

ABHINAV SINHA

PERSONAL INFORMATION

	Born in India, 12 December 1992
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WORK EXPERIENCE

Jun'17– Present **Postgraduate researcher**

Central Scientific
Instruments
Organization,
Council of
Scientific and
Industrial
Research, (CSIR-
CSIO), India

The M. Tech programme of Mechatronics and Robotics, in which I am enrolled, is jointly offered by School of Mechatronics and Robotics, Indian Institute of Engineering Science and Technology, Shibpur, India and three CSIR labs- Central Scientific Instruments Organization, Chandigarh UT, India; Central Electronics Engineering Research Institute, Pilani, India; and Central Mechanical Engineering Research Institute, Durgapur, India. My coursework was completed in IEST-S during 2016-17 post which I am working towards coordinated control of multiple mobile robots for odor source localization at CSIR- CSIO. This project is a part of olfaction research at CSIR- CSIO.

Website: [CSIR](#), [CSIO](#)

Sep'14– Jul'16 **Consultant, Automation & Control Systems**

TATA
Consultancy
Services Limited

Worked on tools like WinCC SCADA, Kepware, Step7, Prosoft, etc. for Control System Integration (CSI); GE IP Proficy Suite, SAP ME, etc. for Manufacturing Execution Systems (MES); and SAP MII for Enterprise Manufacturing Intelligence (EMI). Integrated data from factory floor machines with business layers for various productivity applications like reporting, dashboarding, monitoring, etc. Configured multi master and sensor data integration directly to cloud. Provided plant network security and segmentation for several new manufacturing units. Worked towards enhancing efficiency in Manufacturing Operations Management (MOM).

Website: [TCS](#)

Nov'15 **Visiting faculty, EIS Talent Development**

TATA
Consultancy
Services Limited-
Global Learning
Centre,
Trivandrum,
India

Visited TCS Global Learning Centre at Trivandrum, India to impart hands on training on Manufacturing Operations Management (MOM) and the role of web technologies such as HTML, CSS, JavaScript, etc. in it. The training subjects were of diverse background with a majority having a major in mechanical engineering. Introduced concepts of flow of data from factory floor to managerial layer and cloud; machine logic and business logic; and other aspects of role of engineering and IT in manufacturing.

Website: [TCS](#)

May-Jun'13 **Engineering Intern**

TATA Steel,
India

Learnt how TATA Steel manages everything from science and technology to management, planning to execution and conception of idea to product development. My focus was on the applied study of functioning of one of the largest synchronous motors in Asia commissioned at TATA Steel which uses Siemens Sinamics drive system to operate, and triggers the blower which is connected to blast furnaces.

Website: [TATA Steel](#)

May-Jun'12 **Vacation trainee and intern**

Bharat Sanchar
Nigam Limited,
India

Learnt the functioning of telecom system and was able to do a thorough study of the functioning and behaviour of telecom system and exchanges and other networks. Theoretical courses covered transmission of signals and telecom operations, WiMax technologies, multimedia, internet and voice services, broadband, etc. The training also involved a field study of Base Transceiver Stations in the circle.

Website: [BSNL](#)

PUBLICATIONS

Refereed Journals

IEEE

Consensus tracking in multi agent system with nonlinear and non identical dynamics via event driven sliding modes, *under review*, *IEEE Transactions on Automatic Control*.

