**Project Report - Seam Carving**

**Problem Statement:**

Seam-carving is a content-aware image resizing technique where the image is reduced in size by one pixel of height (or width) at a time. A vertical seam in an image is a path of pixels connected from the top to the bottom with one pixel in each row; a horizontal seam is a path of pixels connected from the left to the right with one pixel in each column. the path with the least sum of energy is considered as the seam to remove.

**Steps to do:**

Calculate the energy levels of the pixels of the given image.

Calculate the cumulative energy levels of the pixels of the given image.

Calculate the vertical seam and Horizontal seam of the given image.

Implement the removal of the Vertical and Horizontal seam of the given image.

**Related Concepts:**

* Two dimensional arrays.
* Used matrix transpose.
* Formulae for Calculating energies.
* Topological sort
* Programming Language – Java
* Picture API

**Code:**

public class SeamCarver {

//time complexity: O(W \* H)

//space complexity: O(W \* H)

public SeamCarver(Picture picture){

}

//time complexity: O(W \* H)

//space complexity: O(W \* H)

public Picture picture(){

}

//time complexity: O(1)

//space complexity: O(1)

public int width(){

}

//time complexity: O(1)

//space complexity: O(1)

public int height(){

}

//time complexity: O(1)

//space complexity: O(1)

public double energy(int x, int y){

}

//time complexity: O(3\*W \* H)

//space complexity: O(2\*W \* H)

public int[] findVerticalSeam(){

}

//time complexity: O(3\*W \* H)

//space complexity: O(3\*W \* H)

public int[] findHorizontalSeam(){

}

//time complexity: O(3\*W \* H)

//space complexity: O(2\*W \* H)

public void removeHorizontalSeam(int[] seam){

}

//time complexity: O(3\*W \* H)

//space complexity: O(2\*W \* H)

public void removeVerticalSeam(int[] seam){

}

}

**Difficulties Faced:**

* There is a confusion when iterating through arrays and picture.
* Have to handle the corner cases for the borders.
* Removing the seam implementation is different for Horizontal and Vertical.

**Score:**

