

findings of this study can be used to develop an android-based information system for detecting Lombok songket motifs. Furthermore, deep learning techniques can be used to improve this method.

IV. CONCLUSION

The Lombok songket motif recognition system with feature extraction algorithm Gray Level Co-Occurrence Matrix (GLCM) and Backpropagation can recognize songket motifs with an average recognizing rate of 88.33%. Furthermore, this system was tested with the same motif and color, and it has a recognition rate of 88.33% at an angle of 0° and 80% at an angle of 45°. Next, at a test angle of 90° and 135°, an recognition of 68.33% and 80% was obtained, then tested using songket with the same motif but with different colors in the database. The results show that at an angle of 0°, this system unsuccessfully recognizes all the test data. Additionally, it can provide a guide for developing Lombok songket detecting applications.

REFERENCES

- [1] L. Leonardo, "Penerapan Metode Filter Gabor Untuk Analisis Fitur Tekstur Citra Pada Kain Songket," *J. Sist. Komput. dan Inform.*, vol. 1, no. 2, 2020, doi: 10.30865/json.v1i2.1942.
- [2] Y. Y. M. R. Yusof, and Y. Ibrahim, "Songket : the Linkage Between Heritage and Tourism in Malaysia," *Asian People J.*, vol. 1, no. 2, 2018.
- [3] H. Hambali, M. Mahayadi, and ..., "Classification of Lombok Songket Cloth Image Using Convolution Neural Network Method (Cnn)," *Pilar Nusa Mandiri* ..., no. 85, pp. 149–156, 2021, doi: 10.33480/pilar.v17i2.2705.
- [4] B. Imran and M. M. Efendi, "The Implementation of Extraction Feature Using GLCM and Back-Propagation Artificial Neural Network to Clasify Lombok Songket Woven Cloth," *J. Techno Nusa Mandiri*, vol. 17, no. 2, 2020, doi: 10.33480/techno.v17i2.1680.
- [5] M. Janpourtaher, "Scientific approach of preservation treatment and restoration procedures on historical royal Songket Sarong," *Int. J. Conserv. Sci.*, vol. 10, no. 1, 2019.
- [6] A. C. Siregar and B. C. Octariadi, "Classification of Sambas Traditional Fabric 'Kain Lunggi' Using Texture Feature," *IJCCS (Indonesian J. Comput. Cybern. Syst.)*, vol. 13, no. 4, 2019, doi: 10.22146/ijccs.49782.
- [7] F. Wijayanti, T. Rohendi Rohidi, and K. Utara, "Palembang Songket Fabric Visual Motif," *Cathar. J. Arts Educ.*, vol. 8, no. 4, pp. 429–436, 2019.
- [8] H. Fonda, "Klasifikasi Batik Riau dengan Menggunakan Convolutional Neural Networks (CNN)," *J. Ilmu Komput.*, vol. 9, no. 1, 2020, doi: 10.33060/jik/2020/vol9.iss1.144.
- [9] F. T. Maharani and Z. Lynch, "The Implementation of the POPMAR (Policy, Organising, Planning and Implementing, Measuring Performance, Audit and Reviewing) Model in Occupational Health and Safety Risk Management in an Indonesian Batik Company," *Indones. J. Occup. Saf. Heal.*, vol. 10, no. 3, 2021, doi: 10.20473/ijosh.v10i3.2021.420-432.
- [10] H. Warsono, T. Afrizal, and R. J. Pinem, "Conserving heritage craft in meeting contemporary and demand issues: A collaborative governance approach," *Int. J. Entrep.*, vol. 25, no. 1, 2021.
- [11] J. Junaidi, N. Pramestie Wulandari, and D. Hamdani, "Subahnale dan Rang-rang Pembelajaran Matematika SMP," *Griya J. Math. Educ. Appl.*, vol. 1, no. 4, 2021, doi: 10.29303/griya.v1i4.102.
- [12] R. C. I. Prahmana and U. D' Ambrosio, "Learning geometry and values from patterns: Ethnomathematics on the batik patterns of yogyakarta, indonesia," *J. Math. Educ.*, vol. 11, no. 3, 2020, doi: 10.22342/jme.11.3.12949.439-456.
- [13] S. Devella, Y. Yohannes, and F. N. Rahmawati, "Implementasi Random Forest Untuk Klasifikasi Motif Songket Palembang Berdasarkan SIFT," *JATISI (Jurnal Tek. Inform. dan Sist. Informasi)*, vol. 7, no. 2, pp. 310–320, Aug. 2020, doi: 10.35957/jatisi.v7i2.289.
- [14] Y. Yohannes, S. Devella, and A. H. Pandrean, "Penerapan Speeded-Up Robust Feature pada Random Forest Untuk Klasifikasi Motif Songket Palembang," *J. Tek. Inform. dan Sist. Inf.*, vol. 5, no. 3, Jan. 2020, doi: 10.28932/jutisi.v5i3.1978.
