

ABSTRAK

Permainan tradisional Indonesia seperti Gobak Sodor mengalami ancaman kepunahan akibat penetrasi teknologi digital dan perubahan preferensi generasi muda. Penelitian ini mengembangkan game edukasi Gobak Sodor 2D berbasis Unity dengan mengintegrasikan teknologi hand tracking menggunakan MediaPipe dan OpenCV, serta menerapkan Goal-Oriented Action Planning (GOAP) sebagai kecerdasan buatan pada AI enemy. Metode penelitian menggunakan pendekatan Research and Development (R&D). Sistem hand tracking berbasis MediaPipe digunakan untuk mendeteksi landmark tangan secara real time sehingga memungkinkan interaksi yang lebih alami tanpa perangkat input konvensional. AI enemy berbasis GOAP digunakan untuk menghasilkan perilaku NPC yang adaptif berdasarkan kondisi permainan. Evaluasi pengalaman pengguna dilakukan menggunakan User Experience Questionnaire (UEQ) dengan enam dimensi pengukuran. Hasil penelitian menunjukkan bahwa game yang dikembangkan mampu menghadirkan pengalaman bermain yang interaktif dan natural. Evaluasi UEQ terhadap 27 responden menunjukkan nilai mean positif pada dimensi daya tarik (1,438), stimulasi (1,444), efisiensi (0,917), ketepatan (1,120), dan kebaruan (1,046), sedangkan dimensi kejelasan memperoleh nilai mean (0,407) yang berada pada kategori netral cenderung positif. Secara keseluruhan, sistem dapat diterima dengan baik oleh pengguna. Penelitian ini berkontribusi pada pengembangan Natural User Interface untuk game edukasi 2D serta memberikan referensi implementasi MediaPipe OpenCV dan GOAP dalam konteks permainan tradisional Indonesia.

Kata kunci: Game edukasi, Gobak Sodor, hand tracking, MediaPipe, GOAP, user experience questionnaire, permainan tradisional

ABSTRACT

Traditional Indonesian games such as Gobak Sodor are facing the threat of extinction due to the rapid penetration of digital technology and shifting preferences among younger generations. This study develops a 2D educational Gobak Sodor game using Unity by integrating hand tracking technology based on MediaPipe and OpenCV and implementing Goal-Oriented Action Planning (GOAP) as the artificial intelligence mechanism for enemy NPCs. The research method employed is Research and Development (R&D). The MediaPipe-based hand tracking system detects hand landmarks in real time, enabling more natural interaction without conventional input devices, while the GOAP-based enemy AI generates adaptive NPC behavior based on dynamic game conditions. User experience evaluation was conducted using the User Experience Questionnaire (UEQ), which measures six dimensions. The results indicate that the developed game provides an interactive and natural gameplay experience. UEQ evaluation involving 27 respondents shows positive mean scores in the dimensions of attractiveness (1.438), stimulation (1.444), efficiency (0.917), dependability (1.120), and novelty (1.046), while the perspicuity dimension obtained a mean score of 0.407, categorized as neutral with a positive tendency. Overall, the system is well accepted by users. This study contributes to the development of Natural User Interfaces in 2D educational games and provides a practical reference for implementing MediaPipe, OpenCV, and GOAP in the context of traditional Indonesian games.

Keywords: Educational game, Gobak Sodor, hand tracking, MediaPipe, GOAP, User Experience Questionnaire (UEQ), traditional games.