

DAYANANDA SAGAR UNIVERSITY



Department of Computer Science Engineering School of Engineering

**INDUSTRIAL VISIT
"NIAS Bengaluru"**

**Date: 28 October, 2022
Time: 10:00 am – 1.00pm**

Resource Person:

Dr. P S Diwaker
ISRO Chair, Professor, NIAS

ORGANISERS:

Dr. Rajesh TM, Associate Professor, CSE

Dr. Tina Babu, Assistant Professor, CSE

Prof. Nandini K, Assistant Professor, CSE

CO-ORDINATOR:

Dr. Gopal Joshi Sharma, Professor, CSE

➤ Meeting Agenda

- To present the proposal of the project "**Advanced methods and algorithms for automatic information extraction for (online or offline) processing and analysis of images and data from multi-source data.**" RES-IIRS-2022-006 from RESPOND BASKET 2022.
- To get the guidance of Dr. Diwakar, ISRO Chair Professor, NIAS, for working on the proposed project.
- To get the satellite-generated terrain image database.
- To discuss various other problem statements or projects that can be taken up by M. Tech. or B. Tech. students to solve the under various projects/ schemes.
- To get the problem statements and guidance for Ph.D. scholars to pursue their Research work.

Members present:

1. Dr Diwakar
2. Dr Rajesh T M
3. Dr Tina Babu
4. Prof. Nandini K
5. Prof. Pooja Shree H R
6. Prof Trupti Hegde
7. Prof. Ambeshwar
8. Sumukh Sankarshana M
9. Srushti B Yalgudri
10. Yash M Narule
11. Ruby Seher
12. Pavan P Neginhal
13. Lokesh K
14. S Inesh Rao
15. G Jahnavi
16. Geetika Metha
17. Manju Elsa Josh
18. Sanjay M

Meeting Details

Dr. Rajesh T M, Associate Professor and Team Lead introduced the members of Visualization of Image and Video Analytics (VIVA) Research Club and explained the working process of the VIVA Research group to Dr. Diwakar. He briefed about the project chosen from the RES-IIRS-2022-006 from RESPOND BASKET 2022 and how the team has planned to address the problem. He asked two of the student co-ordinators Mr. Sumukh and Ms. Srushti to give detailed explanation of the architecture of the proposed model. During the presentation, Dr. Diwakar offered many suggestions that are mentioned below.

Observation of the meeting

- It was noted that, the Google dataset is pre-processed and not a good idea to work with.
- The research papers do not explain any of the basic fundamentals, as the papers are written with the assumption that the readers know the fundamentals
- Real-time data processing is hard to achieve, so we must call it "near real-time."
- To understand hyper-spectral data, big data analytics is used.
- As students, it is good to start off with multispectral data analysis.
- Different parts of the electromagnetic spectrum have distinct features.
- Each pixel is a vector of multi-spectral data.
- The data should be collected based on objective. if the data is mixed up with the objective then it will be difficult to understand the data and extract features
- The results depend on how we choose the data, train it, and link it with the objective.
- Two different sets of data cannot be mixed for training since it will give us wrong results.
- Boundaries cannot be easily defined in natural images as natural features are unique. Therefore, training becomes challenging.
- The same data must be bifurcated for training.
- Image processing can be done using 2D images if the geometric correction of the satellite is accurate.
- Satellites always capture optical images at 10:30 a.m. as long as the sun illumination is in the right direction (Sun synchronous orbit).
- Optical images are not captured at other timings due to sun glint.

- Imaging at night can be done using microwaves, LASERs, thermal emissions, and infrared waves.
- Every element, such as water and rocks, has different emissions.
- Thermal sensors are used to capture forest fires in near real time.
- Microwaves can penetrate the clouds and have no impact like the sun.
- Microwaves are based on two characteristics: the dielectric property of the surface they hit and the surface roughness.
- Interpretation of imaging through microwaves is difficult.
- Noise can be classified into random noise and systematic noise.
- Systematic noises are the wrong pixels which are caused due to mechanical components of the system. These noises are minimal in today's world due to advancements in technology.
- Noises due to atmospheric effects are hard to eradicate but can be reduced.

Meeting Takeaways:

- The team will be guided by Dr. Diwakar.
- The dataset will be provided by ISRO but it must be understood by the team.
- The team will start off with a simpler problem and build its way up.
- A session will be planned based on availability of Dr Diwakar to make sure that the team is good with the fundamentals.

➤ Actions to be Taken:

- Work on parametrized classification and non-parametrized classification and compare them.
- Make a two page write up for entire project proposal.
- Visit Bhuvan Geo Portal.



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