西交利物浦大学
Xi'an Jiaotong-Liverpool University

Pattern Recognition

Lecture 12. Programming Exercises & CW dataset

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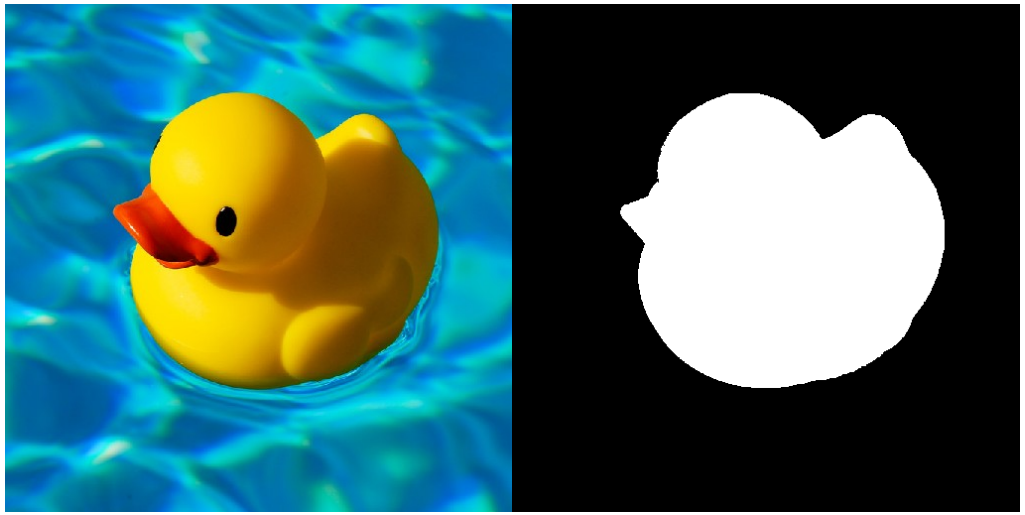
Academic Year 2023-2024

Exercise 1

Find the duck

hint: operate in RBG color space by thresholding on the channel that could separate the foreground and background



(a) (b)

Exercise 1

Find the duck

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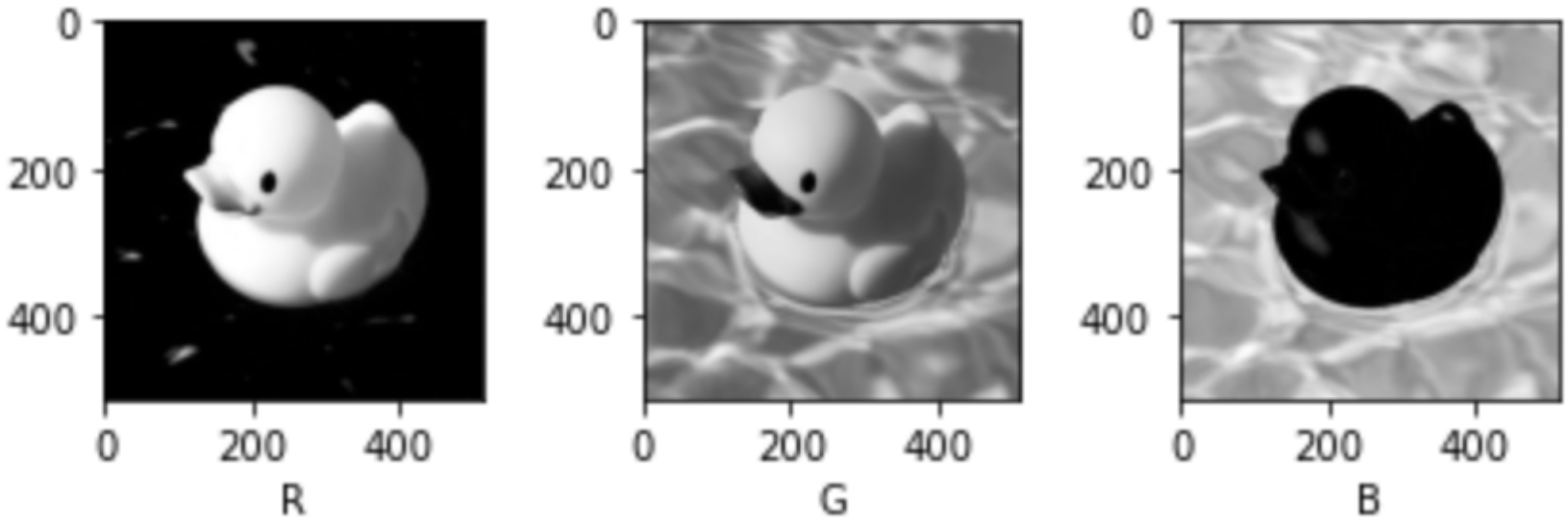