Authors: Abhinav SINHA, Rajiv Kumar MISHRA

Taylor & Francis

Consensus in first order nonlinear heterogeneous multi agent system with event based sliding mode control, under review, *International Journal of Control*.
Authors: Abhinav SINHA, Rajiv Kumar MISHRA

Springer

Consensus in second order heterogeneous multi agent systems using event triggered sliding mode control, under review, *Multidimensional Systems and Signal Processing*.
Authors: Abhinav SINHA, Rajiv Kumar MISHRA

Elsevier

Event triggered sliding mode based consensus tracking in second order heterogeneous nonlinear multi agent systems, under review, *European Journal of Control*.
Authors: Rajiv Kumar MISHRA, Abhinav SINHA

Elsevier

Control of a nonlinear continuous stirred tank reactor via event triggered sliding modes, under review, *Chemical Engineering Science*.
Authors: Abhinav SINHA, Rajiv Kumar MISHRA

IEEE

Event driven sliding mode for congestion control in cognitive radio networks, under review, *IEEE Communication Letters*.
Authors: Tirtha MAJUMDER, Abhinav SINHA, Rajiv Kumar MISHRA, Sudhansu Sekhar SINGH, Prasanna Kumar SAHU

International
Journal of
Electronics and
Communication
Technology

Nonlinear autonomous altitude control of miniature helicopter UAV based on sliding mode methodology, *International Journal of Electronics and Communication Technology*, vol. 61, spl.- 1, Jan- Mar 2015, proceedings of International Conference on Foundatons and Frontiers in Computer, Communication and Electrical Engineering (C2E2 '15), Mankundu, India, 9th-10th January, 2015.
Authors: Abhinav SINHA, Rajiv Kumar MISHRA

Peer Reviewed Conference Proceedings

IFAC

Distributed cooperative control of multi agent systems for odor source localization, under review, *Third International Conference on Advances in Control and Optimization Of Dynamical Systems (ACODS 2018)*, Dr. APJ Abdul Kalam Missile Complex, Hyderabad, India, 18th-22nd February, 2018.
Authors: Abhinav SINHA, Rajiv Kumar MISHRA

IFAC

Temperature regulation in a Continuous Stirred Tank Reactor using event triggered sliding mode control, under review, *Third International Conference on Advances in Control and Optimization Of Dynamical Systems (ACODS 2018)*, Dr. APJ Abdul Kalam Missile Complex, Hyderabad, India, 18th-22nd February, 2018.
Authors: Abhinav SINHA, Rajiv Kumar MISHRA

IEEE

Cooperative control of multi agent systems to locate source of an odor, 2018 IEEE International Conference on Electronics, Communication and Computing Technologies, Bangalore, India, 16th-17th March, 2018.
Authors: Abhinav SINHA, Rishemjit KAUR, Ritesh KUMAR, Amol P. BHONDEKAR

IEEE

Robust nonlinear congestion controller for time delayed and uncertain cognitive radio based wireless network, 2015 IEEE Power, Communication and Information Technology Conference (PCITC), Bhubaneswar, India, 15th-17th October, 2015.
Authors: Tirtha MAJUMDER, Abhinav SINHA, Rajiv Kumar MISHRA, Sudhansu Sekhar SINGH, Prasanna Kumar SAHU

IEEE

Sliding mode controller design for high performance of permanent magnet stepper motor, 2015 IEEE International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS), Coimbatore, India, 19th-20th March, 2015.
Authors: Abhinav SINHA, Rajiv Kumar MISHRA, Tirtha MAJUMDER

IEEE

Robust altitude tracking of a miniature helicopter UAV based on sliding mode, 2015 IEEE International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS), Coimbatore, India, 19th-20th March, 2015.
Authors: Abhinav SINHA, Rajiv Kumar MISHRA

IEEE

Robust nonlinear congestion controller for cognitive radio based wireless network, 2015 IEEE International

Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS), Coimbatore, India, 19th-20th March, 2015.

Authors: Tirtha MAJUMDER, Abhinav SINHA, Rajiv Kumar MISHRA, Sudhansu Sekhar SINGH, Prasanna Kumar SAHU

IEEE Robust and Smooth Nonlinear Control of an Industrial Robot for Automated Pick and Place, 2015 IEEE International Conference on Computing Communication Control and Automation (ICCUBE), Pune, India, 26th-27th February, 2015.

