

Five Day Workshop on Deep-Learning Approaches for Inverse Problems in Imaging (Online)

November 20-24, 2023

(Under SSR Activities, SERB, DST,

Govt. of India)

Registration Form

Please follow the link to register:

<https://forms.gle/JZBXxK2n84ViXi6M7>

Last Date to Register: 18-11-2023.

Organizing Committee

Patron

Prof. O. R. Jaiswal

Director, NIT Goa

Coordinators

Dr. E. Mallikarjun

Assistant Professor, Dept. of ECE, NIT Goa

Dr. Venkatanareshbabu Kuppili

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Organized by



**Department of Electronics and
Communication Engineering
National Institute of Technology Goa
Farmagudi, Ponda,
Goa – 403 401**

About NIT Goa

The National Institute of Technology Goa (NIT Goa) is a premier national-level technical institute in India established in 2010 by an act of parliament (NIT Act, 2007 and NIT (Amendment) Act, 2012). NIT Goa is an autonomous institute functioning under the aegis of Ministry of Education (MoE), Government of India, and has been declared an “Institute of National Importance”. The temporary campus is located in the hilly terrain of Farmagudi, Ponda, approximately 29 km southeast of Panaji, the capital of Goa. The permanent campus of NIT Goa, Cuncolim, South Goa, will be completed soon. Goa is well connected by roadways, railways and airways with various parts of the country. The Institute is dedicated to its academic excellence and aims to produce quality Engineers and Scientists.

The Institute offers undergraduate programmes in Five Engineering Departments: (1) Computer Science and Engineering (CSE), (2) Electronics and Communication Engineering (ECE), (3) Electrical and Electronics Engineering (EEE), (4) Civil Engineering (CVE), and (5) Mechanical Engineering (MCE). The Institute offers M.Tech. Programmes in the Three disciplines: (1) Computer Science and Engineering (CSE), (2) VLSI and (3) Power Electronics and Power Systems (PEPS). The Institute also offers Ph.D. degree in various stream of Engineering, Applied Sciences, Technology and Humanities & Social Sciences.

The Institute admits students into the B.Tech. degree programme based on the ranks obtained in the Joint Entrance Examination JEE (Main) and the scheme of Direct Admission to Students Abroad (DASA). Intake of B.Tech. in Computer Science and Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering is 44 each, out of which 38 is through JoSAA/CSAB and

06 through DASA; and the Intake of B.Tech. in Civil Engineering/Mechanical Engineering is 42 each, out of which 37 is through JoSAA/CSAB and 05 through DASA. Therefore, total 216 students are pursuing B.Tech. at NIT Goa out of which 188 students have been admitted through JoSAA / CSAB and 28 through DASA. The Institute admits M.Tech. students through valid GATE score followed by CCMT (Centralized Counselling for M.Tech. Admissions), and few seats are offered to the sponsored and DRDO candidates. Intake of M.Tech. CSE/VLSI is 27 (23 through CCMT, 02 sponsored & 02 DRDO sponsored) each, and the intake of M.Tech. PEPS is 26 (22 through CCMT, 02 sponsored & 02 DRDO sponsored). The overall intake of M.Tech. is 80. NIT Goa also offers Full-time Self-Financed (Non-GATE) M.Tech. in those seats which remain vacant after admission through CCMT, sponsored, and DRDO categories is completed.

About Department of ECE

The Electronics and Communication Department of NIT Goa was formed in 2010. It offers B. Tech., M. Tech. in VLSI and Ph.D. program in Electronics and Communication Engineering. The goal of the department is to impart both theoretical and practical knowledge in Electronics and Communication Engineering to students so as to enable them for technology and research. The department covers following major areas in Electronics and Communication Engineering through its courses and projects: VLSI, Communication and Networking, Signal Processing, Microelectronics and Electronics Design, Electromagnetics. Faculty members in ECE department are committed towards teaching and research. They try to cultivate interest in students for research and technology. The Department has well equipped laboratories: Electronics Devices and Circuits Lab, Linear Integrated Circuits Lab, Digital Electronics Lab, Microprocessors and

Microcontroller Lab, Microwave Engineering and Antennas Lab, VLSI Lab. The Department also has important soft wares like Cadence, Silvaco, MATLAB, PSPICE, and KEIL.

About the Workshop

Inverse problems (IPs) have been traditionally considered as mathematically challenging because they are non-linear and ill-posed. These types of problems arise in many practical applications such as Microwave imaging, X-ray imaging, Diffusion optical tomography, Ground penetrating radar, etc. It requires suitable regularization and optimization tools for the robust and stable solution. Hence, the course focused on fundamentals and recent developments of regularization techniques and optimization algorithms.

In recent years, deep learning has become one of the most powerful methods in the field of regression and classification problems. These methods are much faster and produce better image quality compared to the conventional iterative methods based on optimization. With a powerful non-linear matching ability and a one-step testing procedure, deep learning methods are becoming the most popular to use in inverse techniques to obtain an inverse solution in real-time. Hence, the course is also focused on fundamentals and recent developments of deep-learning techniques and algorithms.

Practical sessions are arranged for the participants to get hands-on experience (MATLAB programming based) about the algorithm's implementation.

Workshop Objectives

The workshop is aimed at providing an opportunity to research students and faculty members to be exposed to the recent state-of-the-art inverse imaging techniques to various imaging applications. And the applicability of Deep-learning to the inverse problems.

Resource Persons

Dr. Veerakumar, NIT Goa

Dr. Prashanth GR, NIT Goa,

Dr. Yaswanth Kalepu, IIITDM, Kurnool,

Dr. E. Mallikarjun, NIT Goa

Dr. Raviprasad KJ, NIT Goa

Dr. Venkatanareshbabu Kuppili, NIT Goa

Registration Fees

There is no registration fee and the complete program is sponsored by SSR, SERB.

Instructions

- ❖ The number of seats is limited to 50.
- ❖ Registration will be on first come first serve basis. Priority will be given to nearby colleges, Goa.
- ❖ The program will be conducted online.
- ❖ The link to join the online will be shared with registered students prior to the program.