Adaptive Narration in Multiplayer Ubiquitous Games

Stéphane Natkin, Conservatoire National des Arts et Métiers, Paris, France
Chen Yan, Conservatoire National des Arts et Métiers, Paris, France

ABSTRACT

The goal of this research is to develop new gameplays and new narration principles for MUGs (Multiplayer Ubiquitous Games). We aim to formalize a narrative mechanism to generate events which can stimulate the user's physical actions with the real world, and social communications with other players. We first present a pattern to identify the feedback relationship between the real world and the virtual world. We then analyze the notion of narration in games and the notion of user's model in information technology. Based on this analysis, a narration adaptive to the user's profile in considering the real world context is proposed. The last part of the paper is devoted to an experimental game MugNSRC developed through of the preceding principles. A prototype of this game has been developed using off the shell services available on geolocalized mobile phones.[Article copies are available for purchase from InfoSci-on-Demand.com]

Keywords: Mixed Reality, User Model, MMOG, Proactive Game, Location Based Games, Ubiquitous System, Adaptive System, Interactive Narrative

INTRODUCTION

An increasing complexity of relationships between the real world and the virtual world is arising in the next generation games (Bjork et al. 2002). The new types of interaction experimented in Massively Multiplayer Online Games (MMOG) like “World of Warcraft” (Blizzard, 2004), geolocalized games like “Botfighter2” (AliveMobile, 2000) or “Mogi” (Newtgame, 2003), Mixed Reality games like “Age Invaders” (Khoo & Cheok, 2006) or relying on the real time political events of the real world like "Geo-Political Simulator" (Eversim, 2004) and Internet and mail based adventure games like “In Memoriam” (Lexis Numérique, 2003) have one or several of the following properties:

- Pervasive: the game interacts with the player’s life at uncontrolled times through email and phone calls, for example.
- Social: the game leads to social interactions between the players and more generally between people.
- Ubiquitous: The game relies on a ubiquitous computer system using all of the
daily objects as interface and is aware of
the user’s context and needs.
• Mobile: the gameplay relies on the player’s
physical mobility.

There is no general analysis of the type
of entertainment which relies on mixed reality
interactive media and, of course, no underly-
ing narrative theory. In this paper, we present
a method to develop Multiplayer Ubiquitous
Games (MUG). Our goal is to define a model
of mixed reality interactive narration which
is able to:

• Define the global principle of the game:
goal of the game, why the user is interested
to play and what type of interactions are
involved.
• Define the ludic and narrative principles,
the objects in the real and the virtual worlds
and their semantic relations, and the user
model.
• Define the learning process of the user
model and the decision process of the
ludo-narrative system.

The research project relies on four steps
presented in this paper. The first step is to
classify and clarify some concepts used in the
analysis of the possible interaction between
Virtual Worlds (VW) and Real Worlds (RW) for
entertainment applications. In the first section
we recall a general model of the relationship
between RW and VW and state a terminology.
It leads to a classification of applications and
seven criteria with their definitions and possible
values. The second step is to specify a relation
scheme between the information related to
the player behaviour and possible narration
schemes. According to the information avail-
able, we consider three possible levels of the
user model: generic, localized and personalized.
Considering the model of the user as a key
element of the game system, we propose three
types of narration scheme: global, context-
oriented and character-based. In the third step
we defined a model of the user, implemented
in the game, which allows an adaptive driving
of the game evolution according to the user’s
preferences. The functional architecture of
this feedback loop between the RW and the
VW is presented. The last step is to validate
our approach through an experimental MUG
game. We present the pitch of this game whose
development is in progress.

REAL AND VIRTUAL WORLDS

Basic Concepts

In this section we will define the main compo-
nents of mixed reality ubiquitous systems we
are dealing with. In the RW there are one or
several people who know that their actions may
interact with the VW. We will call these people
the users of the system. This means that the user
has a representation in the virtual world whose
behavior is perceptible to him. The identifica-
tion of a user in the virtual space is known as
“avatar”, which is an anonymous and dynamic
character put in charge to explore the VW, and
sometimes may be partly autonomous without
control of the user.

The part of the RW which is concerned
by this study is the user’s physical environ-
ment when he is involved in the dedicated
applications. It contains all of the contextual
information needed to interpret the meaning of
the virtual world within the user’s physical and
social context. We consider three kinds of real
objects able to interact with the system:

• Explicitly represented Real Object (ERO).
An ERO is a natural RW object explicitly
represented in the system, such as the user
represented as an avatar, the user is an ERO.
It can also be some physical variables, like
the location of users, or the users’ emotional
states.
• Implicitly represented Real Object (IRO).
An IRO may be some implicit hypothesis
about the state of objects in the RW. For
example, the game is designed for the ori-
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