



5 DAYS ONLINE SUMMER WORKSHOP
on
RECENT ALGORITHMS FOR REMOTE SENSING APPLICATIONS
(RARSA2022)

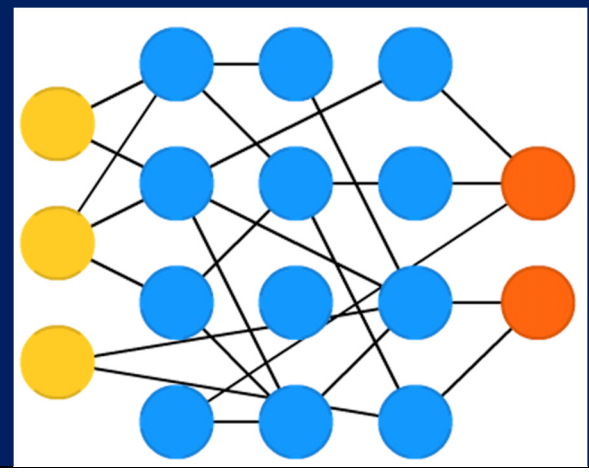
From 12-07-2022 to 16-07-2022

JOINTLY ORGANISED BY
IEEE GRSS BANGALORE CHAPTER, NITK IEEE GRSS STUDENT
BRANCH CHAPTER, NITK IEEE STUDENT BRANCH, AND
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING, NIT KARNATAKA SURATHKAL

REGISTRATION LINK

<https://forms.gle/z34VZQN8WNKNaFGq9>

Last date for registration: 9th July 2022



1. Overview of Summer workshop

Remote sensing can be defined as the collection of data about an object from a distance. Humans and many other types of animals accomplish this task with aid of eyes or by the sense of smell or hearing. Geographers use the technique of remote sensing to monitor or measure phenomena found in the Earth's lithosphere, biosphere, hydrosphere, and atmosphere. Remote sensing of the environment by geographers is usually done with the help of mechanical devices known as remote sensors. These gadgets have a greatly improved ability to receive and record information about an object without any physical contact. Often, these sensors are positioned away from the object of interest by using helicopters, planes, and satellites. Most sensing devices record information about an object by measuring an object's transmission of electromagnetic energy from reflecting and radiating surfaces.

Remote sensing imagery has many applications in mapping land-use and cover, agriculture, soils mapping, forestry, city planning, archaeological investigations, military observation, and geomorphological surveying, among other uses. For example, foresters use aerial photographs for preparing forest cover maps, locating possible access roads, and measuring quantities of trees harvested. Specialized photography using color infrared film has also been used to detect disease and insect damage in forest trees. The simplest form of remote sensing uses photographic cameras to record information from visible *or* near infrared wavelengths. In the late 1800s, cameras were positioned above the Earth's surface in balloons or kites to take oblique aerial photographs of the landscape. During World War I, aerial photography played an important role in gathering information about the position and movements of enemy troops. These photographs were often taken from airplanes. After the war, civilian use of aerial photography from airplanes began with the systematic vertical imaging of large areas of Canada, the United States, and Europe. Many of these images were used to construct topographic and other types of reference maps of the natural and human-made features found on the Earth's surface.

Many recent algorithms offer the many potential applications in the field of remote sensing data processing and analysis. One such potential for effective and efficient classification of remotely sensed imagery. The strengths of recent algorithms include the capacity to handle data of high dimensionality and to map classes with very complex characteristics. Nevertheless, implementing a recent algorithms for classification are not straightforward, and the literature provides conflicting advice regarding many key issues.

The proposed summer workshop presents recent algorithms for remote sensing applications. It also highlights many real applications of remote sensing and contains sessions for the participants who may not have a strong background in the field. The purpose of the 5 days summer workshop is to provide an intensive understanding of how to use the recent algorithms like as deep learning algorithms and to equip the participants with software tools for solving the practical problems in remote sensing domain.

