Perancangan simulasi dan evaluasi segmentasi iris pada biometrik iris dengan menggunakan algoritma region of interest = Simulation design and evaluation of segmentation on iris biometric with region of interest algorithm

Mayendra Leaz, author

Abstrak

[ABSTRAK
Isolasi daerah iris yang tepat dan kecepatan waktu proses yang cepat sangat dibutuhkan pada proses segmentasi dari suatu sistem. Terlebih lagi apabila dihadapkan dengan pangkalan data yang besar. Biometrik iris merupakan salah satu tipe biometrik dengan tingkat akurasi yang tinggi tetapi banyak pemakaian memori. Segmentasi merupakan proses paling awal dari suatu sistem biometrik iris yang akan sangat menentukan kinerja dari suatu sistem. Umumnya, algoritma segmentasi yang banyak digunakan adalah Daugman Integro Differential Operator (IDO). Algoritma ini mempunyai akurasi yang cukup baik tetapi mempunyai kekurangan penurunan akurasi pada masalah pencahayaan suatu citra dan waktu proses yang cukup lama karena banyak menggunakan iterasi. Dalam tesis ini, disimulasikan algoritma Region of Interest (ROI) untuk mempersingkat waktu proses tanpa mengurangi kinerja dari akurasi segmentasi. Algoritma yang disimulasikan melakukan tahapan blurring terhadap citra yang diolah kemudian melakukan pembagian daerah pencarian untuk menetapkan daerah kasar dari posisi iris dalam. Setelah melakukan optimasi posisi iris dalam maka akan dicari titik perpotongan untuk mencari jari-jari dan pusat dari iris dalam. Langkah terakhir adalah mencari jari-jari iris luar dengan acuan iris dalam dengan menggunakan operasi dasar statistik. Hasil simulasi menunjukkan ROI telah berhasil mempersingkat waktu proses segmentasi dan meningkatkan akurasi dibandingkan IDO dengan waktu proses rata-rata sebesar 0,343 detik, EER sebesar 4,12% dan akurasi segmentasi sebesar 1,826%.
<hr>
ABSTRACT
The time process and accurate isolation of iris region are really needed in segmentation process of a system, in particular if the system are faced with huge databases. Iris Biometric is one of biometric types that has high accuracy eventhough it uses a lot of memory. Segmentation is the first process of this biometric system that will determine the performance of the system. Generally, the segmentation algorithm uses Daugman Integro Differential Operator (IDO). The algorithm has good accuracy but in some cases due to illumination problem it may create circular patches allowing to the algorithm detect a false region and processing in long period of time because too many iteration. In this thesis, an algorithm based on Region of Interest is simulated in order to shorten the time process without sacrificing the accuracy. The simulated algorithm use blurring phase and splitting the search region to determine the rough position of inner iris region. Following the optimization of the inner iris position, the intersection point will be searched to determine the radius and the center of the inner iris. The last step is finding the outer iris boundary relative to the inner iris by using the statistical operation. The simulation result shows that ROI algorithm has succeeded to shorten the time process and increase the accuracy compared with IDO with 0.343 s for average time process, 4.12% for EER and 1.826% for segmentation accuracy.;The time process and accurate isolation of iris region are really

needed in segmentation process of a system, in particular if the system are faced with huge databases. Iris Biometric is one of biometric types that has high accuracy eventhough it uses a lot of memory. Segmentation is the first process of this biometric system that will determine the performance of the system. Generally, the segmentation algorithm uses Daugman Integro Differential Operator (IDO). The algorithm has good accuracy but in some cases due to illumination problem it may create circular patches allowing to the algorithm detect a false region and processing in long period of time because too many iteration. In this thesis, an algorithm based on Region of Interest is simulated in order to shorten the time process without sacrificing the accuracy. The simulated algorithm use blurring phase and splitting the search region to determine the rough position of inner iris region. Following the optimization of the inner iris position, the intersection point will be searched to determine the radius and the center of the inner iris. The last step is finding the outer iris boundary relative to the inner iris by using the statistical operation. The simulation result shows that ROI algorithm has succeeded to shorten the time process and increase the accuracy compared with IDO with 0.343 s for average time process, 4.12% for EER and 1.826% for segmentation accuracy., The time process and accurate isolation of iris region are really needed in segmentation process of a system, in particular if the system are faced with huge databases. Iris Biometric is one of biometric types that has high accuracy eventhough it uses a lot of memory. Segmentation is the first process of this biometric system that will determine the performance of the system. Generally, the segmentation algorithm uses Daugman Integro Differential Operator (IDO). The algorithm has good accuracy but in some cases due to illumination problem it may create circular patches allowing to the algorithm detect a false region and processing in long period of time because too many iteration. In this thesis, an algorithm based on Region of Interest is simulated in order to shorten the time process without sacrificing the accuracy. The simulated algorithm use blurring phase and splitting the search region to determine the rough position of inner iris region. Following the optimization of the inner iris position, the intersection point will be searched to determine the radius and the center of the inner iris. The last step is finding the outer iris boundary relative to the inner iris by using the statistical operation. The simulation result shows that ROI algorithm has succeeded to shorten the time process and increase the accuracy compared with IDO with 0.343 s for average time process, 4.12% for EER and 1.826% for segmentation accuracy.]