**Practical No. 5**

**Aim:** Program to implement unsupervised classification - Land use or Land cover map preparation.

**Program Code:**

import numpy as np

import cv2

from sklearn.cluster import KMeans

import matplotlib.pyplot as plt

image\_path = "image.png"

img = cv2.imread(image\_path)

if img is None:

    raise FileNotFoundError(f"Image not found at {image\_path}")

img\_rgb = cv2.cvtColor(img, cv2.COLOR\_BGR2RGB)

rows, cols, ch = img\_rgb.shape

pixels = img\_rgb.reshape((-1, 3))

pixels = np.float32(pixels)

num\_classes = 5

kmeans = KMeans(n\_clusters=num\_classes, random\_state=42, n\_init=10)

kmeans.fit(pixels)

labels = kmeans.labels\_

label\_img = labels.reshape((rows, cols))

cluster\_colors = {

    0: [0, 255, 0],

    1: [0, 0, 255],

    2: [192, 192, 192],

    3: [210, 180, 140],

    4: [255, 255, 0]

}

colored\_map = np.zeros((rows, cols, 3), dtype=np.uint8)

for cluster\_id, color in cluster\_colors.items():

    colored\_map[label\_img == cluster\_id] = color

colored\_map = cv2.cvtColor(colored\_map, cv2.COLOR\_BGR2RGB)

fig, axes = plt.subplots(1, 2, figsize=(14, 6))

axes[0].imshow(img\_rgb)

axes[0].set\_title("Original Image")

axes[0].axis("off")

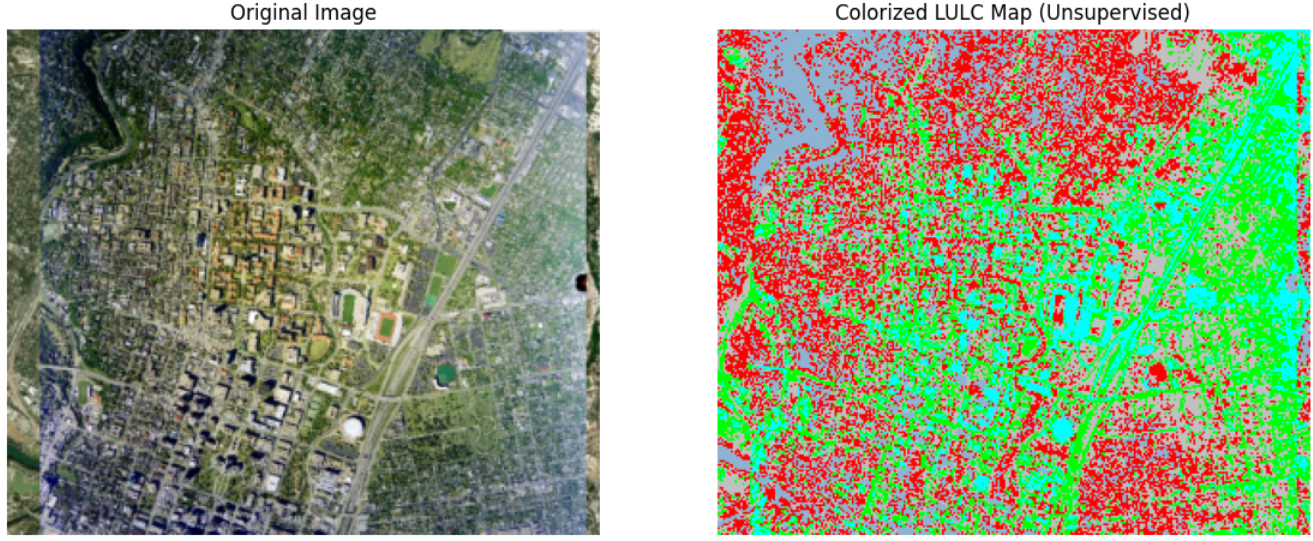
axes[1].imshow(colored\_map)

axes[1].set\_title("Colorized LULC Map (Unsupervised)")

axes[1].axis("off")

plt.show()

**Output:**

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