Exercise 2

Find the pine

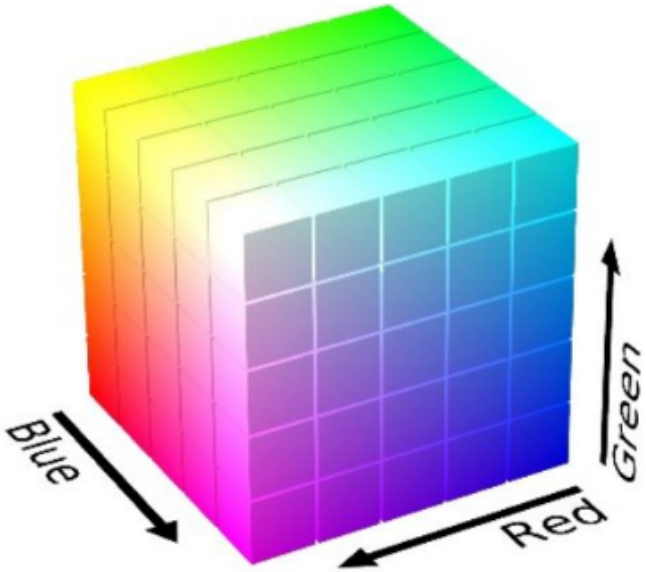
hint: Likewise, use thresholding in color space, RGB and HSV

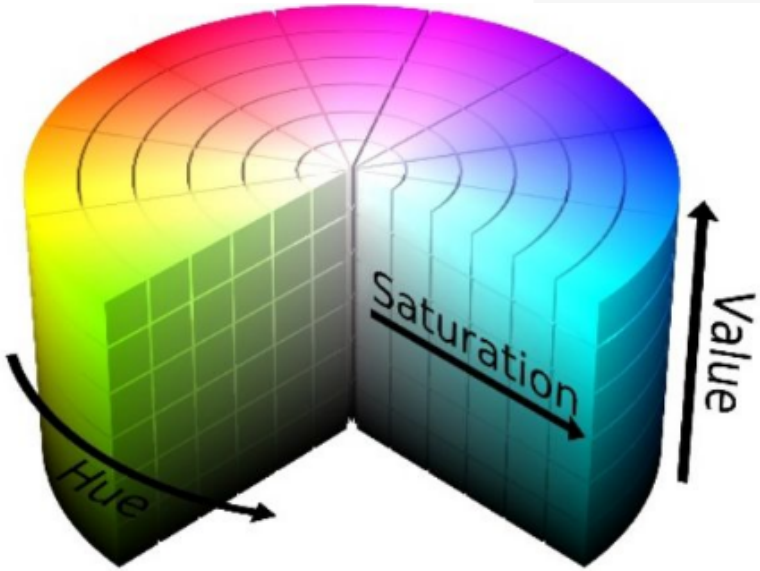
(c) (d)

