ON SECOND INTERNATIONAL CONFERENCE ON ADVANCEMENTS IN AUTOMATION, ROBOTICS & SENSING (ICAARS) AT PSG COLEGE OF TECHNOLOGY COIMBATORE

The Department of Robotics and Automation Engineering conducted the Second International Conference on Advancements in Automation, Robotics & Sensing during 13 -15 December 2018. The conference provided a platform to the researchers, industrial experts, academicians and practicing engineers to exchange information related to technological advances in these fields. 110 papers were received, 65 selected and presented in 13 sessions in 2 days. Around 250 participants participated. The conference was inaugurated by Mr. Santosh K Misra IAS, CEO – TamilNadu e-Governance Agency, which was felicitated by Mr. Marc Jarrault, MD of LAPP India.

The Conference boasted a unique conglomerate of eminent speakers and distinguished scientists like Dr. Richard Voyles, Purdue University, USA; Mr. Paresh Oza, Director – India Design Centre, Danfoss; Dr. Balan Pillai, Stanford University, USA; Mr. Nassif Saif, Kinova Robotics, Canada; Dr. Dirk Frohling, Westfalishe, Germany on 14th December 2018.

Dr.Prahlad Vadakkepat, NUS, Singapore; Mr. Santosh Shukla, Research Scientist, Intel Robotics and AI Division; Mr.Satish Ramachandran, AROBOT – Chennai; Dr. Asokan Thondiyath, IIT Madras; Dr. Jurgen Dunker, University of Westfalishe, Germany; Mr. R.Vivekanandah, VP, Titan Engineering and Automation Ltd. and Mr. Sougandh, Universal Robotics on 15th December 2018.

As a part of the conference, an exhibition on Automation and Robot based products was conducted in which several leading industries like Entuple Technologies, Beckhoff Automation, Scientech Technologies, E4 Energy Solutions, Fronius India Pvt Ltd, Candid Machines, Naraiuran, Lapp Cables and Universal Robotics and Centre of Excellence for Welding – PSG Tech, displayed their products. Along with the exhibition, two pre-conference workshops were also conducted. A 3-day workshop (11-13, Dec 2018) on Kinova Robots titled Manipulators in Service Robotics, Application and Programming Interfaces and a one day workshop on Robotic Welding and Industry 4.0 (13 Dec 2018) were conducted. The resource persons were from Kinova , Nugenix and Centre of Excellence for Welding, PSG Tech. The conference, workshops and exhibition were a great success as they had a very good response.

The event was sponsored by Government Agency – Board of Research in Nuclear Sciences(BRNS) and Non-Government Agencies like Consul Neowatt Power, Cognizant Technology Services, Titan Industries, Ayyappa Welding Service, Caterpillar, Universal Robotics, EPLAN, Danfoss, Delta, Perficient, Malles Automation, Festo, Craftsman Automation, etc.



ICAARS 2018 inaugurated by Mr. Marc Jarrault, MD., Lapp India and Mr. Santosh K Misra, IAS, CEO, TN e-Governance agency, Shri.L.Gopalakrishnan, Managing Trustee, PSG & SONS Charities, Dr. R. Rudramoorthy , Principal, PSG College of Technology, Dr. Richard Voyles, Professor, Purdue University, USA, Dr.B.Vinod, HoD In-Charge, Dept.of RAE



A glimpse of ICAARS 2018 Stalls Shri.L.Gopalakrishnan, Managing Trustee, PSG & SONS Charities; Mr. Santosh K Misra, I.A.S, CEO, TN e-Governance; Dr.M.Sundaram, Programme Coordinator, Dept.of RAE

GUIDELINES FOR STARTING STUDENT CHAPTER OF THE ROBOTICS SOCIETY, INDIA

The Robotics Society (TRS), India empowers technical institutions in India to start authorized TRS Student Chapters and to organize and mentor activities related to Robotic Science in the respective institutes. This student chapter shall care for mentoring the interested students via student's networking and also for promoting knowledge sharing activities in the area of Robotics. The following guidelines to be followed for formation of student chapters and organizing events.