2. Key objectives

The primary objectives of the course are as follows:

- Exposing participants to the fundamentals of remote sensing image processing and analysis.
- Building in confidence and capability amongst the participants in the application of remote sensing image processing and analysis using deep learning algorithms.
- Providing exposure to practical problems and their solutions, through case studies in the remote sensing applications.
- Enhancing the capability of the participants to identify new applications of remote sensing Image processing and analysis using deep learning algorithms.

3. Teaching Faculty for the summer workshop

Instructors from NITK, IIST, and ISRO

4. Course details

4.1 Duration: 5 Days

4.2 Lectures and practical's schedule

Day 1: 12th July 2022

Lecture 1 (9:30am to 11:00am): By Dr. Shyam Lal, NITK Surathkal

Introduction and Applications of Machine Learning and Deep Learning in Remote Sensing

Lecture 2 (11:15am to 12:45pm) By Dr. Nagajothi Kannan, Scientist-SF, NRSC(ISRO), Bangalore
Fundamental of Image Processing Concepts for Remote Sensing

Day 2: 13th July 2022

Lecture 3 (9:30am to 11:00am): By Dr. Jeny Rajan NITK Surathkal

Introduction and Mathematical understanding of Artificial Neural Networks

Lecture 4 (11:15am to 12:45pm): By Dr. Sudhakar Reddy, Scientist-SG & Head (FB&ED), NRSC(ISRO) Hyderabad

Recent Advances in Remote Sensing Applications for Forest Biodiversity & Ecology

Day 3: 14th July 2022

Lecture 5 (9:30am to 11:00am) : By Dr. Jeny Rajan NITK Surathkal

Introduction and Mathematical understanding of 2D CNN Models with Applications

Lecture 6 (11:15am to 12:45pm): By Nalini J., Scientist-SF(AS&DMA), NRSC (ISRO) Hyderabad
Recent Algorithms for Analysis of High-Resolution Data (Satellite, Aerial, UAV and LiDAR)

Day 4: 15st July 2022

Practical 1 (9:30am to 11:00am): By Dr. Shyam Lal, NITK Surathkal

Building of 2D VGG16 CNN Model for Classification of Remote Sensing Images using Python

Lecture 7 (11:15am to 12:45pm): By Dr. Chandrasekar K, Scientist-SG and Head(WRP&DD), NRSC(ISRO) Hyderabad

Advance Remote Sensing Techniques for Water Resources Application

Day 5: 16th July 2022

Lecture 8 (9:30am to 11:00am): By Dr. Rama Rao N., IIST, Trivandrum, Kerala

Deep Learning Algorithms for high resolution remote data analysis

Lecture 9 (11:15am to 12:45pm): By Dr. Arijit Roy, Scientist-SG & Head(DMSD), IIRS(ISRO) , Dehradun

Advance Remote Sensing Tools and Techniques for Disaster Management

5. Who can attend

- Students at all levels (Ph.D/M.Tech/MSc/B.Tech(3thYear))
- Faculty members from academic institutions.
- Engineers and researchers from Industry organizations including R&D laboratories.

6. Registration Fee: NIL **Link for registration:** <https://forms.gle/z34VZQN8WNKNaFGq9>

Important Note: Preferences will be given to IEEE GRSS, and IEEE members.

7. Last date for workshop registration: 9th July 2022

8. Student Volunteers:

1. **Mr. Basavaraju K.S., Chair, NITK IEEE GRSS SBC**
2. **Mr. Vasala Saicharan, Vice-chair, NITK IEEE GRSS SBC**
3. **Ms. Vibha K, Member of NITK IEEE GRSS SBC**
4. **Ms. Salma Shaik , Member of NITK IEEE GRSS SBC**
5. **Mr. Bonthu Sandeep Reddy, Member of NITK IEEE GRSS SBC**

9. Workshop Coordinators

1. Dr. Shyam Lal, Vice-chair, IEEE GRSS Bangalore Chapter and Founding Faculty Advisor of NITK IEEE GRSS Student Branch Chapter,

Assistant Professor, Department of Electronics and Communication Engineering.

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(For any inquiry contact workshop coordinator)

2. Raghavendra B.S., IEEE GRSS Member

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3. Dr. Shwetha H. R. IEEE GRSS Member

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