Exercise 2

Find the pine

hint: Likewise, use thresholding in color space, RGB and HSV



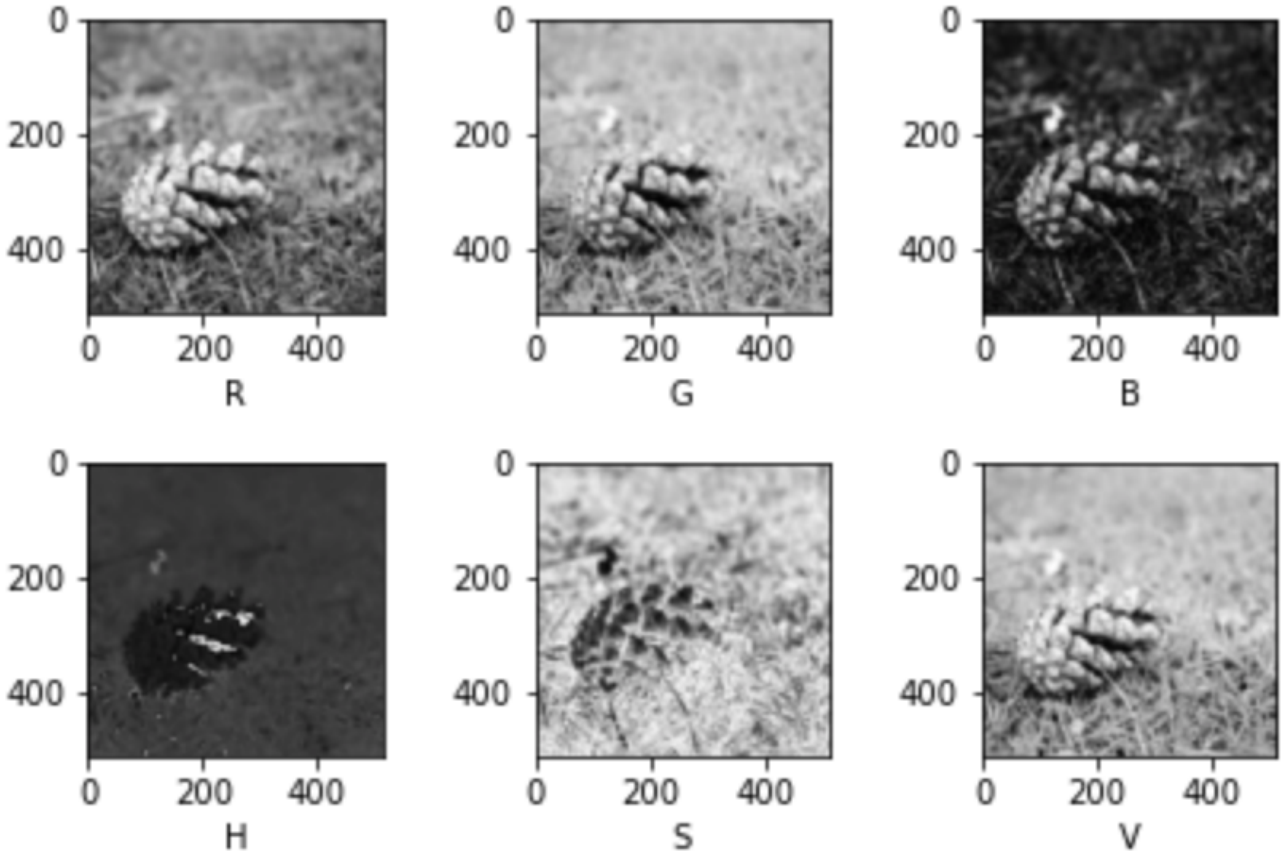


1. `https://scikit-image.org/docs/dev/auto_examples/color_exposure/plot_rgb_to_hsv.html`
2. `https://docs.opencv.org/4.x/df/d9d/tutorial_py_colorspaces.html`
3. Pillow method Image.convert()

Exercise 2

Find the pine

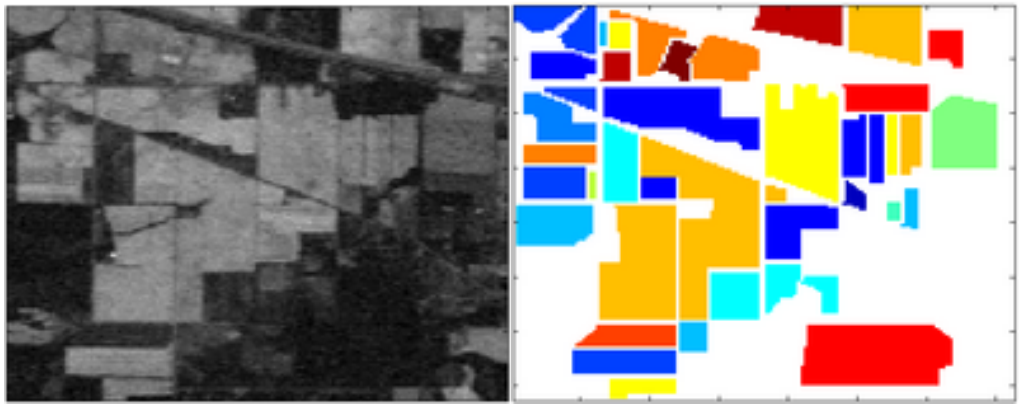
hint: Likewise, use thresholding in color space, RGB and HSV