Authors: Abhinav SINHA, Rajiv Kumar MISHRA, Supratik JAISWAL

IEEE Nonlinear Autonomous Control of a Two-Wheeled Inverted Pendulum Mobile Robot Based on Sliding Mode, 2015 IEEE International Conference on Computational Intelligence and Networks (CINE), Bhubaneswar, India, 12th-13th January, 2015.

Authors: Abhinav SINHA, Pikesesh PRASOON, Prashant Kumar BHARADWAJ, Anuradha C. RANASINGHE

IEEE Perturbing effect compensation technique for smart sensors, 7th IEEE International Conference on Information and Automation for Sustainability (ICIAfS), Colombo, Sri Lanka, 22nd-24th December, 2014.

Authors: Anuradha C. RANASINGHE, Lahiru K. RASNAYAKE, Abhinav SINHA, Kavinda K. RASNAYAKE

IEEE Smooth sliding mode controller design for robotic arm, 2013 International Conference on Control, Automation, Robotics and Embedded Systems (CARE), Jabalpur, India, 16th-18th December, 2013.

Authors: Abhinav SINHA, Rajiv Kumar MISHRA

Book Chapters

*CRC Press/
Taylor & Francis
Group*

Smooth sliding mode control of a nonlinear CSTR using an inverse hyperbolic function-based law, *Foundations and Frontiers in Computer, Communication and Electrical Engineering: Proceedings of 3rd International Conference C2E2, Mankundu, West Bengal, India, 15th-16th January, 2016.*

Authors: Abhinav SINHA, Rajiv Kumar MISHRA

*CRC Press/
Taylor & Francis
Group*

Congestion control in Cognitive Radio Networks using fractional order rate reaching law based sliding modes, *Foundations and Frontiers in Computer, Communication and Electrical Engineering: Proceedings of 3rd International Conference C2E2, Mankundu, West Bengal, India, 15th-16th January, 2016.*

Authors: Tirtha MAJUMDER, Abhinav SINHA, Rajiv Kumar MISHRA, Sudhansu Sekhar SINGH, Prasanna Kumar SAHU

POSITIONS HELD

*Jul'14–
Present* **Reviewer, IEEE Indian Control Conference — India**

Mar-Aug'16 **Designated research reviewer on the technical program committee, 3rd IEEE International Conference on Electronic Design — Phuket, Thailand**

Feb-Jul'16 **Designated research reviewer on the technical program committee, IEEE 1st International Conference on Power Electronics, Intelligent Control and Energy Systems — New Delhi, India**

Sep'15-Apr'16 **Reviewer, 2016 2nd Advanced Research in Material Sciences, Manufacturing, Mechanical and Mechatronic Engineering Technology International Conference — Greater Jakarta, Indonesia**

Sep-Dec'15 **Reviewer, 1st Environmental and Civil Engineering Technology International Conference — Krabi, Thailand**

Mar-Dec'15 **Reviewer & member of international technical program committee, 12th IEEE India International Conference on Electronics, Energy, Environment, Communication, Computer and Control — New Delhi, India**

Sep-Nov'15 Member of international technical program committee, 2015 IEEE International Conference on Signal Processing & Data Mining — Rome, Italy

Apr-Nov'15 Reviewer, Mechanical and Manufacturing Engineering Conference — Bandung, West Java, Indonesia

Oct'14-Aug'15 Reviewer, IEEE 4th International Conference on Advances in Computing, Communications and Informatics — Aluva, Kochi, India

Jan-Aug'15 Reviewer, Springer International Conference on Computing in Mechanical Engineering — Aluva, Kochi, India

May-Jun'15 Member of Technical Programme Committee, 2015 Global Summit on Computer and Information Technology — Sousse, Tunisia

May-Jun'15 Member of Technical Programme Committee, 2015 World Symposium on Mechatronics Engineering & Applied Physics — Sousse, Tunisia

