

ABSTRAK

Perubahan iklim yang tidak menentu menyebabkan penentuan waktu tanam, pengelolaan air, dan pemilihan varietas padi menjadi kurang optimal sehingga berpotensi menurunkan produktivitas dan meningkatkan risiko gagal panen. Selain itu, data klimatologi yang tersedia masih belum dimanfaatkan secara optimal karena informasi yang disajikan cenderung bersifat teknis dan sulit diterapkan secara langsung dalam pengambilan keputusan budidaya. Penelitian ini bertujuan merancang dan membangun *website* berbasis algoritma LSTM untuk menghasilkan prediksi kondisi iklim serta rekomendasi waktu tanam, estimasi kebutuhan air, dan rekomendasi varietas padi. *Website* dikembangkan menggunakan metode *Rapid Application Development* (RAD), sedangkan model prediksi dibangun menggunakan data klimatologi BMKG wilayah Bogor dan diintegrasikan melalui *Flask* API. Rekomendasi waktu tanam dihasilkan menggunakan logika *Fuzzy Sugeno* berdasarkan hasil prediksi klimatologi. Hasil evaluasi menunjukkan bahwa model suhu menghasilkan nilai MAE sebesar 0,67383 dan RMSE sebesar 0,86260, model kelembaban menghasilkan nilai MAE sebesar 3,10620 dan RMSE sebesar 3,93650, model regresi curah hujan menghasilkan nilai MAE sebesar 10,01678 dan RMSE sebesar 17,56947, sedangkan model klasifikasi curah hujan memperoleh akurasi sebesar 80,321%. Hasil *Black Box Testing* menunjukkan seluruh fungsi *website* berjalan sesuai kebutuhan, sedangkan *User Acceptance Testing* memperoleh rata-rata skor 4,37 dari skala maksimum 5. Dengan demikian, penelitian ini berhasil menghasilkan *website* yang mampu mendukung pengambilan keputusan budidaya padi berbasis data klimatologi.

Kata Kunci: Algoritma LSTM, data klimatologi, *deep learning*, padi, *website*.

ABSTRACT

Unpredictable climate change has made determining planting time, managing irrigation, and selecting appropriate rice varieties less effective, thereby reducing productivity and increasing the risk of crop failure. In addition, the available climatological data have not been optimally utilized because the information provided is generally technical and difficult to apply directly to cultivation decision-making. This study aimed to design and develop a website based on the Long Short-Term Memory (LSTM) algorithm to generate climate predictions and provide recommendations for planting time, water requirements, and suitable rice varieties. The website was developed using the Rapid Application Development (RAD) method, while the prediction models were built using BMKG's climatological data from the Bogor region and integrated into the website through a Flask API. Planting time recommendations were generated using Fuzzy Sugeno logic based on the predicted climatological conditions. The evaluation results showed that the temperature model achieved an MAE of 0.67383 and an RMSE of 0.86260, the humidity model achieved an MAE of 3.10620 and an RMSE of 3.93650, the rainfall regression model achieved an MAE of 10.01678 and an RMSE of 17.56947, while the rainfall classification model achieved an accuracy of 80.321%. The Black Box Testing results indicated that all website functions operated as expected, while the User Acceptance Testing (UAT) achieved an average score of 4.37 out of 5. Therefore, this study successfully developed a website capable of supporting decision-making in rice cultivation based on climatological data.

Keywords: climatological data, deep learning, LSTM algorithm, rice, website.