Exercise 3

Investigate the remote sensing image

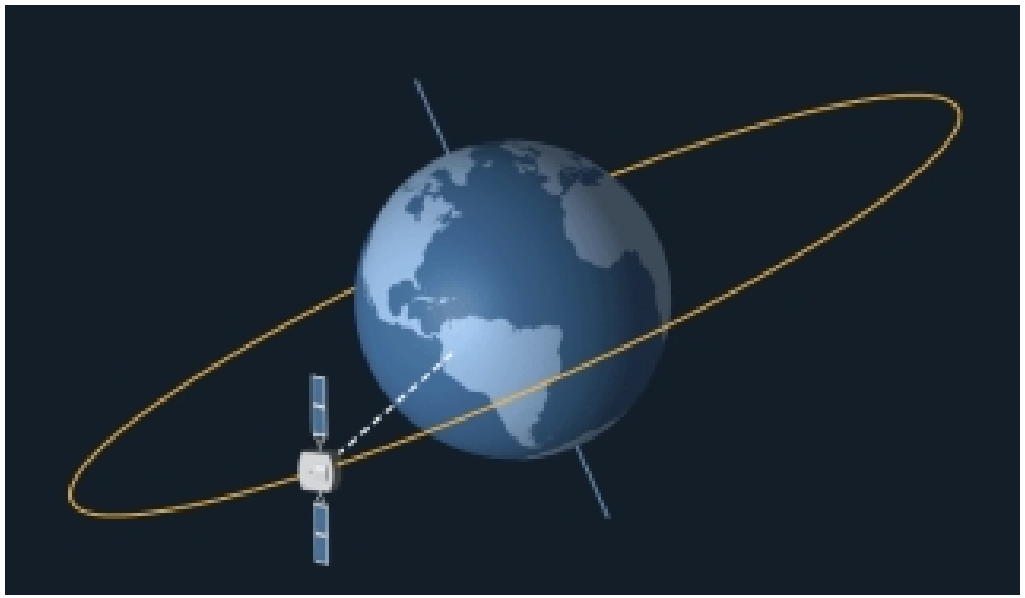
https://www.ehu.eus/ccwintco/index.php/Hyperspectral_Remote_Sensing_Scenes#Indian_Pines



(e) (f)

Introduction to Remote sensing dataset

- Remote sensing is the acquiring of information from a distance.
- observes Earth and other planetary bodies via remote sensors on satellites and aircraft that detect and record reflected or emitted energy.



