

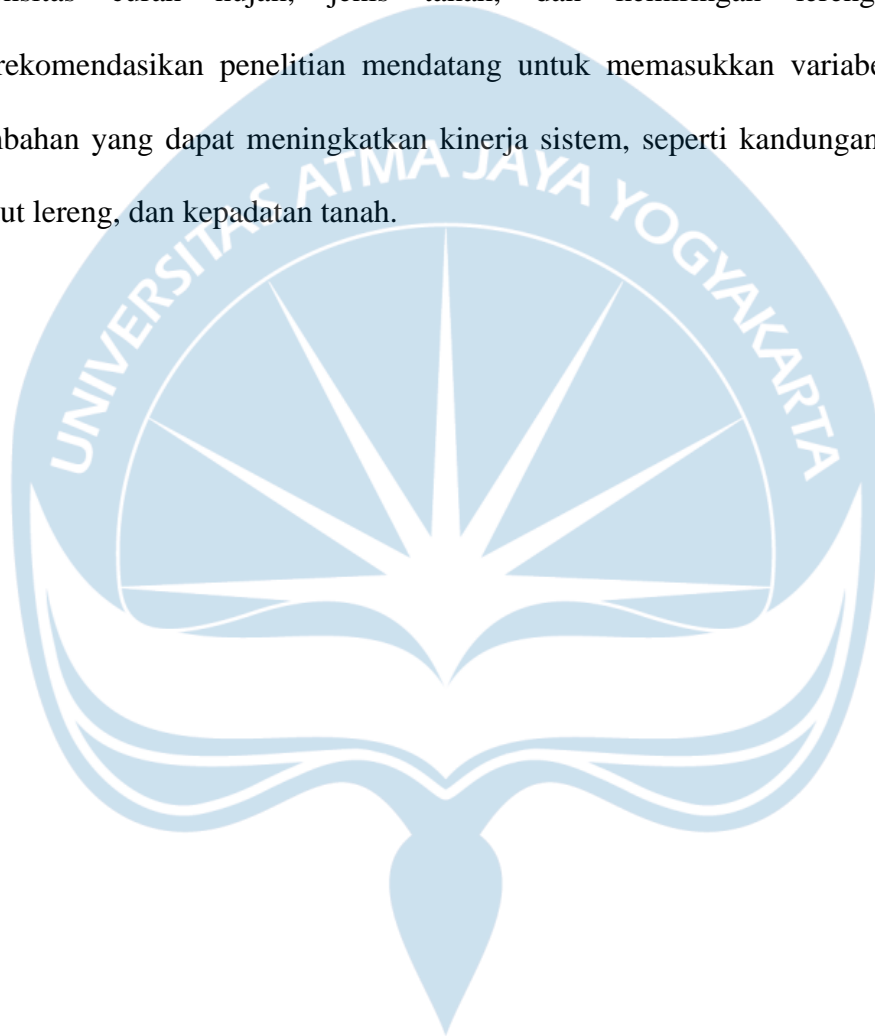
## BAB VI

### KESIMPULAN

Penelitian ini bertujuan untuk mengembangkan sistem peringatan dini terhadap potensi longsor yang disebabkan oleh ketidakstabilan tanah yang dipengaruhi oleh variabel-variabel utama, seperti intensitas curah hujan dan kemiringan lereng. Dataset yang digunakan mencakup 3637 kejadian longsor dengan fokus pada empat variabel utama yang memicu ketidakstabilan tanah. Metode analisis dalam penelitian ini melibatkan penggunaan model SARIMA untuk menstasionerkan data, diikuti oleh penerapan model TCN untuk melakukan prediksi kejadian longsor. Hasil eksperimen menunjukkan bahwa penerapan stasionerisasi pada data memperbaiki kinerja model TCN, dengan mengurangi nilai *Mean Squared Error* (MSE) dari 0.471855 menjadi 0.341675. Hal serupa terjadi pada *Metode Absolute Error* (MAE) yang menurun dari 0.472495 menjadi 0.535469, dan pada *Metode Absolute Percentage Error* (MAPE) yang turun dari 0.428708 menjadi 0.377399. Selanjutnya, nilai *R2 Score* meningkat dari -0.380841 menjadi -0.000121 setelah penerapan stasionerisasi pada data. Hasil ini menunjukkan bahwa stasionerisasi data dapat meningkatkan akurasi prediksi model TCN.

Dalam perbandingan dengan model LSTM, TCN menunjukkan kinerja yang lebih baik dalam memprediksi kejadian longsor. Namun setelah divalidasi dengan 17 data kejadian longsor pada tahun 2023, 11 kejadian berhasil terdeteksi dan 6 kejadian tidak terdeteksi. Berdasarkan hasil ini model TCN perlu disempurnakan lagi, sehingga mendapatkan data yang lebih akurat. Penelitian ini juga berhasil

mengimplementasikan prediksi kejadian longsor untuk rentang waktu satu tahun ke depan, memberikan kontribusi sebagai sistem peringatan dini untuk daerah-daerah rawan longsor. Meskipun penelitian masih memfokuskan pada variabel seperti intensitas curah hujan, jenis tanah, dan kemiringan lereng, peneliti merekomendasikan penelitian mendatang untuk memasukkan variabel eksogen tambahan yang dapat meningkatkan kinerja sistem, seperti kandungan air tanah, sudut lereng, dan kepadatan tanah.



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