

ABSTRAK

Murti, Ida Bagus Teguh Teja (2019), Perbandingan Klasifikasi *Modified Quadratic Discriminant Function (MQDF)* dan *Discriminative Learning Quadratic Discriminant Function (DLQDF)* pada *Isolated Character* aksara Bali.

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Kata-kata kunci: klasifikasi, QDA, *MQDF*, *DLQDF*, aksara Bali, Pengenalan Pola

Lontar Bali adalah salah satu warisan budaya yang berharga karena menyimpan berbagai informasi masyarakat Bali. Para peneliti yang melakukan digitalisasi lontar untuk mendapatkan informasi tersebut mengalami beberapa tantangan. Salah satu tantangan mengenali aksara Bali tersendiri (*isolated character*) pada lontar yang telah dibuat set data *AMADI_LontarSet*. Beberapa penelitian terkait *isolated character* yaitu riset menggunakan berbagai macam ekstraksi fitur dengan klasifikasi k-NN yang mencapai akurasi 85,15%. Ekstraksi fitur ini berupa *Histogram of Gradient (HoG)*, *Neighborhood Pixels Weights* dan *Kirsch Directional Edges (NPWK)*, *Zoning* serta gabungan 3 ekstraksi dengan panjang fitur masing-masing: 1984, 400, 204 dan 2588. Selain itu penelitian *isolated character* melalui kompetisi *ICFHR 2016* mengusulkan metode *VMQDF* yang menambahkan jumlah citra input, melakukan *Gradient Feature* dan klasifikasi *MQDF* mencapai akurasi 88,39%. Berdasarkan penelitian sebelum sehingga penelitian ini membandingkan klasifikasi *MQDF* dan pengembangan *MQDF* yaitu *DLQDF* dengan penggunaan ekstraksi fitur. Selain membandingkan, penelitian mengusulkan menggunakan seleksi fitur ANOVA yang hanya membutuhkan jumlah fitur. Seleksi fitur pada penelitian ini bertujuan mencegah kelebihan memori akibat besarnya jumlah fitur untuk proses klasifikasi sehingga digunakan panjang fitur 204 dan 400. Alur proses penelitian yaitu pengumpulan data latih berupa ekstraksi fitur, proses seleksi fitur, membuat kelas label yang berisi rata-rata, *eigenvalue*, *eigenvector* dan melatih akurasi data latih pada klasifikasi *MQDF* dan *DLQDF* berdasarkan ekstraksi fitur, panjang seleksi fitur, panjang vektor (k) berdasarkan persentase panjang seleksi fitur. Melalui pelatihan akurasi *DLQDF* dibutuhkan penyesuaian *hyper-parameter* dengan $\alpha = 0.2$, $\text{learning rate} = 0.1$, $\xi = 10^{-16}$ hingga mencapai akurasi training maksimal. Setelah hasil pengujian dilakukan maka dapat dibandingkan akurasi *DLQDF* lebih baik dibandingkan *MQDF*. Hasil akurasi *DLQDF* dengan data uji mencapai akurasi hingga 100% dengan ekstraksi fitur *HoG*, seleksi fitur 204, k=20

ABSTRACT

Murti, Ida Bagus Teguh Teja (2019), Comparison of Classification of Modified Quadratic Discriminant Function (MQDF) and Discriminative Learning Quadratic Discriminant Function (DLQDF) in Isolated Character Balinese script.

This thesis has been approved and checked by Advisor I : Made Windu Antara Kesiman, S.T., M.Sc., Ph.D. and Advisor II: Dr. I Gede Aris Gunadi, S.Si., M.Kom.

Keywords: classification, QDA, MQDF, DLQDF, Balinese script, Pattern Recognition

Lontar Bali is one of the valuable cultural heritages because it stores various information about Balinese people. Researchers who digitized lontar to obtain this information encountered several challenges. One of the challenges is recognizing isolated Balinese characters in lontar that the AMADI_LontarSet data set has been created. Several studies related to isolated characters, namely research using various kinds of feature extraction with the k-NN classification which achieves an accuracy of 85.15%. This feature extraction is in the form of Histogram of Gradient (HoG), Neighborhood Pixels Weights and Kirsch Directional Edges (NPWK), Zoning and a combination of 3 extractions with their respective feature lengths: 1984, 400, 204 and 2588. In addition, isolated character research through ICFHR competition 2016 proposes the VMQDF method that adds the number of input images, performs a Gradient Feature and MQDF classification achieves an accuracy of 88.39%. Based on previous research, this research compares the MQDF classification and MQDF development, namely DLQDF with the use of feature extraction. In addition to comparing, the study proposes using ANOVA feature selection which only requires the number of features. Feature selection in this study aims to prevent memory overload due to the large number of features for the classification process so that feature lengths of 204 and 400 are used. The flow of the research process is collecting training data in the form of feature extraction, feature selection process, creating class labels containing the average, eigenvalue, eigenvector and train the accuracy of training data on MQDF and DLQDF classification based on feature extraction, feature selection length, vector length (k) based on the percentage of feature selection length. Through DLQDF accuracy training, hyper-parameter adjustments are needed with $\gamma = 0.2$, learning rate = 0.1, $\epsilon = 10^{-16}$ to achieve maximum training accuracy. After the test results are carried out, it can be compared the accuracy of DLQDF is better than MQDF. DLQDF accuracy results with test data reach up to 100% accuracy with HoG feature extraction, feature selection 204, k=20