INTISARI

PENERAPAN DETERMINISTIC FINITE STATE MACHINE UNTUK MEMODELKAN PERILAKU NPC DAN DAMPAKNYA TERHADAP RESPONS PEMAIN

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Pengembang game sering menghadapi dilema antara kompleksitas AI Non-Playable Character (NPC) dengan keterbatasan sumber daya. *Finite State Machine* (FSM) adalah solusi teknis yang pragmatis, namun penelitian ini bertujuan membuktikan FSM juga berfungsi sebagai alat desain untuk menciptakan perilaku yang "adil" (*fair*) dan "terbaca" (*readable*). Penelitian ini merancang *Deterministic* FSM (DFSM) untuk NPC musuh di Unity Game Engine, kemudian mengevaluasi dampaknya terhadap pengalaman pemain menggunakan metode campuran (kuesioner dan wawancara) setelah sesi *playtesting*.

Hasil penelitian menunjukkan bahwa FSM sangat berhasil menciptakan perilaku yang "adil" (skor 4.2/5) dan "mudah dipelajari" (skor 4.8/5). Namun, ditemukan dua temuan krusial: (1) Keterbacaan gagal pada level serangan khusus (skor 3.4) akibat implementasi sinyal visual (*telegraphing*) yang buruk. (2) Muncul "paradoks tantangan", di mana permainan secara kualitatif dirasa "tidak menantang" (karena *cooldown* lambat) namun secara kuantitatif "sangat menantang" (skor 4.4) akibat tantangan artifisial dari *telegraphing* yang buruk. Penelitian ini menyimpulkan bahwa FSM terbukti sebagai alat desain yang efektif, di mana kualitas pengalaman pemain tidak ditentukan oleh arsitektur AI, melainkan oleh tuning parameter pendukung seperti *telegraphing* dan *timing*.

Kata Kunci : *Finite State Machine* (FSM), *Non-Playable Character* (NPC), Game AI, Pengalaman Pemain, *Game Design*

ABSTRACT

APPLICATION OF A DETERMINISTIC FINITE STATE MACHINE TO MODEL NPC BEHAVIOR AND ITS EFFECT ON PLAYER RESPONSES

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Game developers often face a dilemma between the complexity of Non Playable Character (NPC) AI and resource constraints. The Finite State Machine (FSM) is a pragmatic technical solution, but this research aims to prove that FSM also functions as a design tool to create "fair" and "readable" behavior. This study designs a Deterministic FSM (DFSM) for an enemy NPC in the Unity Game Engine, then evaluates its impact on player experience using a mixed-methods approach (questionnaires and interviews) following a playtesting session.

The research results show that the FSM was highly successful in creating behavior perceived as "fair" (score 4.2/5) and "easy to learn" (score 4.8/5). However, two crucial findings emerged: (1) Readability failed at the "special attack" level (score 3.4) due to poor visual signal (telegraphing) implementation. (2) A "challenge paradox" emerged, where the game was qualitatively perceived as "not challenging" (due to slow cooldowns) yet quantitatively rated as "very challenging" (score 4.4) due to artificial difficulty from poor telegraphing. This study concludes that FSM proves to be an effective design tool, where the quality of player experience is not determined by the AI architecture, but by the tuning of supporting parameters such as telegraphing and timing.

Keywords : Finite State Machine (FSM), Non-Playable Character (NPC), Game AI, Player Experience, Game Design