# Carioca - The Video Game

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## ABSTRACT

This paper presents the *"Carioca"* videogame[1] made in the Unreal game engine. It is a first person simulation of a dangerous Brazilian favela where players can choose the course of actions which suits their self-imposed goals. The game tries to generate an emergent narrative by embedding narrative cues in the environment as well as presenting a tactile gameworld governed by simulation rules. Via their interaction with the game and its characters, the players can change the meaning of life in the favela - for better or worse.

## Categories and Subject Descriptors

K.8.0 [**Personal Computing**]: General—*Games*

## General Terms

Design

## Keywords

game, emergent narrative, simulation, game environment

## 1. INTRODUCTION

Aided by increased efficiency and availability of computing power to the masses, videogames have been experiencing a massive boost in performance. While the most perceptible change has been the level of graphics being used in games, a more subtle change has been the complexity achieved in their gameplay. Open ended games like *Assassin's Creed II* [7] allow the player to literally go "anywhere". Similarly, players have vast action space in games like *The Elder Scrolls IV: Oblivion* [8].

However, while games have been providing more control to the player over his actions inside the game, they lack a similar level of control over the game's narrative. Games, as an experiential medium, can convey a narrative in one of the following ways [9]:

- **Received Narrative** – This is the narrative method where the user only acts as the story receiver; he cannot influence the outcome of the story by his actions. Classic point and click adventures like *Grim Fandango* [4] belong to this category.
- **Discovered Narrative** – These are games where players have more freedom in terms of the order that narrative is discovered. This category has games that have branching narratives and player's actions have larger effect on the narration, but the overall story still sticks to the same general arc such as in *Heroes of Might and Magic V* [1].
- **Created Narrative** – These are mostly sandbox games or strategy games where the players have a very large action set that can combine in unimagined ways to form a story. Games like *The Sims* [6] are not conveying any kind of explicit narrative, however the player interprets their actions as a sequence which builds a narrative.

The goal for this project is to develop a game in an AAA game engine[2] that illustrates characteristics of discovered narrative games as well as created narrative games. We propose that this can be achieved by combining the best of both worlds - the simulation nature of created narrative games and level design wizardry present in discovered narrative games. Through the development of such a game, we can analyse the effectiveness of these factors in generating emergent narrative.

## 2. SIMULATION

Unlike contemporary narrative media (like books, movies etc.), videogames constantly generate events via some kind of simulation. These can be the ones that were specifically placed by the game designer to happen at certain occasions, or as a result of gameplay. The mixture of such emergent and authored events can result in players feeling a narrative disjoint.

However, there might be another narrative model that is more attuned to the simulated nature of games. Lets take the example of *The Sims* [6] where players are tasked with carrying out a vast range of activities for their avatar (called Sims). The system is simulated via a plethora of statistical parameters embedded into the characters, objects and environments. These individual simulations are logically

[1]Carioca installer file - `http://bit.ly/pWghdh`

[2]Unreal Development Kit (UDK) - `http://udk.com/`


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connected to certain events. For example, an extrovert Sims will feel sad after long periods of loneliness (i.e. in game rule terms - *'if hasn't talked to another Sim for last X minutes, increase sadness by Y value')*. The player's experience over a period of time generates a sequence of events via the core simulation of the gameworld. In the absence of an authored narrative, players have a much easier time in accepting these events as the narrative. Such a narrative model, where events encountered during a play session can be retold as a story is termed as an Emergent Narrative.

# 3. ENVIRONMENT

Spaces don't only provide a play area for the player (*Assassin's Creed II* [7]), but also provides them with gameplay focus (*SimCity 2000* [5]). Kücklich validates the importance of spaces by stating that "learning how to play a computer game always involves learning how to negotiate game space" [3]. Another element that spaces can heavily contribute to is narrative. Jenkins says that "game designers don't simply tell stories; they design and sculpt spaces" [2], pointing out the connection between spaces and story in videogames. Environment can be used as a staging background where stories can unfold by the use of narrative cues spread out in the game world. The player can navigate in the world, meet these cues and let an over-arching narrative emerge.

Level design in the *Carioca* game tries to utilize a similar model in order to let narrative emerge through the environment. The game design allows weaving of story clusters, which are used as narrative vessels to evoke associations and progress the story. The player discovers these clusters by navigating in the game world, through dialogue with other characters and through his actions and choices. It is up to the player to catch up with the story clues of the game and formulate a story in his mind. Visual cues that the player encounters while he navigates in the world are part of the setting of the world while the rest are part of the visual feedback which informs the player about the state of the world.

Visual feedback provided by the dynamic environment of *Carioca* game has dual functionality. The primary function is to notify players about the state of the world and summarizing the kind of events that took place. According of what type of events happened in the level the environment changes and portrays visually the state of the world. This visual feedback is constructed according to film theory. Secondly, parts of the visual feedback are used are narrative cues in order to evoke narrative associations and help players to formulate a small story in their mind. These, in conjunction with other sub-plots experienced by the player, will shape an overall narrative.