https://www.earthdata.nasa.gov/learn/backgrounders/remote-sensing

Introduction to Remote sensing dataset

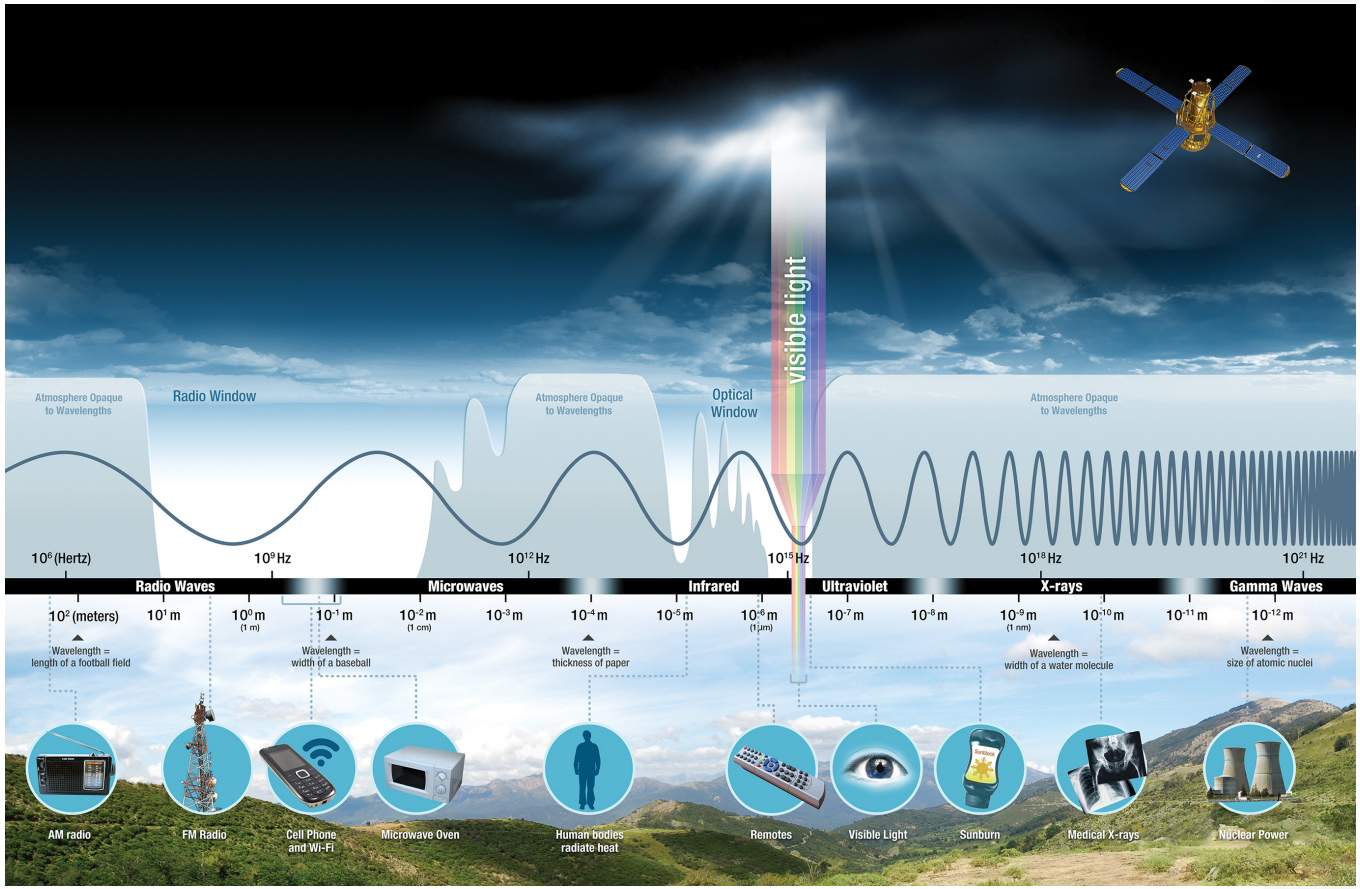
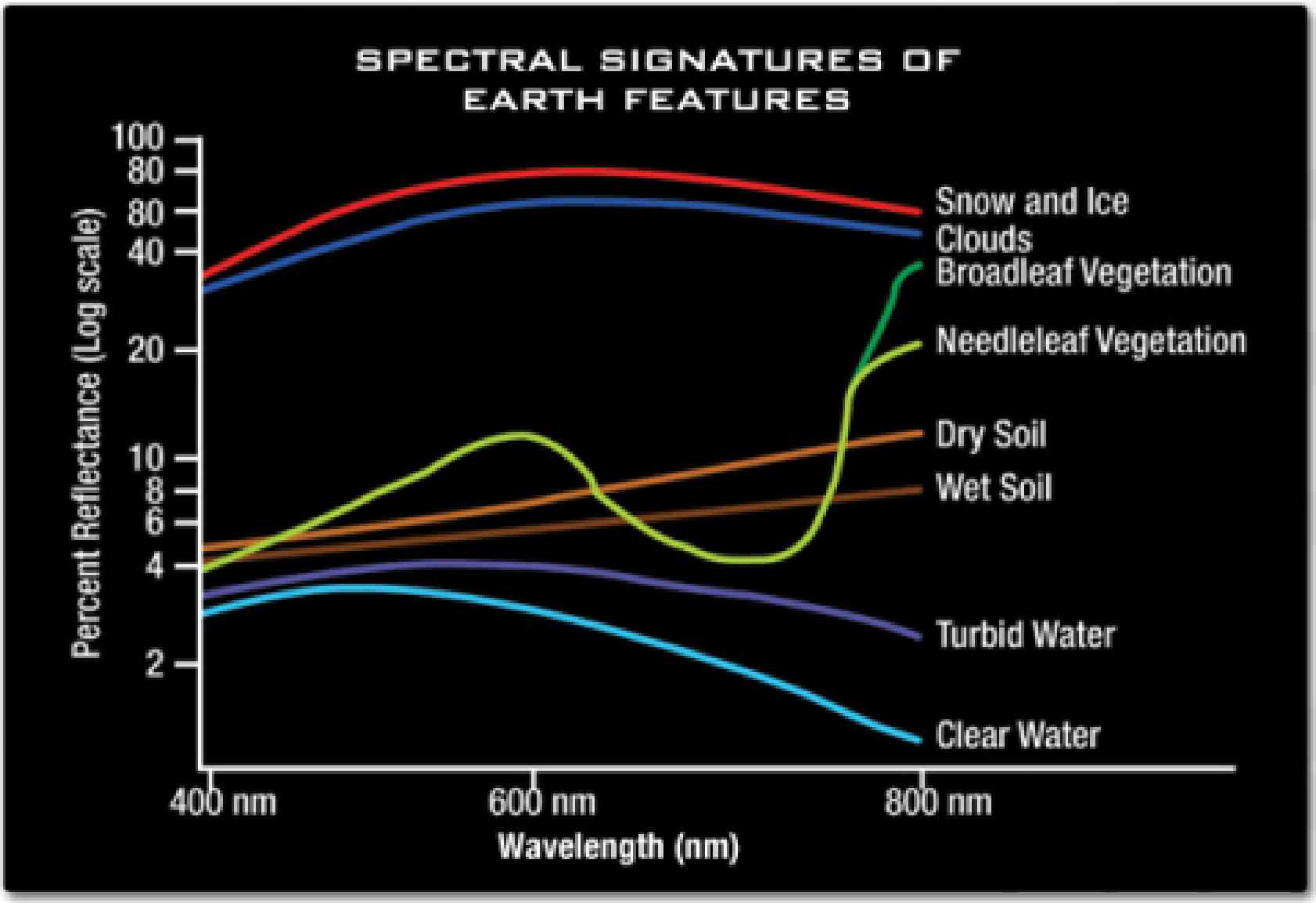


