



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore - 35**

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Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

DEPARTMENT OF AGRICULTURE ENGINEERING

19AGT302 – GIS AND REMOTE SENSING

III – YEAR V SEMESTER

UNIT 3 – DIGITAL IMAGE INTERPRETATION AND PROCESSING

TOPIC 3 – IMAGE PROCESSING



Last Class Review

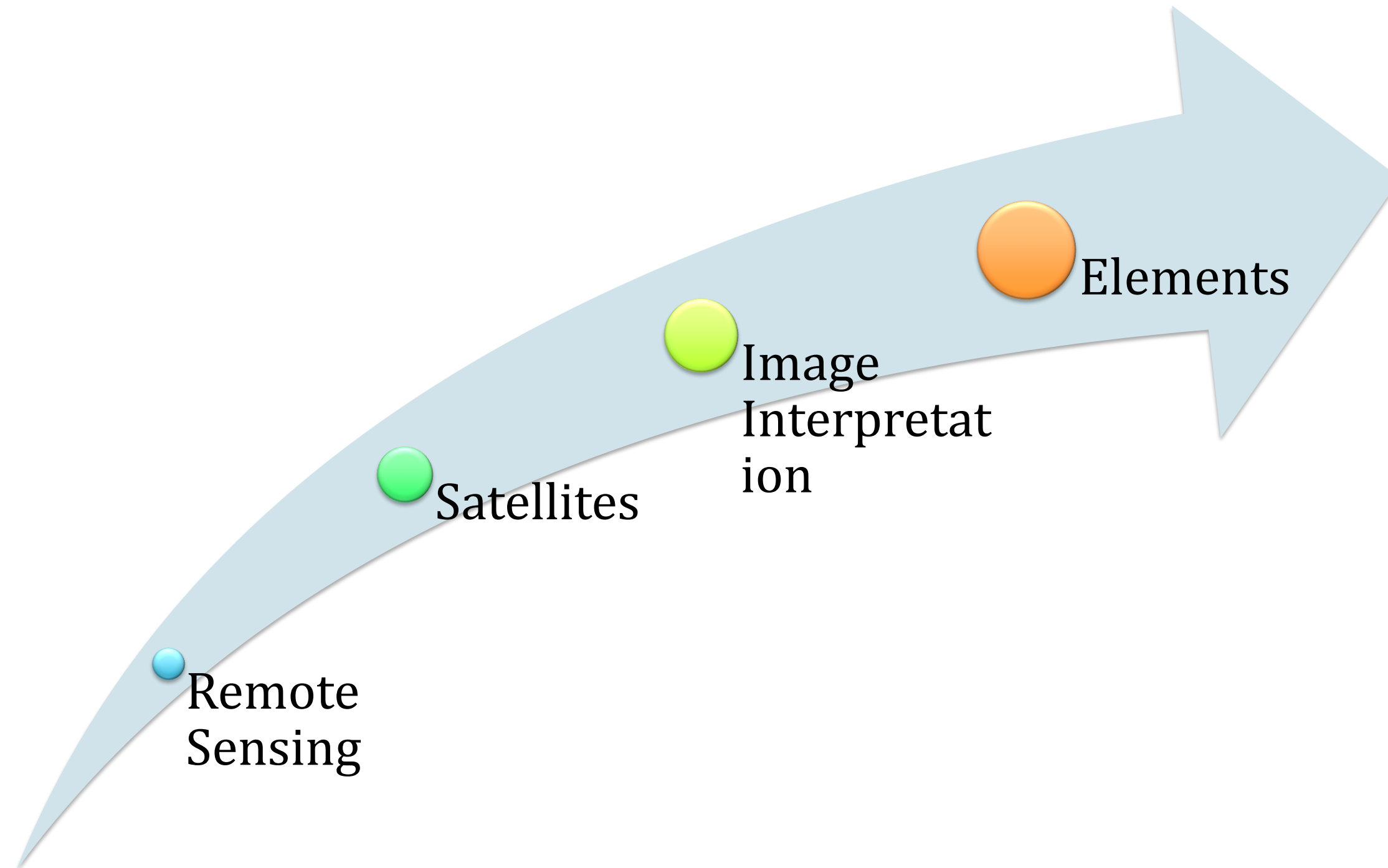




Image Interpretation – Strategies



Direct
recognition

indirect
interpretatio
n

from known
to unknown

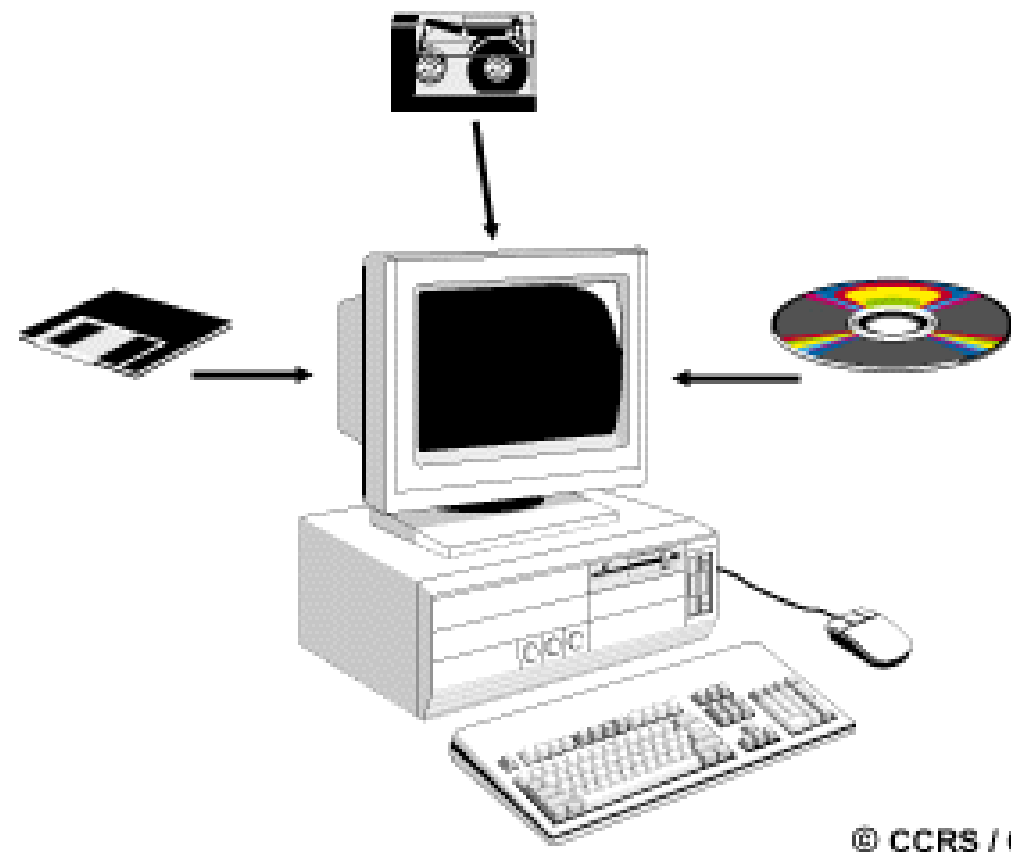
from direct
to indirect

Use of
collateral
information



Image Processing

- ❖ Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it. It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image.





Operations



- ❖ Digital Image Processing is largely concerned with four basic operations: image restoration, image enhancement, image classification, image transformation.
- ❖ Image restoration is concerned with the correction and calibration of images in order to achieve as faithful a representation of the earth surface as possible—a fundamental consideration for all applications.
- ❖ Image enhancement is predominantly concerned with the modification of images to optimize their appearance to the visual system.
- ❖ Visual analysis is a key element, even in digital image processing, and the effects of these techniques can be dramatic. Image classification refers to the computer-assisted interpretation of images—an operation that is vital to GIS.
- ❖ Finally, image transformation refers to the derivation of new imagery as a result of some mathematical treatment of the raw image bands.