# 4. DESIGN

In *Carioca* game, players are placed on a hilly favela in Rio De Janeiro. The favela is structured so that the downhill section is better looking and represents citizens involved in legitimate work (as seen in Figure 1(a)) while the uphill section is more notorious, dangerous and grungy looking (shown in Figure 1(b)).

NPCs as well as players are able to perform certain set of basic actions that can be associated to life in a favela - eat, sleep or recreate. These actions can be performed only in specific spaces like food places (eat), bars (recreation), legal working spaces (legal work), houses (sleep) and garbage heaps (scavenging).

All characters in the game (including the player) are controlled by statistical values that define their needs. For example, a character's hunger value increases over time making it hungry enough to warrant eating twice a day. In order to satisfy these needs, characters can simply step into a certain kind of space. A hungry bot would eat food by stepping into a food area. According to the type of NPC (civilian, druggie or gangster), they can beat, mug, kill, buy/sell drugs, have legitimate jobs or scavenge among garbage. The action to be performed by NPC is decided by prioritizing its various needs and picking the most important action at that moment.

These actions can be categorized into legal actions (i.e. working in legal places), violent actions (i.e. beatings, killings) or drug related actions (i.e. drug trafficking). The player himself has the possibility to perform any of these actions. These categories are used in order to formulate a visual feedback schema for the game environment. If violent events or drug related acts take place in the game then the environment changes and portrays which category's actions are performed. If the game world is prosperous (earnings from legal spaces) and the violence/drug-dealing events are at low levels then the environment remains intact and nice looking.

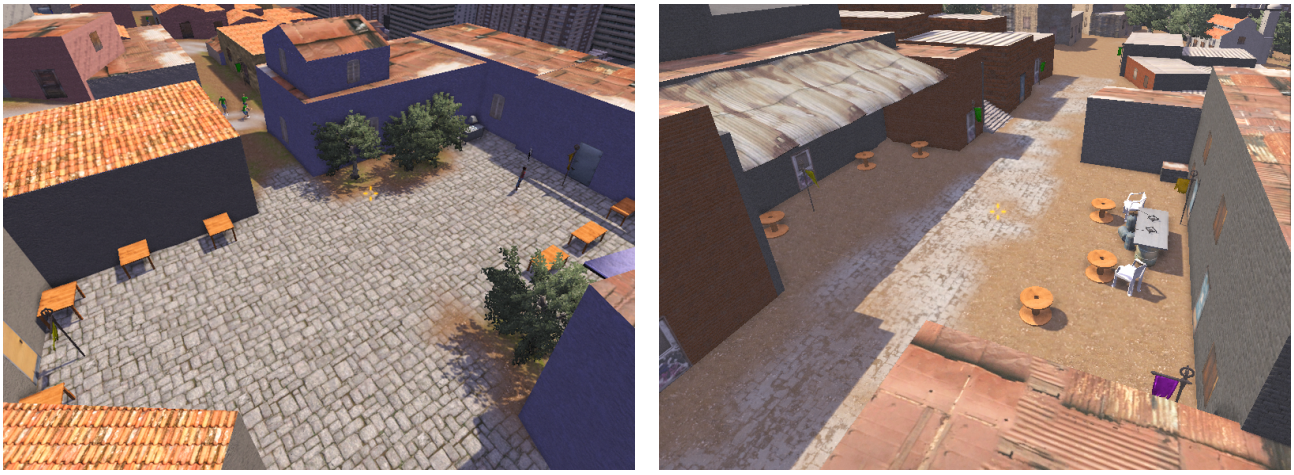
The visual feedback is provided by the use of film theory. Certain film techniques have been studied and applied in the game much in the same way they are used in films. The objective is to make feedback easily noticeable and understandable to what may well be an untrained eye of videogame player. More specifically, the use of lighting and setting (only objects and colors) has been used in this goal. Objects (props) fulfil the second function of the visual feedback which has been mentioned earlier, i.e. they help the player in formulating a story.

For instance, if any of the game's district zones have too much violent acts taking place in them, then it would look something like in Figure 2(b). Similarly, the game notifies players of drug state (Figure 2(c)) as well as a combination of violence and drug (Figure 2(d)). However, if the player can solve the gameworld's problems, then the district returns to it original, clean state as shown in Figure 2(a).

An important element of the game is that NPCs rate their relationships with every other character in the game - including the player. Having good relationships with NPCs can unlock dialogue options and features for the player, while having a bad relationship can result in them not talking to the player at all.

