ABSTRAK

Industri *game* telah mengalami perkembangan yang pesat, hal ini ditandai dengan hadirnya berbagai jenis *game*. Bentuk interaksi pemain dalam *game* sudah dapat direpresentasikan dengan berbagai cara. Namun, terdapat tantangan untuk memungkinkan interaksi secara *real-time* antara pengguna dan sistem. Untuk mewujudkan interaksi tersebut, *hand gesture recogntion* mampu melakukan pengenalan isyarat tangan secara *real-time*. Penelitian ini bertujuan untuk mengembangkan model *hand gesture recognition* sebagai alat kendali pada *game fighting* menggunakan *framework* MediaPipe dan OpenCV. Model MediaPipe dibandingkan dengan model YOLOv8 berdasarkan hasil evaluasi model. Evaluasi model menggunakan *confusion matrix*, nilai evaluasi tertinggi pada model YOLOv8 dengan skor akurasi 100%. Pengujian model berdasarkan variabel kecerahan ruangan dan jarak tangan ke kamera pada model MediaPipe menghasilkan persentase deteksi yang lebih tinggi dibandingkan model YOLOv8. Model terbaik diimplementasikan pada *game fighting* untuk menambah variasi alat kendali bagi pemain dalam mengontrol aksi karakter *game fighting*. Pengembangan *game* berbasis *desktop* dilakukan menggunakan metode GDLC dan *framework Pygame*. Hasil *alpha testing* menggunakan *blackbox* menunjukkan *output* yang benar pada setiap fitur. Hasil *beta testing* dari laptop kategori *low-end* dan PC kategori *low to mid-range* pada *mode Gesture* menghasilkan rata-rata 7,41 fps dan 29,77 fps, sehingga membutuhkan spesifkasi CPU yang cukup kuat untuk menjalankan model pada *game*.

Kata Kunci: *game fighting, hand gesture recognition, MediaPipe, YOLOv8*

ABSTRACT

The gaming industry has experienced rapid development, showed by the presence of various types of games. The form of player interaction in the game can be represented in various ways. However, there are challenges to enable real-time interaction between users and the system. To actualize this interaction, a hand gesture recognition is able to recognize hand gestures in real-time. This study aims to develop a hand gesture recognition model as a control tool in fighting games using MediaPipe and OpenCV frameworks. The MediaPipe model is compared with the YOLOv8 model based on the results of the model evaluation. Model evaluation used confusion matrix wtih the highest evaluation value produced by the YOLOv8 model with an accuracy score of 100%. Model testing based on room brightness and hand-to-camera distance from the MediaPipe model produces a higher detection percentage than the YOLOv8 model. The best model was implemented in fighting games to add variety to the control tools for players in controlling the actions of fighting game characters. Desktop-based game development is carried out using the GDLC method and the Pygame framework. The results of alpha testing using blackbox showed the correct output on each feature. The results of beta testing from low-end laptops and low to mid-range PCs in Gesture mode produced an average of 7.41 fps and 29.77 fps, so it requires a fairly strong CPU specification to run the model in the game.

Keywords: *fighting game, hand gesture recognition, MediaPipe, YOLOv8*