Utility and Limitations of Algorithm to Implement Region Growing

Utility:

1. Parameters like maxColorDiff offer intuitive control over how inclusive or strict the region formation should be. To find the toothbrush, it is not based on fixed geometrical shapes. Therefore, the flood fill algorithm allows the toothbrush to be of any shape.

2. The non-recursive expansion (i.e., ArrayList approach) is efficient in memory management and operation simplicity, making it well-suited for real-time, interactive applications like webcam-based painting.

Limitations:

1. Setting the static threshold (i.e., maximum color difference) might be inefficient due to the different nature of images. For instance, if the image contains more noise, it might require a higher threshold to avoid the region growing from terminating prematurely due to small color fluctuations.

2. The algorithm is based on effective lighting, therefore, if the user is not in a properly lit environment the program will not conduct its tasks effectively