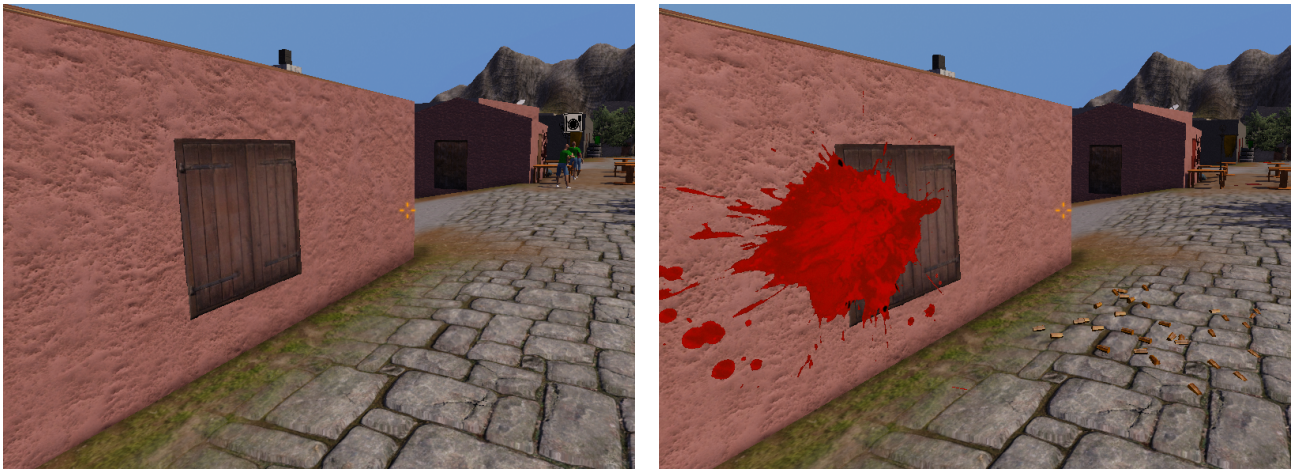
Players interact with NPCs through a dialogue system, that has consequences on the player's and NPC's stats. For example, the player can talk to a gangster and choose to threaten him, steal money and beat him (repeatedly till death) - all through the dialogue system. This dialogue screen is depicted in Figure 3 where its dialogue data is retrieved from a SQLite database depending on the bot type and player stats.

The simulation is setup in such a way that the game world will start spiralling into a violent state. It is left up to the player to choose whether he wants to accelerate that process by taking part in the violence and make money, or try to help the situation and save civilians by donating money to the church. The game however, does not compel the player



(a) *Downhill Area* (b) *Uphill Area*

**Figure 1: Comparison of *Downhill* and *Uphill* areas in Carioca game**



(a) *"Normal"* Theme (b) *"Violent"* Theme

(c) *"Drug"* Theme (d) *"Violent + Drug"* Theme

**Figure 2: Carioca gameworld in different states**


**Figure 3: Player in Dialogue mode**

to do either; he can decide to simply stand around and look at the favela go up in flames (metaphorically speaking).

## 5. ANALYSIS

Playtests were conducted in order to evaluate if the game achieved its goals. This process involved looking at the effectiveness of simulation in facilitating narrative generation as well as analysing the overall environment and its function as a form of visual feedback. The overall environment created an appealing setting where interesting narrative events were enacted.

An interesting observation was made regarding the placement of a nice looking mansion (in complete contrast to rest of the favela) at the top of the hill when it triggered one playtester to instantly try and approach it thinking that the mansion could belong to a local kingpin and he could usurp him. In the gameplay and dialogue system there is no mention about a local kingpin or the mansion. Of course the mansion was designed with that intention but there is no such mention in the whole game. This illustrated the effectiveness of environment as a tool where players could play out the role they wanted to play.

**Figure 4: An unreachable mansion-like building at the top of the hill**

The game's simulation also aided players in dynamically choosing their own aim and building their own interpretation of the story. While certain playtesters felt like *"Robinhood of the favela"*, others wanted to live by doing legitimate work and try to avoid troublemaking. The gameworld remained in a coherent state for either case because of being governed by the simulation rules. However, the game clearly communicated these different states to the player - in the former scenario, gangsters showed a decrease in their relationship and a game environment showed signs of violence (blood props), while in the later case, relationships did not change and the world remained relatively clean.

While evaluating the visual feedback provided by the environment, it should be separated into two parts - one consisting of lighting and color, and the other one for the props. Both lighting and color changes helped to set the atmosphere according the events that took place. Lighting changes were recognized by almost half of the playtesters while the color changes had more subconscious impact. The props performed very well at their primary function, to provide visual feedback about the state of the world since most of the players noticed them and understood their purpose. Props had quite a success for their second function too since half of the playtesters stated that the props helped them to construct a story while they were playing.

## 6. CONCLUSION

Overall it would be fair to say that the game succeeded in achieving its narrative goals. Not only that, but it also manage to be fun and entertaining for most playtesters as many of them continued playing it even after the playtest time had ended. However, further work on understanding the direct implications of the simulation and how to adjust its parameters can enable the designers to create various dramatic situations for the players on the fly. Moreover, the inclusion of a tool that conveys player's story to them during gameplay would also encourage them to think of their actions as a part of a narrative.

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