

INTISARI

DETEKSI KETERSEDIAAN SLOT PARKIR BERBASIS PENGOLAHAN CITRA DIGITAL MENGUNAKAN METODE *HISTOGRAM OF ORIENTED GRADIENTS* DAN *SUPPORT VECTOR MACHINE*

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Sistem informasi ketersediaan slot pada area parkir sangat bermanfaat dalam memberitahukan informasi ketersediaan kepada pengendara mobil. Penelitian ini bertujuan untuk mengimplementasikan metode berbasis pengolahan citra digital untuk memproses status slot parkir pada area parkir mobil dengan menggunakan metode ekstraksi ciri HOG (*Histogram of Oriented Gradients*) pada setiap *region* area parkir. Hasil ekstraksi ciri diklasifikasikan menggunakan SVM (*Support Vector Machine*) dengan membandingkan kernel Linear, RBF (*Radial Basis Function*), Poly, dan Sigmoid. Hasil klasifikasi SVM dianalisis menggunakan *confusion matrix* melalui parameter: *accuracy*, *specificity*, *sensitivity*, dan *precision*.

Pada pengujian data utama dengan kernel Linear didapatkan akurasi kondisi *sunny* 98.0%, *rainy* 98.8%, dan *cloudy* 99.2%. Pengujian kernel Poly didapatkan akurasi kondisi *sunny* 99.2%, *rainy* 98.9%, dan *cloudy* 99.4%. Pengujian RBF kernel didapatkan akurasi kondisi *sunny* 97.9%, *rainy* 98.7%, dan *cloudy* 99.6%. Pada pengujian data tambahan dengan menggunakan kernel Linear didapatkan akurasi sebesar 97.7%, kernel RBF didapatkan akurasi 97.9%, dan kernel Poly didapatkan akurasi sebesar 97.4%. Pengujian kernel Sigmoid menggunakan *default grid* tidak didapatkan model yang optimal melalui validasi sehingga tidak dapat digunakan dalam pengujian.

Kata Kunci: *slot parkir, ekstraksi fitur, histogram of oriented gradients, klasifikasi, support vector machine, kernel*

ABSTRACT

PARKING SLOT OCCUPANCY DETECTION BASED ON DIGITAL IMAGE PROCESSING USING HISTOGRAM OF ORIENTED GRADIENTS AND SUPPORT VECTOR MACHINE METHOD

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The information system of parking slot occupancy is very useful in informing the availability of parking slot to driver. This research aims to implement method based on digital image processing to inform the status of parking slots at the car parking area by using a feature extraction method HOG (Histogram of Oriented Gradients) in every region of the parking area. Feature extraction results are classified using SVM (Support Vector Machine) by comparing the Linear, RBF (Radial Basis Function), Poly, and Sigmoid kernels. SVM classification results were analyzed using the confusion matrix with accuracy, specificity, sensitivity, and precision parameters.

In terms of accuracy, system obtained with Linear kernel in sunny conditions shows 98.0% accuracy; rainy 98.8% accuracy; cloudy 99.2% accuracy. Obtained accuracy using Poly kernel test in sunny conditions shows 99.2%; rainy 98.9%; cloudy 99.4%. Obtained accuracy using RBF kernel in sunny conditions shows 97.9%; rainy 98.7%; cloudy 99.6%. In terms of accuracy using additional data testing obtained with Linear kernel shows accuracy of 97.7%, RBF kernel testing obtained accuracy of 97.9% and Poly kernel test obtained accuracy 97.4%. Sigmoid kernel testing can't be used because the optimal model did not obtained by using default grid.

Keyword: *parking slot, feature extraction, histogram of oriented gradients, clasification, support vector machine, kernel.*