Specialised Course for Nigeria on Advances in Satellite Image Analysis and SAR Data Processing

Jan 06 -17, 2025

Course Plan:

Week 1	Lectures, Hand-on exercises : **Image processing and AI for information Extraction**
Week 2	Lectures, Hand-on exercises: **SAR data processing**
1 day (included in above time frame)	Field visit

Tentative Course Agenda:

A. Lecture topics

1. Remote Sensing technology and Applications
2. Overview of Digital Image Processing
3. Image Pre-processing & Enhancement Techniques
4. Pixel Based Information Extraction
5. Object Based Information extraction
6. Data Fusion Algorithms
7. Change Detection
8. Introduction to AI and its applications on EO data
9. Introduction to Machine Learning
10. ML based approaches (Supervised & Unsupervised) for EO data
11. Concept of Neural Network and Deep Learning Architectures for EO data
12. Deep learning algorithms for Image segmentation & Object Detection
13. Overview of SAR Remote Sensing
14. SAR Data Processing
15. SAR Radiometric & Geometric Corrections
16. SAR Interferometry
17. SAR Polarimetry
18. Target Detection and Recognition
19. Applications of SAR Remote Sensing

B. Practical's/ Hand-on/Demonstrations:

1. Familiarization with RS data and image interpretation (optical/microwave)
2. Hands-on Exercise on Image Pre-processing
3. Hands-on Exercise on Enhancement Techniques
4. Hands on exercise on pixel based image classification methods
5. Hands on exercise on image data fusion
6. Hands on exercise on change detection with EO data
7. Familiarization with Google Earth Engine
9. Demo on Machine learning approaches for EO data classification
10. Demo on ANN based approaches for EO data classification
11. Hands-on Exercise on SAR Radiometric & Geometric Corrections
12. Hands-on Exercise on SAR Interferometry
13. Hands-on Exercise on SAR Polarimetry