Chapter Formation

- Approval of the TRS Governing Council must be obtained for formation of student chapter.
- Faculty advisor should make a formal request to the Secretary TRS for formation of the chapter, giving the details of members.
- Chapter's working committee should have Secretary, Joint Secretary, Treasurer, and the chapter Counselor (i.e. Faculty Advisor).
- For all monetary and non-monetary activities, planned on campus or off-campus, approval of Governing Council of TRS, India is a must in all cases/situations. For this purpose faculty advisor can write to student activity coordinator of TRS, with a copy to Secretary TRS.
- Student activity coordinator of TRS in consultation with Secretary TRS can grant permission for such events. TRS will not provide any financial support for the events.
- Money collection, providing money receipts, expenditures for various procurement shall be as per accounting practices and protocols of the parent Institute.
- Annual audited statement of money collected during the events and expenditure incurred should be provided to student activity coordinator of TRS with copy to secretary and treasurer of TRS.
- If student chapter organizes some workshop/training session with any organization outside the chapter, prior approval from Secretary and student activity

coordinator TRS is required. In any case, activities of purely commercial nature should not be taken up.

- A report on the event shall be forwarded to Newsletter coordinator within 6 working days after the activity.
- For any violation of the above rules, TRS has the right to revoke the registration of the chapter and take appropriate action against the members.

Benefits of Chapter

- Membership of the chapter itself narrates to sincere interest of a member in the robotics activity.
- Discount in charges of various robotics event at entry/participation as per the event declarations will be offered to the chapter members. It can be Seminar, Workshop, Conference, and Expert Lecture etc.
- Members can get exposure to various activities and events and it can be mentioned in individual's credentials to the chapter's activities after approval of chapter counsellor/staff advisor.
- Student Chapters can invite TRS members/office bearers for lectures, workshop and seminars. This will give exposure to student chapter members and will increase networking.

Note :-

Complete responsibility (finance, safety, legal...etc) of the event organized by the chapter lies with chapter authorities and parent Institute. TRS office bearers will not be responsible for the activities of the student chapter.

ROBO-COPS @ PUNE



The police authorities of Pune have introduced a robot named 'Rodeo' to move around the city roads to function as a quasi-traffic policeman. Rodeo is the first robot across the entire country to be used in the traffic department.

TRS STUDENT CHAPTER

RCC INSTITUTE OF INFORMATION TECHNOLOGY (RCCIIT), KOLKATA

The Robotics Society (TRS) Student Chapter (SC) started on 22nd January 2019, with four faculty members and fifteen students. Dr. Srijan Bhattacharya, Assistant Professor, Applied Electronics & Instrumentation Engineering (AEIE), RCCIIT, Kolkata, is the Coordinator of SC-TRS, RCCIIT. AEIE Department organized several student workshops. Among them, two student workshops were organized during 2016 and 2018 with the theme “Mechatronics & Robotics”. The main speakers were Dr. Srijan Bhattacharya (RCCIIT, Kolkata), Prof. Subhasis Bhaumik (IEST, Shibpur) and Prof. Ujjwal Mondal (University of Calcutta). The next workshop is planned on August-2019. Ongoing sponsored project (The Institution of Engineers (India)) : STUDY THE CHARACTERISTICS OF IONIC POLYMER METAL COMPOSITE (IPMC)] AS EMG SENSOR

Project undertaken by Dr Srijan Bhattacharya and his students:

1. IPMC Based Data Glove for Finger Motion Capturing, object identification: IPMC's are used as flexion sensor

for designing data glove, and used the same for object identification. (Fig. 1 & Fig. 2.)

2. Potentiality of IPMC to Diagnose Human Arm Activity as EMG Sensors: IPMC's are used as sensor for EMG sensors. (Fig. 3.)
3. Autonomous Temperature Monitoring Robot for Hazardous Environment: Autonomous robot design for detecting temperature and sending the same real-time. (Fig. 4.)

Project undertaken by Prof. Avishek Paul and his students

4. Mimicking Robotic Arm: Design and execution process of a robotic arm which mimics the motion of human arm. Human - Machine Interface is used for robots using DIY “Bend Sensors”, also known as “Flex Sensors”. The set up involves actual interfacing of a human limb with the robotic arm which makes maneuvering the robot more accurately. (Fig. 5 and Fig. 6.)

