Transcoding Action: A perspective on the articulation between the player's and system's actions in video games

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Abstract

When playing a video game, the player and the game system act and sense each other and the actions they can perform are constrained by their sensors and actuators. Along their short history video games have proposed multiple interfaces for interaction, from the keyboard to the joystick, all the way to contemporary touch and natural user interfaces.

This paper emerges from the need to understand the nature of the articulation between the actions of the player and those of the entities whose behavior may be directly influenced, including the player's avatar. This paper is therefore focused on the transcoding of the player's actions into the system, and vice-versa, as a means of communication through acts of gameplay.

It proposes four modes of transcoding their actions that go from 1) moments in which there is only an arbitrary relation between them; to 2) periods where a partial correlation is established; to 3) events where there is a direct correspondence between them; and to 4) moments in which there is direct contact between the player and the actors of the game.

This study aims at an understanding of the relationship between the player and the game system from an operative point of view in which action is at the center of this problematic, raising the awareness on how the player's body is as much embed in the video game's interactivities as the game system's hardware. [1]

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Action; Actors; Hardware; Player; System; Transcoding.

ACM Classification Keywords
Design; Theory.

1. Introduction: Player's and actor's performance

When playing a video game, the player and the game system's actions are constrained by the supported hardware and the implemented interfaces. Push buttons, knobs, analog controllers, digital cameras, accelerometers, infra-red emitters and sensors, global positioning systems, digital compasses, touch sensitive surfaces, etc. are just some examples of hardware components that have been explored and combined in various forms across the short history of video games, developing new interaction devices.

By combining this and other components, several alternative devices have emerged, promoting different modes of interaction between the player and the system. Some of them became somehow obsolete, or out of fashion, such as the laser gun, and others prevailed despite their age and even became ubiquitous, such as the keyboard, the mouse and the trackpad.

In order to operate those devices the player has to perform very specific actuations. Depending on the characteristics of each controller and of the game, she has to execute determinate combinations of gestures, involving different amplitude, speeds, rhythm, etc.. Even sound or speech may be used. In other words, while operating an input device the player's actions that are manifested through her body result in some sort of performance that is interpreted by the game system.

This paper is focused on the articulation between the performance of the player and that of the entities she interacts with, controls or influences in the game, that we will be referencing from now on as "actors". We propose four modes that explore different perspectives on this relationship regarding the performances of both intervenients.

2. Transcoding action: modes of articulation

Transcoding may be defined as the conversion from one form of encoded representation, or information, to another. We use the term to point out the fact that the information that circulates between the player and the game system is the result of the actuations of each, and that these actuations are sensed and interpreted by each in a feedback loop. In other words, some of the player's actions are sensed and then interpreted by the machine that performs its own actions, which are then fed back to the player. Transcoding is thus used as a term to illustrate how the actors' actuations in the game system correlate to those of the player's, and vice-versa.

2.1 Arbitrary Articulation

An *arbitrary* articulation occurs when there is *no direct correlation* between the player's and the actors' actions.

The system doesn't map the player's performance in order to make it correspond to that of the actors, or vice-versa. The link between these may be established by some sort normative rules, conventions that derived from classic game mechanics or simply imposed by the system itself and instructed to the player.

"We've evolved exquisite sensitivity to visceral challenges. A survey of games featuring jumping found that the games with the "best controls" all shared an important characteristic: when you hit the jump button, the character on screen spent almost exactly the same amount of time in the air. Games with "bad controls" violated this unspoken assumption. I'm pretty sure that if we went looking, we'd find that good jumping games have been unscientifically adhering to this unspoken rule for a couple of decades, without ever noticing its existence." [2]

In order to punch or kick in *Street Fighter* (1987) or to jump in *Super Mario Bros.* (1985), the player only needs to press the correspondent push button. But the action of pressing that push button has nothing to do with the action performed by the avatar the player controls, or the actor. They seem to be apparently unrelated, but the system instructs the player, and teaches her their relationship.

"You are a console gamer, for better or for worse, even though you are aware of the generally higher quality PC games. Anyone who claims allegiance to the recognizably inferior is in dire need of a compelling argument. Here is yours: The keyboard has one supreme purpose, and that is to create words. Swapping out keys for aspects of a game control (J for "jump", < for "switch weapon") strikes you as frustrating and unwieldy, and almost every PC game does this or something like it. PC gamers themselves, meanwhile, have always seemed to you an unlikable fusion of tech geek and cult member—a kind of mad Scientologist." [3]

Here, the player(s) usually needs to be taught of how they function, as they usually are not very intuitive. But in some cases this may not purposely happen. In *Mortal Kombat* (1992) the playable characters possess very specific combinations of keys that makes them execute special moves. In *Mortal Kombat*, at the end of the fight, the player has the ability to gruesomely kill the character of the opponent player with a special move called 'fatality'. In order to execute this move the player has to press a somewhat difficult combination of keys/buttons (combos) in a determinate amount of time. These combos are not taught by the system, neither does it make them evident. Actually, it grants the player a very limited amount of time for her to execute them or to explore other combos. Then, this information circulated mostly outside of the game itself—in magazines and through word-of-mouth. The fact that they are not intuitive, and somewhat difficult to perform and to memorize contributed to make them 'hidden', or not easily accessible, and that only made their execution even more desirable.

