Parallel cellular algorithm

Image Processing

The parallel cellular algorithm is used in image processing to divide the image into its regions or to apply filters. It works by updating each pixel based on its neighbors and update is done in parallel across all pixels making the process faster and more efficient especially for larger images

Pseudocode.

```
import numpy as
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
def initialize_image(h,w):
    return np.random.randint(0,256,(h,w),dtype=np.uint8)
def segment_image(i, n_s):
    kmeans = KMeans(n_clusters = n_s, random_state=42)
    labels = kmeans.fit_predict(image.flatten().reshape(-1,1))
    return labels.reshape(image.shape)
def parallel_algorithm(image, iterations):
    grid = image.copy()
    for _ in range(iterations):
        grid = np.array([[np.mean(image[max(0,x-1):x+2
                max(0,y-1):y+1])
        for y in range(image.shape[-1])] for x in range
                image.shape[0])]
    return grid
```