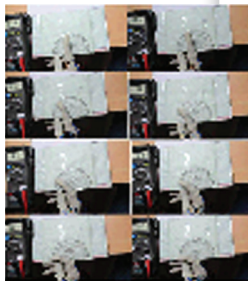


Fig 1: PMC Data Glove

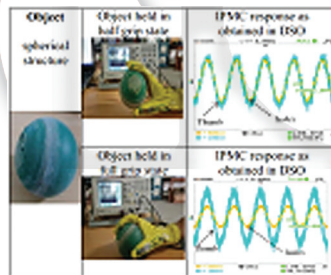


Fig 2: IPMC Data Glove for Object Identification

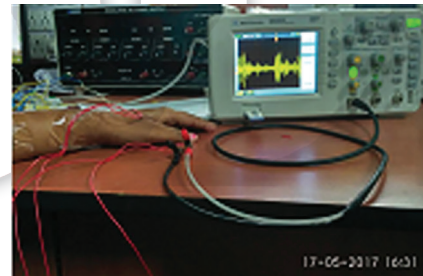


Fig. 3: IPMC as EMG signal

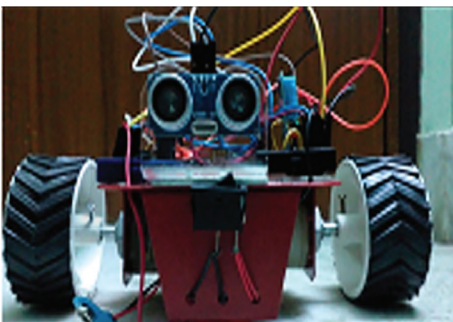


Fig 4: Autonomous robot for obstacle avoidance and temperature monitoring

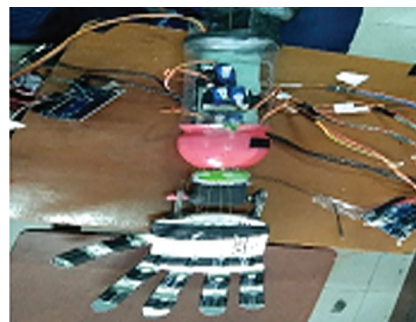


Fig. 5. Overall system



Fig. 6. Actual movement of the fingers as per the movement of an actual human arm.



Are you intrigued by drones?

Then, the 'Game of Drones' event was the place to be. Held on November 28, 2018 in Bengaluru, India, it brought together the drone communities in India and Switzerland. It was organised by Swissnex India, Huviar Technologies and Indian experts from drone-tech startups. The event was about the future of drone technology and how this would impact the drone-tech startup community.

The drone industry is eagerly waiting for the day when the Ministry of Civil Aviation's Drone Regulations 1.0 will come into effect. While we brace ourselves for significant changes in the way the industry needs to operate, we're exploring the trends in the world beyond we mean India and the bright prospects the drone industry holds.

On the evening of November 28, 2018, key Swiss and Indian players in the drone ecosystem, came together to explore synergies and share best practices, on how the industry would evolve.

Here's the outcome of the event, Game of Drones...

A glimpse of the future..

Imagine depending on a drone in times of emergency, such as transporting important work documents or acquiring something left behind at home. Yes, it's a possibility now! A day will come when this technology will save time, emissions and improve efficiency. How cool would that be?

Well, that's what the future technologies have to offer – convenience, speed, efficiency and flexibility.

These might not be the greatest examples where technology can touch lives. A video was made by Redwing Aerospace Laboratories and Bloodstream some time ago that solves the most critical factor in healthcare logistics - getting blood on

time. Now that's a perfect example of technology saving lives! So, what are the top three areas where drone technologies would make a deep impact?

"Drone technologies can change the whole paradigm of several industries," says Mélanie Guittet, Co-Founder & Business Development at the Swiss drone-tech startup INVOLI. *"There's a huge range of possible applications, but my top three would be, firstly, in the Transportation of people and goods as it will revolutionise the way people connect, secondly, in agriculture where drone can help in delivering tailored solutions like decreasing pesticide use and other agricultural procedures and thirdly in surveillance, where they would be deployed in war zones, or in other situations where you don't want to put a human at risk."*

Chaos isn't a pit. Chaos is a ladder!

While there is lot of speculation going on, on the upcoming regulations, it also brings forth opportunities to be more streamlined and efficient.

"Regulations are absolutely necessary to ensure accountability. Integrating autonomous systems into society comes with its own challenges. And for India, I think the new set of regulations is a great step forward. Since it's new, there will be a steep learning curve. And to better prepare for this, India could look at lessons learnt by other countries," says Simon Johnson, VP of the Drone Association of Switzerland.

While regulations are perceived as obstructions by many, Mélanie has a different take on it. *"I think it's is an enabler, a catalyser for the growth of drone industry. Else, it'll shrink to small scale without regulations. This is especially true for the big corporations. For the drone industry to realise its full potential, regulations are must, allowing wider adoption of drones in a safe and efficient manner."*

Knowledge is power

Drones might take away jobs in the future; and that is one way to look at it but it also opens new avenues to greater opportunities. However, power skilling is the key element here and there's a dearth of platforms to support the advancement of drone tech. An interesting idea that came out of the discussion was to create a curriculum on Drones 101 – to equip tomorrow's talent to be able deliver the jobs the plethora of jobs drones would create.