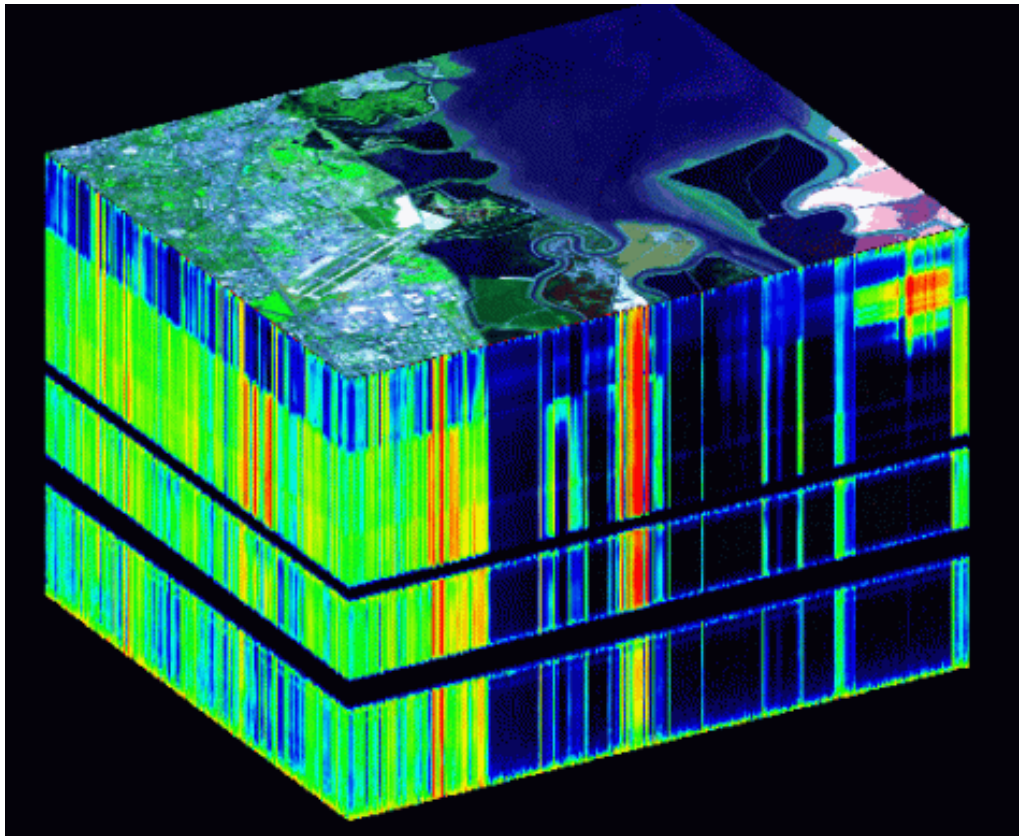
Diagram of the Electromagnetic Spectrum Diagram of the Electromagnetic Spectrum. Credit: NASA Science.

- All things on Earth reflect, absorb, or transmit energy, the amount of which varies by wavelength.
- Just as your fingerprint is unique to you, everything on Earth has a unique spectral fingerprint.
- Researchers can use this information to identify different Earth features as well as different rock and mineral types.