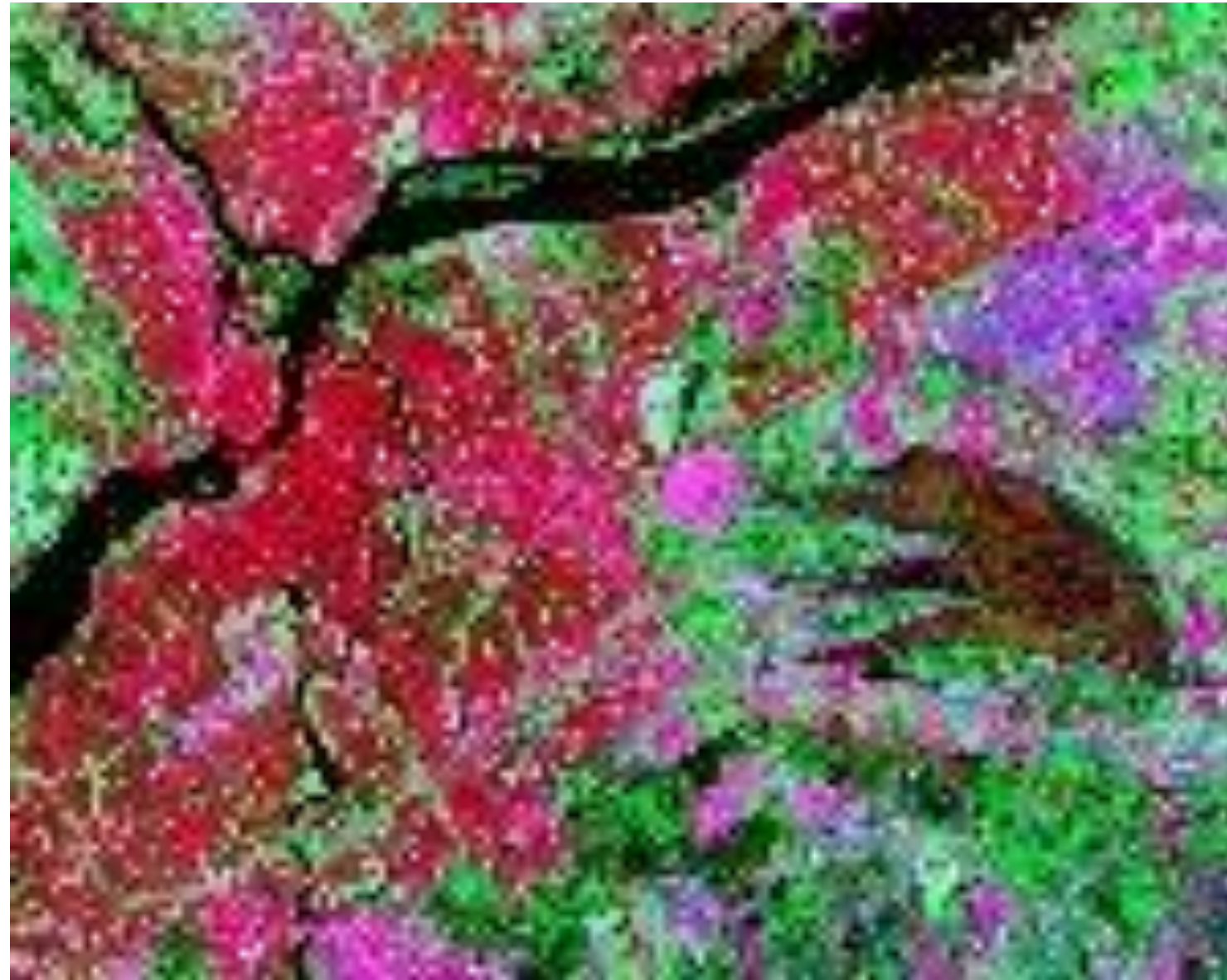
Pre Processing



- ❖ Preprocessing functions involve those operations that are normally required prior to the main data analysis and extraction of information, and are generally grouped as radiometric or geometric corrections.
- ❖ Radiometric corrections include correcting the data for sensor irregularities and unwanted sensor or atmospheric noise, and converting the data so they accurately represent the reflected or emitted radiation measured by the sensor.
- ❖ Geometric corrections include correcting for geometric distortions due to sensor-Earth geometry variations, and conversion of the data to real world coordinates (e.g. latitude and longitude) on the Earth's surface.



Image Enhancement



- ❖ The objective of the second group of image processing functions grouped under the term of image enhancement, is solely to improve the appearance of the imagery to assist in visual interpretation and analysis.
- ❖ Examples of enhancement functions include contrast stretching to increase the tonal distinction between various features in a scene, and spatial filtering to enhance (or suppress) specific spatial patterns in an image.



Image transformation

- ❖ Image transformations are operations similar in concept to those for image enhancement.
- ❖ However, unlike image enhancement operations which are normally applied only to a single channel of data at a time, image transformations usually involve combined processing of data from multiple spectral bands.
- ❖ Arithmetic operations (i.e. subtraction, addition, multiplication, division) are performed to combine and transform the original bands into "new" images which better display or highlight certain features in the scene.