"A lot of industries are finding that competencies and the skills that they need for businesses are not present in the current labour market. Therefore, we need to better synergise aspects of what the industry really requires with what the current education system provides in order to be more effective for training people for jobs of tomorrow," says Raghav Khanna, doctoral student at ETH Zurich.

Would the drones win the iron throne?

Drones are undoubtedly the future but it comes with huge responsibilities to create the right kind of impact. The participants at Game of Drones had interesting inputs on the niche areas wherein future drone technologies could create huge impact.

While there's a lot being spoken about security of drones, isn't safety of drones equally critical? Who would take accountability of drone failures? A few more questions were also raised during the discussions like... 'With the kind of regulations that India is getting into, what will happen to emergency response?', 'How can we effectively use drones for traffic management, medical logistics, coastline surveillance, monitoring of pilferage in large mines, etc?'

As mentioned by one of the Indian participants, *"When you play the Game of Drones, you either fly or fall. Would the future of the Indian drone industry take flight or be restrained by regulations, we'll know soon enough".*

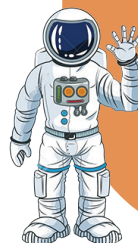
The whole meet was a stimulating and encouraging experience to initiate and participate in this first-of-its kind initiative to bring together drones communities from India and Switzerland. Why not give technology a chance especially if it shows clear potential. There always a hesitation when there is an invention, but humankind would not be where it is today, if we lived in self-doubt. *"It is clear that discussions and explorations of collaborations, partnerships and knowledge exchanges sessions between stakeholders of the two ecosystems shall be continued for the development of drones, their associated technologies and possible use cases. The potential is huge and promising,"* says Loïc Krähenbühl, Entrepreneurship & Innovation, and Swissnex India.

The author, Anju Edgar is the Head of Communications, swissnex India, with minor contributions from Cassius Castellino who is the Programme Co-ordinator - University Partnerships, swissnex India.



FUN FACTS

Indian Space Research Organisation (ISRO) chairman K Sivan has announced that a humanoid robot resembling the qualities of a man, although not as extensively as humans, will be sent to space as a part of Gaganyaan project. The robot will be employed to do a handful of experiments in space before actually sending humans by 2022.





The Robotics Society



ADVANCES IN ROBOTICS AIR 2019

4th International Conference of The Robotics Society
Indian Institute of Technology Madras,
Chennai-600036, India

02-06 July 2019

DOCTORAL SYMPOSIUM

The AIR 2019 Doctoral Symposium will be held on 6th July 2019. The symposium involves presentations by PhD students working in all areas of robotics. It would provide an opportunity to showcase the ongoing research work and facilitate interaction with experts in the field for their valuable feedback. Both the student and the research advisor shall attend. More details including paper submission link can be found at conference website, <http://advancesinrobotics.com/2019/doctoral-symposium/>.

Call For Papers

The organizers of the conference invite short papers from Ph.D research scholars in the following fields of robotics (representative list only, can include other related topics as well):

- Kinematics, dynamics, control and simulation of autonomous intelligent systems
- Design of robotic mechanisms
- Robotics-related computer hardware, software, and architectures
- Navigation and control of unmanned vehicles – Ground, Underwater
- Machine learning and artificial intelligence for robotics
- Tactile and other contact sensory technology
- Medical, rehabilitation and assistive robotics
- Bio-mimetic and bio-inspired robotic systems
- Man-machine interface and integration
- Vision and non-contact sensory systems
- Active sensory processing and control
- Drones and drone applications
- Virtual reality and haptics
- Swarm robotics
- Humanoid robots
- Tele-robotics
- Soft robotics

Submission Instructions

All submissions must be limited to 2 pages of the two-column IEEE Conference Proceedings format, (covering the research objectives, motivation for research, proposed methodology, current status of the research, and future challenges). These submissions will be made available in a handout during the symposium.

Submissions from students both at early and late stages of their doctoral work are encouraged.

Only those students who attend along with their supervisors will be eligible for presentation.



Dates To Remember

Submission deadline	: 15 May 2019
Announcement of results	: 20 May 2019
Symposium date	: 06 July 2019



Registration

All the selected participants for the symposium need to register for the conference (along with their guides). Those who register for the symposium can attend the conference and tutorials.

Registration Fee:

Full-time students	: Rs. 3,000
(with a valid ID)	
20% discount for TRS members	

International Delegates:

Students	: USD 100
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Bio robotics Laboratory,
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Prof. Eduardo Nebot

Director,
Australian Centre for Field Robotics
University of Sydney, Australia

Prof. Jan Peters

Dept. of Computer Science,
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