**Automatic Shadow Detection in Image**

**Using Adaptive Thresholding Segmentation**

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**Idea description:**

The rays of lights are blocked by a opaque surface or an object which results in a dark area called shadow. These shadows and shades in an image have various negative effects on the image analysis. To reduce the adverse effects shadow detection technique is introduced. Then we can achieve this using adaptive thresholding segmentation for automatic shadow detection. Based on the variations in pixel intensities of each zone, adaptive thresholding is used to differentiate desirable foreground image items from the background. This is a preprocessing technique which helps in minimizing the errors and enhancing the performances of the computer algorithms.

**Goals and objectives:**

* Preprocess the image by transforming it into a ratio map which is then altered using exponential function to reduce the gap between the non- shadow and shadow pixels stretches.
* A shadow pixel region is formed with the help of connected component analysis, trying to implement adaptive thresholding iteratively to identify the true shadows.
* Use fine shadow determination progression to extract the true shadows.
* The best techniques are used to detect only shadows and avoid the loss of darks objects from the image.
* Tasks such as tracking, segmentation and object detection can have an enhanced performance with shadow detection.

**Motivation:**

The decreased performance of the various tasks with recurring errors is an exceedingly challenging task to manage. Image analysis is a process of transforming an image into fundamental components so that we can extract valuable information with an increased quality of image. Shadows always cause some disturbance in the image analysis. The Earlier system used latent relations to detect the shadow pixels and a successive thresholding scheme was implemented which has relatable low accuracy and time consumption was extremely high.

**Significance:**

The adaptive thresholding changes the threshold dynamically. It is a more knowledgeable version that can detect the shadows. It commonly takes the input image and gives the outputs along with segmentation. Threshold will be calculated for each and every pixel in the image. Shadows usually cause some kind of disturbance during the analysis of image. There comes the successive thresholding scheme that is implemented which has high time consumption and low accuracy.

**Literature Survey:**

Finlayson, Hordley and Drew proposed a method which is concerned with the derivation of progression of shadow-free image representations. It is a method which is used in the illumination-invariant image with the original color image was used to locate the image's shadow edges. Here the edges are set to zero and the edge representation is reconstructed to get the shadow free images.

Clement Fredembach and Graham D. Finlayson showed that the propagation of error during the reconstruction can be reduced by closing the shadow edges before reintegration. Here the system reintegrates the image along with Hamilton path and as the reintegration method is path based it is simple and fast.

Xu, QI, and Jiang proposed a system that gives a comprehensive method to remove vague as well as hard shadows from an image. Here it shows the shadow-free reflectance image, and it shows that the method can robustly remove vague shadows and hard shadows from the appearance in the real images.

**Objectives:**

The input image is preprocessed and converted to the ratio map with the help of transformation method.

By applying the threshold, the pixels in the shadow are located to form the region by using connected component analysis and to detect actual shadow pixels, the local thresholding algorithm is applied to each region sequentially.

To extract the shadows we need to verify whether the remaining shadow pixel is true, and a fine shadow determination progression is applied.

**Features:**

The features used in this project are

* Adaptive mean
* Gaussian mean
* CVT color
* Gray2rgb
* Histogram
* Binary threshold

**Expected Outcome:**

The project represents the adaptive threshold algorithm with shadow detection. Here the system detects the changes in the image automatically without setting any threshold values manually. The system works in both light and dark environments.

**Reference:**

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3. M.-T. Yang, K.-H. Lo, C.-C. Chiang, W.-K. Tai, “Moving cast shadow detection by exploiting multiple cues”, Image Processing, IET Vol 2, pp. 95-104, 2008
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5. Bo Quin, Chuangde Zhang, Zhengua Fang, Wei Li, “A Quick Self-Adaptive Background Updating Algorithm Based On Moving Region”, Proceedings of the 9th Jointh Conference on Information System, 2006
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**The GitHub repository link is given below**

https://github.com/Incrediblebug20/Fe-project-