- [15] M. A. Rasyidi, R. Handayani, and F. Aziz, "Identification of batik making method from images using convolutional neural network with limited amount of data," *Bull. Electr. Eng. Informatics*, vol. 10, no. 3, 2021, doi: 10.11591/eei.v10i3.3035.
- [16] Z. E. Fitri, A. Madjid, and M. Nanda, "Penerapan Neural Network untuk Klasifikasi Kerusakan Mutu Tomat," *J. Rekayasa Elektr.*, vol. 16, no. 1, pp. 44–49, 2020, doi: 10.17529/jre.v16i1.15535.
- [17] J. M. Challab and F. Mardukhi, "A hybrid method based on LSTM and optimized SVM for diagnosis of novel coronavirus (COVID-19)," *Trait. du Signal*, vol. 38, no. 4, pp. 1061–1069, Aug. 2021, doi: 10.18280/ts.380416.
- [18] R. S. Patil and N. Biradar, "Automated mammogram breast cancer detection using the optimized combination of convolutional and recurrent neural network," *Evol. Intell.*, vol. 14, no. 4, pp. 1459–1474, 2021, doi: 10.1007/s12065-020-00403-x.
- [19] Y. Park and J. M. Guldmann, "Measuring continuous landscape patterns with Gray-Level Co-Occurrence Matrix (GLCM) indices: An alternative to patch metrics?," *Ecol. Indic.*, vol. 109, Feb. 2020, doi: 10.1016/j.ecolind.2019.105802.
- [20] I. Amalia, "Ekstraksi Fitur Citra Songket Berdasarkan Tekstur Menggunakan Metode Gray Level Co-occurrence Matrix (GLCM)," *J. Infomedia*, vol. 3, no. 2, 2018, doi: 10.30811/jim.v3i2.715.
- [21] M. Sholihin, "Classification of Batik Lamongan Based on Features of Color, Texture and Shape," *Kursor*, vol. 9, no. 1, 2018, doi: 10.28961/kursor.v9i1.114.
- [22] I. P. G. S. Andisana, M. Sudarma, and I. M. O. Widyantara, "Pengenalan Dan Klasifikasi Citra Tekstil Tradisional Berbasis Web Menggunakan Deteksi Tepi Canny, Local Color Histogram Dan Co-Occurrence Matrix," *Maj. Ilm. Teknol. Elektro*, vol. 17, no. 3, 2018, doi: 10.24843/mite.2018.v17i03.p15.
- [23] C. Jatmoko and D. Sinaga, "A Classification of Batik Lasem using Texture Feature Ectraction Based on K-Nearest Neighbor," *J. Appl. Intell. Syst.*, vol. 3, no. 2, 2019, doi: 10.33633/jais.v3i2.2151.
- [24] N. Nurhalimah, I. G. P. Suta Wijaya, and F. Bimantoro, "Klasifikasi Kain Songket Lombok Berdasarkan Fitur GLCM dan Moment Invariant Dengan Teknik Pengklasifikasian Linear Discriminant Analysis (LDA)," *J. Teknol. Informasi, Komputer, dan Apl. (JTika)*, vol. 2, no. 2, 2020, doi: 10.29303/jtika.v2i2.98.
- [25] I. Nurhaida, V. Ayumi, D. Fitrihanah, R. A. M. Zen, H. Noprisson, and H. Wei, "Implementation of deep neural networks (DNN) with batch normalization for batik pattern recognition," *Int. J. Electr. Comput. Eng.*, vol. 10, no. 2, pp. 2045–2053, 2020, doi: 10.11591/ijece.v10i2.pp2045-2053.
- [26] A. Zahra, E. Ernawati, and E. P. Purwandari, "Perbandingan Metode K-Means Clustering dan Discrete Cosine Transform Untuk Kompresi Citra Batik Besurek Motif Gabungan," *Pseudocode*, vol. 5, no. 2, 2018, doi: 10.33369/pseudocode.5.2.46-55.
- [27] Z. Xing and H. Jia, "Multilevel Color Image Segmentation Based on GLCM and Improved Salp Swarm Algorithm," *IEEE Access*, vol. 7, 2019, doi: 10.1109/ACCESS.2019.2904511.
- [28] K. Chandrababha and S. Akila, "Texture Feature Extraction for Batik Images Using GLCM and GLRLM with Neural Network Classification," *Int. J. Sci. Res. Comput. Sci. Eng. Inf. Technol.*, 2019, doi: 10.32628/cseit195322.
- [29] O. Sudana, I. P. A. Bayupati, and D. G. Yudiana, "Classification of Maturity Level of the Mangosteen using the Convolutional Neural Network (CNN) Method," *Int. J. Adv. Sci. Technol.*, vol. 135 (20), no. February, 2020, doi: 10.33832/ijast.2020.135.04.
- [30] F. A. Ahda and F. A. Rahman, "Perancangan Infografis Songket Lombok," *J. Desain Komun. Vis. Asia*, vol. 1, no. 1, 2017, doi: 10.32815/jeskovsia.v1i1.307.
- [31] R. Aprianti, K. Evandari, R. A. Pramunendar, and M. Soeleman, "Comparison of Classification Method on Lombok Songket Woven Fabric Based on Histogram Feature," 2021, doi: 10.1109/iSemantic52711.2021.9573223.
- [32] P. N. Andono and E. H. Rachmawanto, "Evaluasi Ekstraksi Fitur GLCM dan LBP Menggunakan Multikernel SVM untuk Klasifikasi Batik," *J. RESTI (Rekayasa Sist. dan Teknol. Informasi)*, vol. 5, no. 1, 2021, doi: 10.29207/resti.v5i1.2615.