Feb-Jun'15 Reviewer, Mechanical and Manufacturing Engineering Conference — Bali, Indonesia

Dec'14-Mar'15 Member of international technical program committee, 2015 IEEE International Conference on Engineering and Computational Innovative Sciences — Casablanca, Morocco

Sep'14-Feb'15 Reviewer, IEEE 1st International Conference on Signal Processing, Informatics, Communication and Energy Systems — Calicut, India

Aug'14-Jan'15 Member of Technical Programme Committee, 2014 IEEE International Conference on Control Automation & Applied Mechanics — Algiers, Algeria

Aug'14-Jan'15 Member of Technical Programme Committee, 2014 IEEE International Conference on Computer Applications & Aided Diagnosis — Algiers, Algeria

Aug'14-Jan'15 Member of Technical Programme Committee, 2014 IEEE International Conference on Computer Vision & Image Analysis — Sousse, Tunisia

Aug'13-May'14 Coordinator, KIIT Robotics Society — KIIT University, Bhubaneswar, India

*KIIT Robotics
Society*

Managed students directly by teaching and training them about innovation in technology and science related to robotics and embedded systems. Areas such as control, automation and signal processing being an integral part of the course. From theory to applications, hobbyist electronics to complex machines, there were several other major areas of engineering which were explored and a forum of discussion over the same was created. Apart from academics, there were other things such as event management, competitions that were regularly organized to promote interest and developments in robotics and embedded systems.

Website: [KIIT University](#), [KSAC](#)

Jun'11-May'14 Trainer, KIIT Robotics Society — KIIT University, Bhubaneswar, India

*KIIT Robotics
Society*

Indulged in teaching and training engineering students about innovation in robotics and embedded systems, particularly autonomous and semi autonomous robotics. Areas such as control of robotic systems, automation and signal processing

being an integral part of the course. From theory to applications, hobbyist electronics to complex machines, there were several other major areas of engineering which were explored.

Website: [KIIT University](#), [KSAC](#)

Feb'14 **Organizer, Ingenious Tableaux — KIIT University, Bhubaneswar, India**

*KIIT Robotics
Society*

Organized an autonomous robotic competition, Ingenious Tableaux. The theme of this event was to design an autonomous robot that can accomplish the task of line following combined with image processing.

Website: [KIIT University](#), [KSAC](#)

Feb'14 **Organizer, Paper Presentation in Embedded Systems — KIIT University, Bhubaneswar, India**

*KIIT Robotics
Society*

Organized a paper presentation event. The theme of this event was to motivate young graduating engineers to participate and contribute to the inquiry of embedded systems. Technical papers, posters, ideas, working models, etc. were encouraged.

Website: [KIIT University](#), [KSAC](#)

Sep'13 **Organizer, Autonomous Robotic Events — KIIT University, Bhubaneswar, India**

*KIIT Robotics
Society*

Organized several robotics events in which the design of autonomous or semi autonomous robots was covered followed by a small competition. The competition was open and witnessed a surge of participation from freshmen and sophomores in mechanical, electrical, electronics and computer science majors. The theme was to demonstrate the Dos and Dents in a robotic competition.

Website: [KIIT University](#), [KSAC](#)

EDUCATION

2016-2018 **Indian Institute of Engineering Science & Technology, Shibpur, India**

*Masters of
Technology*

Specialization: *Mechatronics & Robotics* · **School:** *Mechatronics and Robotics*

Thesis: *Cooperative control of multiple mobile agents for locating source of odor (ongoing work)*

Description: This thesis explores the challenge of locating source of an odor via non bio inspired computing algorithms and a control systems point of view. With the obvious advantages of multiple robots over a single robot such as flexibility, robustness, scalability; this work focuses on the distributed coordinated control of multiple robots deployed in an environment to locate an odor source.