Introduction to Remote sensing dataset



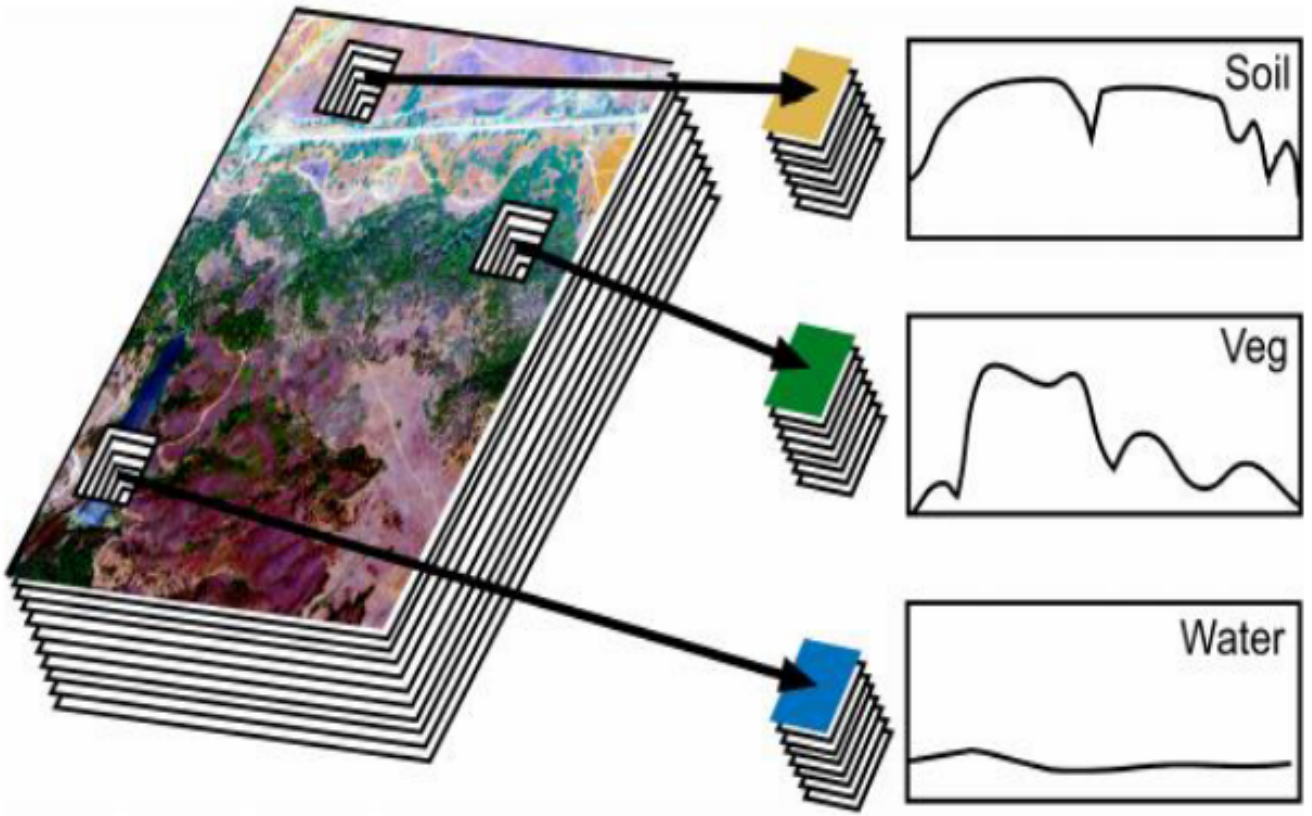
Introduction to Remote sensing dataset



The top of the cube is a false-color image made to accentuate the structure in the water and evaporation ponds on the right. The sides of the cube are slices showing the edges of the top in all spectral channels.

Introduction to Remote sensing dataset

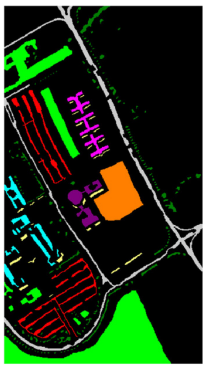
classification example



CW dataset

The dataset is the scene acquired by the ROSIS sensor during a flight campaign over Pavia, nothern Italy. The number of spectral bands is 103 for Pavia University. Pavia University is 610*610 pixels, but some of the samples in the images contain no information and have to be discarded before the analysis. The geometric resolution is 1.3 meters. Image groundtruths differenciate 9 classes each. It can be seen the discarded samples in the figures as abroad black strips.

Pavia scenes were provided by Prof. Paolo Gamba from the Telecommunications and Remote Sensing Laboratory, Pavia university (Italy).



https://www.ehu.eus/ccwintco/index.php/Hyperspectral_Remote_Sensing_Scenes#Pavia_Centre_and_University

CW dataset

Pavia University scene

- Download MATLAB data files: Pavia University (33.2 MB) | Pavia University groundtruth (10.7 KB)

Groundtruth classes for the Pavia University scene and their respective samples number

#	Class	Samples
1	Asphalt	6631
2	Meadows	18649
3	Gravel	2099
4	Trees	3064
5	Painted metal sheets	1345
6	Bare Soil	5029
7	Bitumen	1330
8	Self-Blocking Bricks	3682
9	Shadows	947

https://www.ehu.eus/ccwintco/index.php/Hyperspectral_Remote_Sensing_Scenes#Pavia_Centre_and_University

CW dataset where to download

FOLDER

Module handbook and other important resources

Folder Settings

This folder provides access to the module handbook and other important resources.

