

PENGEMBANGAN METODE SEGMENTASI DAN CBIR PADA CITRA DISCRETE COSINUS TRANSFORM

ABSTRAK

Penelitian ini mengevaluasi efektivitas proses matching citra menggunakan metode Euclidean Distance, dengan dataset citra yang telah diekstrak koefisien DC dan tersegmentasi menggunakan metode Multi Otsu Thresholding. Setelah melakukan penyamaan resolusi pada citra menjadi 1800x2400 dan ekstraksi koefisien DC, diperoleh citra grayscale berkualitas lossy dengan pengurangan resolusi menjadi 225x300. Segmentasi menggunakan metode Multi Otsu Thresholding menunjukkan hasil yang baik, dengan objek dan latar belakang terpisah secara jelas. Proses matching menggunakan Euclidean Distance mencapai rata-rata kepresisian 80,38%, berdasarkan pengujian 80 query dan 20 recall dari 1800 dataset citra artificial, dengan presentasi matching tertinggi pada citra kaca mata (100%) dan terendah pada citra sepatu dan Menara Eiffel (60%). Hasil ini menunjukkan bahwa algoritma Euclidean Distance dapat memanggil citra mirip meskipun tidak berasal dari kelas query, akibat rendahnya selisih piksel setelah proses matching. Proses ini dijalankan pada komputer dengan spesifikasi Core i5 dan RAM 8GB menggunakan Python 3.8, dengan waktu rata-rata pemrosesan 10,24 detik.

Kata Kunci: Matching citra, Euclidean Distance, ekstraksi koefisien DC, segmentasi, Multi Otsu Thresholding, citra grayscale, pengenalan pola, pemrosesan citra

DEVELOPMENT OF SEGMENTATION AND CBIR METHODS ON DISCRETE COSINUS TRANSFORM IMAGES

ABSTRACT

This study evaluates the effectiveness of image matching processes using the Euclidean Distance method, with a dataset of images that have been extracted for DC coefficients and segmented using the Multi Otsu Thresholding method. After standardizing the image resolution to 1800x2400 and extracting the DC coefficients, grayscale images of lossy quality were obtained with a resolution reduction to 225x300. Segmentation using the Multi Otsu Thresholding method showed good results, with objects and backgrounds clearly separated. The matching process using Euclidean Distance achieved an average precision of 80.38%, based on tests with 80 queries and 20 recalls from a dataset of 1800 artificial images, with the highest matching percentage for glasses images (100%) and the lowest for shoe and Eiffel Tower images (60%). These results indicate that the Euclidean Distance algorithm can retrieve similar images even if they do not belong to the query class, due to the low pixel differences after the matching process. This process was conducted on a computer with Core i5 specifications and 8GB of RAM using Python 3.8, with an average processing time of 10.24 seconds.

Keywords: Image matching, Euclidean Distance, DC coefficient extraction, segmentation, Multi Otsu Thresholding, grayscale images, pattern recognition, image processing.