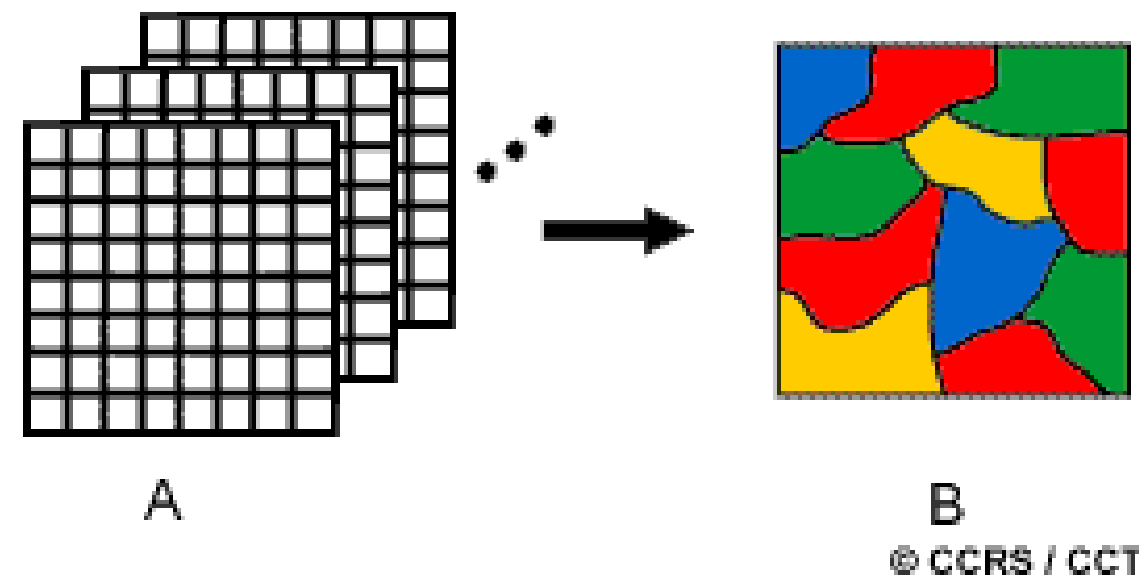
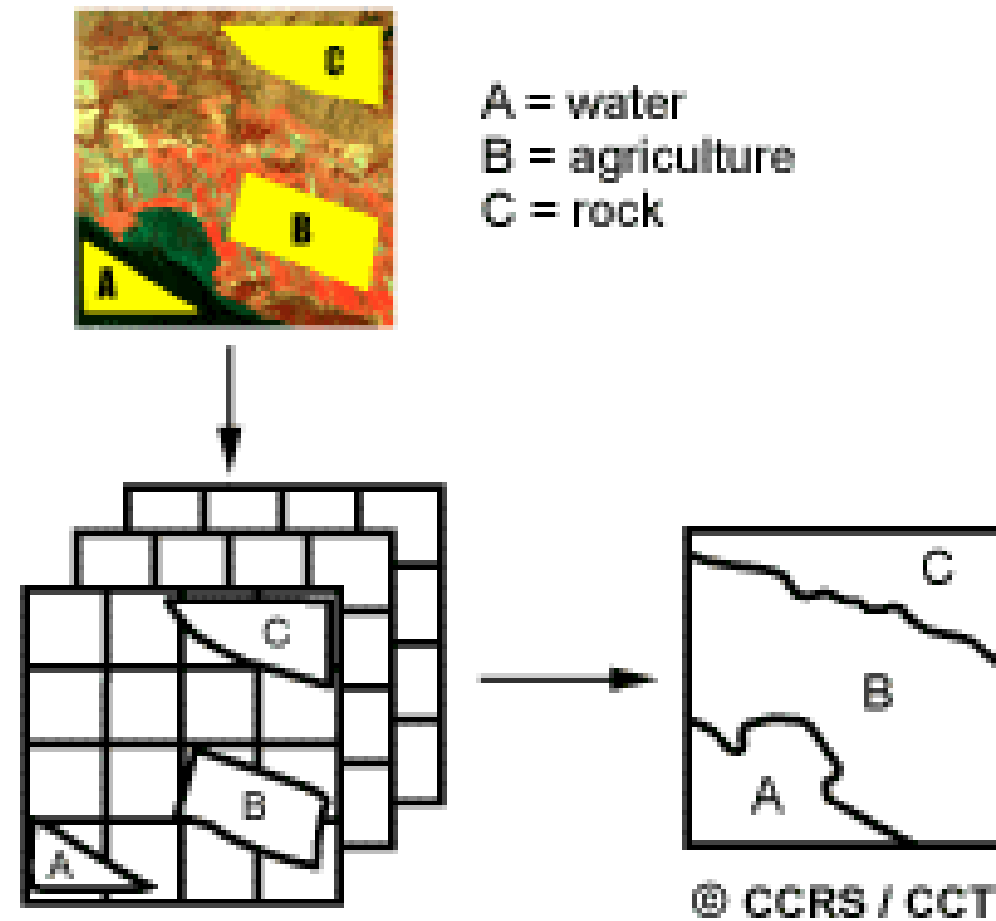




