

3D 遊戲中智慧型角色的互動式運動模組

摘要

在 3D 遊戲中，讓虛擬角色能夠在場景中自主的和使用者進行即時互動，一直是一個非常有挑戰性的問題。過去在此方面的相關研究雖然為數不少，但大多數的研究不是用效能來換取角色動作的規劃品質，就是屈就於效能而決定犧牲品質，能妥善的在兩者之間取得平衡的系統並不常見。本論文所提出的系統，便是一個能在兩者之間取得不錯平衡的角色動作規劃器。我們的規劃器會根據使用者的操作命令來預測角色未來可行的行動空間，並搭配時間預算的概念，將這些預測結果儲存在一種稱為可行動作樹的資料結構，從這些預測結果中搜尋出最符合使用者操作要求的角色動作。我們利用這個規劃器實作了兩種不同的應用，並測試了它們的效能。我們相信這個運動模組能實用在一般如遊戲的即時動畫環境中，提昇動畫角色的互動性與動畫品質。

Interactive Motion Control for Intelligent Characters in 3D Games

Abstract

Allowing a virtual character to interact with the user autonomously in a 3D game has been a challenging problem for long. There has been much research in this direction but most of them have to trade interactivity of control with the quality of the generated motions or the other way. It is rare to see a system that can find a good balance between these two factors. In this thesis, we propose an interactive system consisting of a motion planner aiming to find a good balance between these two factors. Our planner attempts to predict the feasible motion space in the near future according to user commands. We use the concept of time-budgeted computing to maintain a data structure called Feasible Motion Tree representing the feasible motion space. This tree is maintained in an incremental fashion and is used to select the most appropriate motion clip when the current motion clip comes to the end. We have used this motion planning module to implement two different applications and verify its efficacy and efficiency. We believe that this motion planning module can be used in a real-time virtual environment, such as a game, for the improvement of the interactivity and the quality of motion control.