Chapter 28
A Graphical Tool for the Creation of Behaviors in Virtual Worlds

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ABSTRACT

Typically, the creation of AI-based behaviors for Non-Playing Characters (NPC) in computer games is carried out by people with specialized skills in the broad areas of design and programming. This book chapter presents Second Mind (SM), a digital solution that makes it possible for novice users to successfully author behaviors. In SM, authors can use a graphical interface to define the behaviors of virtual characters in response to interactions with players. Authors can easily endow NPCs with behavior capabilities that make them act in different possible roles such as e.g. shopkeepers, museum hosts, etc. A series of user tests with human subjects to evaluate the behavior authoring process shows that Second Mind is easy to understand and simplifies the process of behavior production.

INTRODUCTION

In order to increase player experience, the virtual characters that populate video games and virtual worlds should exhibit believable behaviors (Umarov, Mozgovoy, & Rogers, 2012). This does not apply only to the player characters, which are the characters that are controlled by the player, and as such are meant as more of a player's extension. This also applies to any other character that is controlled by the game, usually through artificial intelligence, such as townsfolk, vendors, enemies, allies, historical figures, bystanders, quest givers, etc. All these latter characters are referred to as non-player characters (NPCs) and are an integral part of the game. They exist to interact with the player characters, other NPCs, and the environment in a way that reflects their own distinct personalities and dialog capabilities.

In the context of synthetic characters, believability is all about making the users believe they are interacting with a living agent, whose existence is consistent with the virtual world the character is situated in. In essence, believability is the ability to suspend the users' disbelief, by providing an illusion of life (Bates 1994).

Creating behaviors for NPC usually requires specialized skills in both design and programming well beyond the skills of the average person (Magerko, Laird, Assanie, Kerfoot, & Stokes, 2004). Hence, the intrinsic nature of the behavior generation process is restricted to the individuals who have a certain expertise in this specific area. To date, there is little understanding of how individuals without programming and design experience (whom we will refer to as "novice users" throughout this paper) can carry out the behavior authoring process.

The behaviors of NPCs are usually scripted and are automatically triggered by certain actions, events, or dialogue. In that sense, player characters play the game, while NPCs display some facet of the game and help to further the storyline making the game what it is (Gillies & Ballin, 2004). In early digital games, NPCs display only basic non-interactive dialogue capabilities. Monologues realized with screens of text, floating text, voiceovers, cutscenes, text clouds and other non-branching dialogue techniques made it possible for NPCs to convey only an immediate impression of their personality in reaction to or to initiate interaction with the player. However, this lack of interactivity turns the player into a mere passive consumer of content. More recent, advanced games allow for interactive dialogue where the player can engage in a compelling conversation with NPCs that results in witty and dramatic storylines that fit the context at hand. In those games, a conversation is typically modelled using dialogue trees (Adams, 2012) where the player is presented with and can choose from a limited list of interaction options in response to an NPC's action. Each choice affects the course of the game in a different way since each of them may result in a different response from the NPC. Moreover, the possibility to choose between different options makes it necessary for the game designer to customize the NPCs' behaviors by modifying their default scripts or by creating entirely new ones.

Branching the overall storyline puts the player in charge of learning about the game by engaging him in conversation with NPCs. In this way, uncovering the storyline becomes part of an increased overall player experience (Li, Thakkar, Wang, & Riedl, 2014). Besides engaging interactive narrative experiences (Yu & Riedl, 2014) with unfolding storylines, it is also necessary to have the tools that make it possible to design and create the appropriate behaviors. This is not just about making them funnier. It is also about creating more surprising and unpredictable behaviors within the game constraints so that two interactions with an NPC never turn out to be the same.

Digital games have much to gain from adopting artificial intelligence (AI) techniques to author complex behaviors. This is however, a difficult task for it requires a great deal of competence and resources. Usually, only the game creators or the people with specialized skills in both design and programming can carry out such a task. As a result, authoring behavior can even become a bottleneck in the process of creating the content displayed within digital worlds.

In this paper, we present Second Mind, a digital authoring tool solution that helps any players to populate virtual worlds with NPCs that can exhibit believable interactive behaviors. Our solution is based on a study that we carried out using paper prototypes to investigate how individuals without programming and design experience carry out the behavior authoring process. That study reveals some major limitations that we account for in the development of Second Mind. In Second Mind, novice users can easily design the behavior of graphical characters that impersonate different tradesmen such as shopkeepers, museum hosts, etc. in virtual worlds.

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