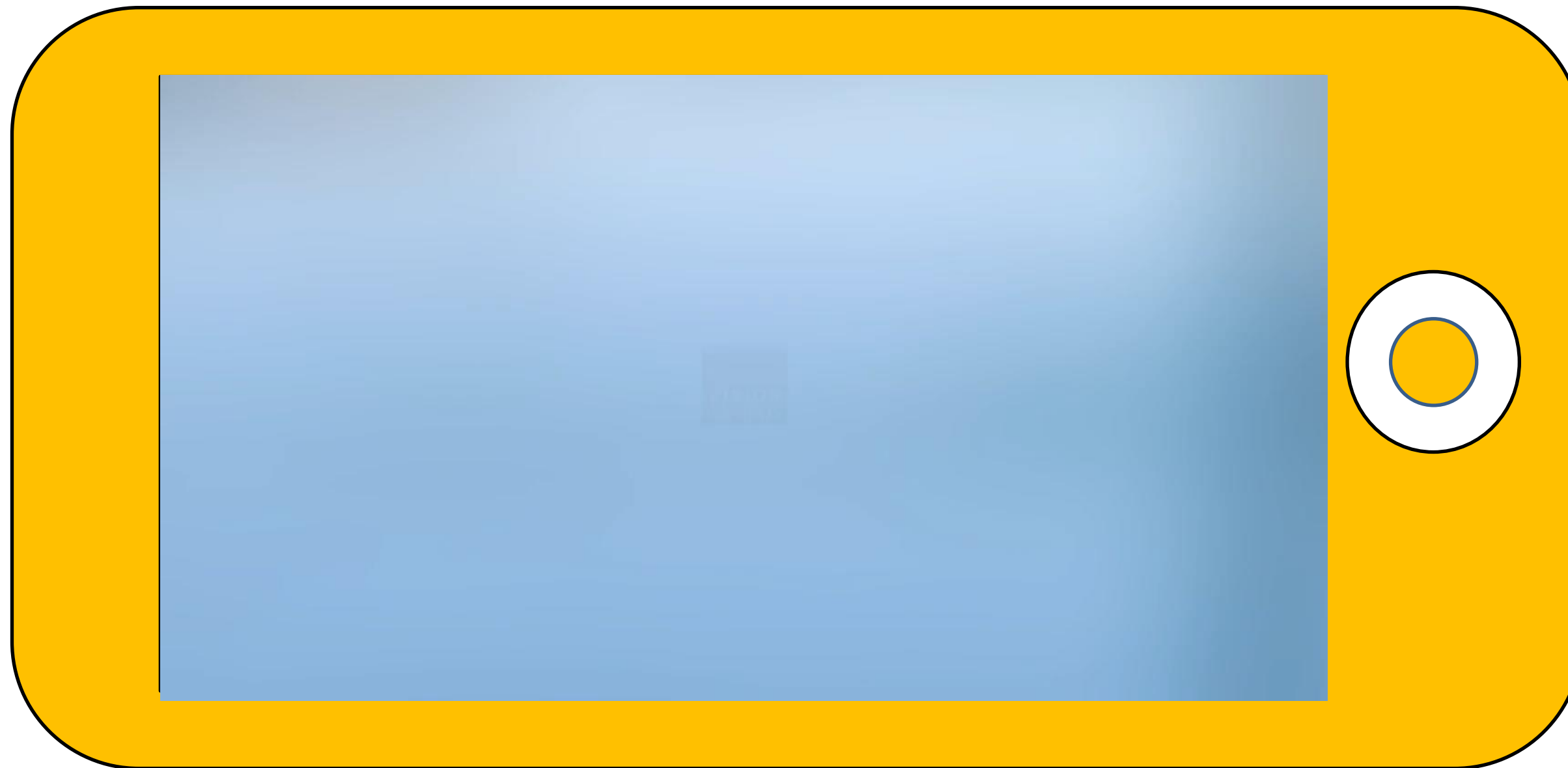
Image Classification and Analysis



- ❖ Image classification and analysis operations are used to digitally identify and classify pixels in the data.
- ❖ Classification is usually performed on multi-channel data sets (A) and this process assigns each pixel in an image to a particular class or theme (B) based on statistical characteristics of the pixel brightness values.
- ❖ There are a variety of approaches taken to perform digital classification



Reference Videos





See You at Next Class!!!!