ABSTRAK

Radiografi *thorax X-Ray* menghasilkan citra digital radiografi di area dada seperti paru-paru, jantung dan tulang rusuk. Citra ini dapat memvisualisasikan kondisi paru-paru pasien penyakit COVID-19. Teknik *Edge Detection* dapat melihat tepi objek paru-paru pasien COVID-19 secara lebih jelas. Paru-paru penderita COVID-19 mengalami kerusakan yang diakibatkan dari GGO *(Ground Glass Opacity)* COVID-19 yaitu terdapat kabut putih, paru-paru terlihat kabur bagian tepi atau daerah yang terjangkit penyakit dan juga mempengaruhi luas pada. Teknik ini dapat memudahkan tenaga kesehatan melihat hasil *rontgen* pada objek paru-paru pasien COVID-19 dan membantu dokter dalam penanganan pasien COVID-19. Dengan kemajuan di bidang komputer dalam penerapan teknik pemrosesan citra dilakukan dengan Teknik *Edge Detection* ini menggunakan *software* Matlab untuk mendapatkan hasil citra tepi dan luas dari paru-paru bersih pada pasien COVID-19. Data yang digunakan dalam penelitian ini adalah 30 sampel citra paru-paru pasien COVID dan 10 sampel citra paru-paru pasien sehat sebagai pembanding yang bersumber dari RSUD Embung Fatimah Batam di-*preprocessing dengan Grayscale* dan *Intensity Adjustment,* dilanjutkan proses segmentasi dengan *Masking* dan *Boundaries* serta *Active Contour* kemudian menggunakan Teknik *Edge Detection*, selanjutnya perhitungan *Peak Signal to Noise Ratio* (PNSR), *Mean Square Error* (MSE) dan *Region Properties* (Area dan Perimeter). Hasil dari penelitian ini adalah rata-rata nilai MSE mendekati 0 dan PSNR >30 dB, sebanyak 22 citra paru-paru pasien COVID-19 menghasilkan nilai akurasi sebesar 73%. Citra hasil pengujian dengan Teknik *Edge Detection* untuk mengindentifikasi tepi objek paru-paru pasien COVID-19 yang cukup jelas dengan menghasilkan piksel putih yang begitu terlihat. Perimeter paru-paru kanan rentang 110.897 - 261.254 dan Area 267.719 - 940.668, Perimeter paru-paru kiri rentang 114.613 - 262.943 dan Area 170.616 - 856.993, sedangkan pasien sehat memiliki Perimeter paru-paru kanan rentang 187.598 -270.624 dan Area 514.947 - 1025.44, Perimeter paru-paru kiri 182.226 - 287.358 dan Area 480.592 - 901.418, maka, infeksi virus COVID-19 mengurangi luas paru-paru, rentang paru-paru COVID-19 lebih rendah dari paru-paru sehat.

Kata kunci: *Edge Detection*, Paru-Paru, COVID-19, PSNR, MSE

ABSTRACT

X-Ray chest radiographs produce digital radiographic images of chest areas such as the lungs, heart and ribs. This image can visualize the lung condition of COVID-19 patients. The Edge Detection technique can see the edges of objects in the lungs of COVID-19 patients more clearly. The lungs of patients with COVID-19 are damaged due to the GGO (Ground Glass Opacity) of COVID-19, namely there is white fog, the lungs look blurry at the edges or areas affected by the disease and also affect the area of the area. This technique can make it easier for health workers to see X-ray results on objects in the lungs of COVID-19 patients and assist doctors in handling COVID-19 patients. With advances in the computer field in the application of image processing techniques, this Edge Detection Technique uses Matlab software to obtain edge and area images of clean lungs in COVID-19 patients. The data used in this study were 30 samples of lung imagery of COVID patients and 10 samples of lung imagery of healthy patients as a comparison sourced from Embung Fatimah Hospital Batam which were preprocessed with Grayscale and Intensity Adjustment, followed by a segmentation process with Masking and Boundaries and Active Contour then uses Edge Detection Technique, then calculates Peak Signal to Noise Ratio (PNSR), Mean Square Error (MSE) and Region Properties (Area and Perimeter). The results of this study are that the average MSE value is close to 0 and PSNR > 30 dB, as many as 22 lung images of COVID-19 patients produce an accuracy value of 73%. The image of the test results with the Edge Detection Technique to identify the edges of objects in the lungs of COVID-19 patients which are quite clear by producing white pixels that are very visible. Perimeter of the right lung ranged from 110,897 - 261,254 and Area 267,719 - 940,668, Perimeter of the left lung ranged 114,613 - 262,943 and Area 170,616 - 856,993, while healthy patients had Perimeter of the right lung in the range of 187,598 -270,624 and Area 514,947 - 1025.44, Perimeter of the right lung ranged from 187,598 -270,624 left lung 182,226 - 287,358 and Area 480,592 - 901,418, so, COVID-19 virus infection reduces lung area, the range of COVID-19 lungs is lower than healthy lungs.

Keywords: Edge Detection, Lungs, COVID-19, PSNR, MSE