REMOTE SENSING EDUCATION DOCUMENT

https://www.basarsoft.com.tr/
ramazan.kupcu@basarsoft.com.tr
egitim@basarsoft.com.tr

REMOTE SENSING EDUCATION DOCUMENT

Remote sensing is the technique of recording and examining the earth and ground resources without establishing a physical connection with them. In other words, remote sensing; It is a branch of science that aims to take images of the earth without physical contact via aircraft and satellites and to obtain information from these images.

With remote sensing technologies, fast, reliable and low-cost projects with high added value can be developed in the production and management of spatial information.Although the studies on geographic information systems in the public and private sectors in our country are at a very advanced level, activities related to remote sensing are at the stage of maturation in recent years, especially with the widespread use of free satellite images, images provided by UAV and drone technologies, and images taken from our national satellites.

Our institutions need the processing and evaluation of remote sensing data in order to carry out their activities more effectively. Many technologies have emerged that facilitate automatic or semi-automatic determination of information using satellite data.

As in the world, large projects are carried out on a national scale in these areas in our country, and value-added outputs are produced. Remote sensing technologies are used in agriculture, forestry, environment, water management, defense, intelligence, mining, disaster management, management of underground and surface resources, urban planning and many space-based engineering and research projects.

The main purpose of this training program is to teach the users practically the processing and valuation of remotely sensed images and the production of value-added products through sample data for their own work areas.

Our entire training program lasts for 5 full days (30 hours). The topics and contents covered in the training program are as follows:

Introduction to Remote Sensing

The foundations of remote sensing (RS) are built on the science of physics and enable us to understand the earth. After the obtained data are based on physical foundations, the analysis carried out by mathematical methods. The theoretical knowledge of Remote Sensing technologies will be explained in this context. Usage areas of remote sensing, sectoral Satellite projects in Turkey and around the world, sensors and image features, free image download portals and BAŞARSOFT remote sensing solutions information will be given.

- Basic Concepts in Remote Sensing
- Types of Remote Sensing, Sensor Systems and Detection Platforms
- Microwave Remote Sensing
- Image Types and Features

- Digital Image Processing
- Classification
- Remote Sensing Application Areas
- BAŞARSOFT Remote Sensing Solutions
- Free Image Download Portals

Image Processing and Valuation

With the ERDAS Imagine program on sample satellite images, various format types of images will be displayed over sample satellite images, cropping operations on images according to their areas of interest, sharpening of images and the readability of the images colored according to different band combinations will be studied. In addition, applications of different indices for the determination of plant health and water areas will be carried out using images. Inferences will be made by analyzing the images taken from different sensors such as Thermal and Lidar.

- Satellite Image Formats and Metadata Reading
- Introduction of Analysis and Imaging Tools
- Subset, Pansharp, Mosaic Operations
- Image Enhancement Operations
- Combining the Bands
- Generation a Vegetation and Water Index
- Landsat 8 Thermal Band Analysis with Spatial Models
- Lidar Point Cloud Data Analysis

Image Classification

Classification in remote sensing is the process of identifying meaningful groups in the image that provide thematic information. In other words, classification is the transformation of image data with different spatial, spectral, radiometric and temporal components into descriptive labels or thematic information that categorizes different surface materials and states. Thematic information, which is defined as what and where, different types of soil and vegetation from general categories such as vegetation on the earth, soil, water, water depth and pollution, etc. connected to more detailed subcategories as it varies. In this context, practical examples of different classification algorithms will be developed. The performances of pixel-based and object-based classification methods will be compared and the spatial model and machine learning algorithm will be run on different satellite images.

- Supervised Classification
- Unsupervised Classification
- Object Based Classification
- Classification with Machine Learning Algorithm

Geometric Correction

Geometric correction is the process of removing the shifts that occur in satellite and aerial photographs due to topographic differences on the earth. The images usually contain geometrical distortions due to the rugged topography of the earth and the inability to obtain a perfectly vertical image. Geometric correction removes these distortions and an ortho-image is created where all objects are shown as if they were located on a planimetric map.

Geometric correction operations on different images will be explained in detail and the subject will be fully comprehended.

- Adjustment of Aerial Photographs, DTM and Generating Orthophoto
- Adjustment GCP Operations
- DTM Creation
- Orthophoto Generation
- Georeferencing,
- Orthorectification
- Orthorectification with RPC
- Image Georeferencing with Imagine Autosync.

Topographic Analyzes

Topographic analyzes are performed using the digital elevation model. During the analysis of the digital height model, the software uses the height, that is, the Z value in the DEM, and re-codes these values according to all x and y coordinates.By using GIS and remote sensing technologies, different applications of topographic analysis, which has many application areas in 3D analysis of the land, will be comprehended.

- DEM Generation from Stereo Satellite Images
- DSM, DTM, DEM creation
- Generating Education Map
- Generation of Aspect map
- Generating a Shaded Relief Map
- Generating a Color Relief Map
- Generating a Raster Contour Line
- Visibility Analysis

Change Analyzes

It aims to detect the changes that occur between two images of the same place taken at different times. These changes include application examples such as land cover, land use, illegal structure control, coastal erosion monitoring.

- Zonal Change Detection
- Change Analysis with Spatial Modeler