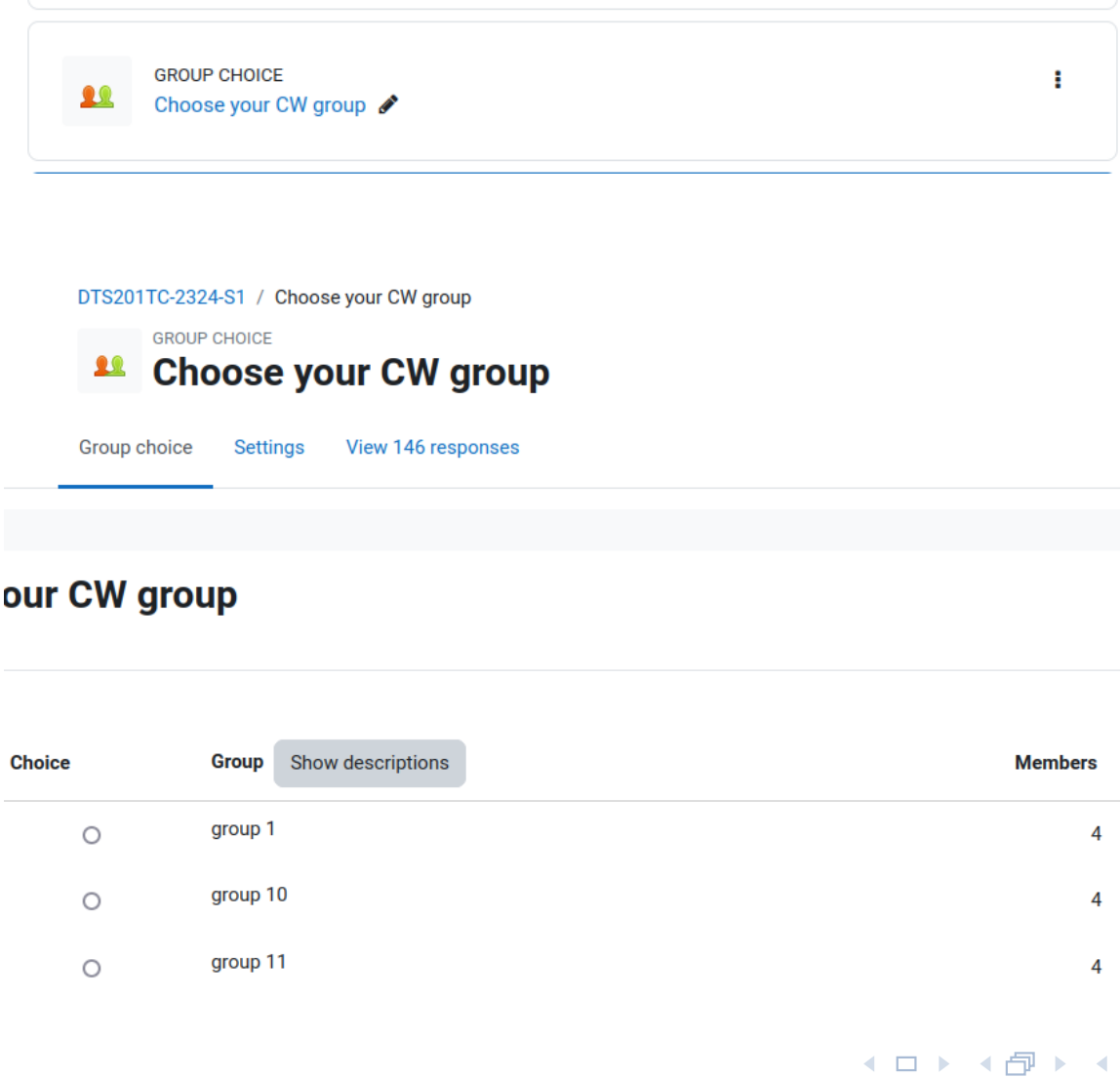
Edit Download

DTS201TC coursework AY23-24_v1.0.pdf

DTS201TC CW DATASET.zip

DTS201TC-Module Handbook-AY23-24.pdf

How to team up



Thank You !

Q & A