Advisors: Ms. Rishemjit KAUR, Mr. Ritesh KUMAR, Dr. Amol BHONDEKAR

2010-2014 **Kalinga Institute of Industrial Technology (KIIT University), India**

*Bachelor of
Technology*

Major: *Electronics & Instrumentation engineering* · **School:** *Electronics Engineering*

Thesis: *Automated PID tuning of line follower robot*

Description: This project report on automated PID tuning of line follower robots describes an effective way of controlling line following robots, i.e., a category of mobile robots via a simple yet effective control methodology based on classic Proportional-Integral-Derivative control. The conventional way of running, testing and implementing line follower robots is based on providing certain conditions to the robot in the form of a computer program and it has to move according to the conditions provided for different paths. However, this does not make the robot capable of taking decisions such as how to overcome the wobbling and to reduce the error that may creep in the form of deviation from the current position or say, overshoot from the line. To achieve the objective of enabling the robot to correct these moves on its own or to enable the robot to control and reduce the overshoot so as to stay on course, providing smoothness, we have implemented Proportional-Integral-Derivative control based on the informations that can be gathered from the movement of the robot.

Advisor: Prof. Rajiv Kumar MISHRA

AWARDS AND HONORS

Jul 2016

MHRD Postgraduate GATE fellowship · **Ministry of Human Resource Development, India**

Awarded for qualifying Graduate Aptitude Test in Engineering (GATE) with 96 percentile, a computer based standardized test conducted by jointly by Indian Institute of Science and Indian Institutes of Technology on behalf of the National Co-ordination Board – GATE, Department of Higher Education, Ministry of Human Resource Development, Government of India for postgraduation education in engineering and graduate employments in various Public Sector Undertakings under Government of India.

Dec 2015

Champions of Initial Learning Program (ILP) · **TATA Consultancy Services Limited**

Award for contribution towards Engineering and Industrial Services (EIS)- Talent Development in Manufacturing Operations Management domain. Associated with the position of visiting faculty at TCS.

Jul 2015

On the spot award · **TATA Consultancy Services Limited**

Award for the research work done in the field of Control Systems and allied areas, and for serving as research reviewer for many technical peer reviewed conferences in India and abroad.

Feb 2015

Best paper award · **IEEE Computer Society & IEEE Pune section**

Awarded Best Paper of the session track in Robotics at IEEE International Conference on Computing, Communication, Control and Automation, Pune, India

Aug 2013

Outstanding contribution award · **KIIT Robotics Society, KIIT University**

Awarded for technical contribution towards the society.

Mar 2012

Top achiever award · National Institute of Technology Jamshedpur, India

Awarded for achieving top score in the autonomous robotics event in Ojass 2012, an annual techno- management fest of NIT Jamshedpur, India.

COMPUTER SKILLS

<i>Basic</i>	C++, JAVA, JAVAScript, VBscript, Microsoft .Net, MATHEMATICA, Xilinx ISE, ARM cortex microcontrollers, LabView, Adobe Photoshop
<i>Intermediate</i>	C, AVR microcontrollers, HTML, CSS
<i>Advanced</i>	MATLAB, L ^A T _E X, Microsoft Office suite, Linux, Microsoft Windows family

OTHER INFORMATION

<i>Honorable Mentions</i>	2009 · Gold Medalist, Regional Mathematics Olympiad
	2008 · Prefect & Head Boy, High School
	2006 · Winner, Sanskrit couplets recitation competition
	2004 · Prefect & Head Boy, Middle School
	2004 · Winner of GK quiz competition
	2003 · Featured in local newspaper as young scientific talent
	2000 · Winner of calligraphy competition, Junior School

<i>Languages</i>	HINDI · Mothertongue
	ENGLISH · Full professional fluency
	ORIYA · Elementary proficiency
	BENGALI · Elementary proficiency
	MARATHI · Elementary proficiency

<i>Interests</i>	Travelling · Fiction & Poetry · Playing Age of Empires · Solving Sudoku
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October 5, 2017