Many of these combos require a kind of performance from the player that bears no correlation with the one performed by her avatar—her surrogate in the game—but others have a closer relationship, which takes us to the next mode.

2.2 Symbolic Articulation

A *symbolic* articulation occurs when the player's and the actor's actions *partially correlate*. This is a moment where the performance of their actions may somehow be similar, but executed through alternative means,

using analogous dynamics. The player doesn't necessarily exert the same movements or performs the same, but her actuation suggests or somehow bears some resemblance to the actions that are being executed by the actor(s) in the game world.

In order for the player to successfully perform the *hadouken* (a kind of surge of energy that is invoked and directed to the opponent) using *Ryu* or *Ken* (characters in the game) in *Street Fighter* (1987), she has to perform a strict combination of keys following a specific order rigorously timed: she has to move the joystick or press the D-pad a quarter circle starting from 'down' and then pressing the 'punch' key; for example, she has to press 'down', then 'down/right' (or 'down/left'), then 'right' (↓, ↘, →) and the 'punch' key in one swift move. Somehow the movement that the player has to execute in the controller or joystick is similar to the movement that is executed by her avatar, that crouches a bit and thrusts forward with its arms, projecting the energy ball. Thus, here we may say that there is a symbolic articulation between both.

"Through the use of simple gestures like quarter turns or moving to the left or the right with the analog stick, the game creates a deeper connection between the character's in-game actions and the real-world actions of the player playing the game. Although the player's motions are still abstractions of the in-game actions they invoke, the deeper connection formed between them is surprisingly powerful." [4]

Another example may be found in the same game when the player moves her avatar. When the player wants it to jump, she presses the 'up' key in the controller, and if she wants it to crouch she presses 'down'. These keys are arranged in the gamepad respecting this spatial logic: the up key is placed at the top and the down key is placed at the bottom. The same logic applies to right and left movements, as the spatial arrangement between keys contributes to this rationale. In order to mention another example lets consider *Pong* (1972). If the player controls the paddles by means of a keyboard using the arrow keys and if the 'up arrow' is mapped for the paddle to move up, and the 'down arrow' key is mapped for it to move down, we may say the articulation between the player and the paddle is symbolic, as an arrow that points up implies moving upwards and vice-versa. The same is true when rotating the knobs to right or to the left in the arcade version.

Another interesting example may be found in *Metroid: Other M* (2010). In this game the player sees the game-world from the side, in a third person perspective, holding the controller sideways or horizontally. But when she aims the controller at the screen, the perspective of the world changes to a first-person view, as now she can closely inspect the game-world. Controlling the camera in this way not only creates a closer correlation between the player and the camera, but also changes some dynamics of play as she is forced to hold the controller in two different manners.

2.3 Mimetic Articulation

We may call *mimetic* to the articulation between the player's and the actor's actions when they are *homologous*, or in order words, when the actor imitates the player's performance, or vice-versa. Here the player's actuations are mapped, embed in the actor and reproduced through it. We may even say that the

output mainly consists in a sort of reproduction of the player's actuation.

Nowadays the player's movement can be traced through computer vision (CV) devices, accelerometers, etc.. Many contemporary video games resort to these and we invoke *The Legend of Zelda: Skyward Sword* (2011) as an example. In this game when player raises her arm holding the Wii Remote (the controller of the gaming console), Link (the player's avatar) immediately raises his sword. When the player swings her arm holding the controller, Link also swings his sword in order to attack enemies. As a result, fighting becomes a rather physical activity in this game as the articulation that is established here is pretty mimetic. Video games such as *Kinect Star Wars* (2012) are also an example.

"[P]erformative games (…) emphasize a physical response that requires the cybernetic integration of the games' challenges into the players' cognitive, kinaesthetic, and perceptual functions." [5]

But, we may still think about simpler approaches. In *Pong* (1972), when the players control their paddles by means of a trackpad, sliding their fingers through it in order for the paddle to move up or down, we may consider that the players' actions are also mapped, reproduced and manifested through those paddles' movement. But, if the players are controlling the paddles by touching their image, we may be talking about another mode of articulation.

2.4 Tangible Articulation

"The input structure is the player's tactile contact with the game; people attach deep significance to touch, so touch must be a rewarding experience for them. Have you ever noticed the tremendous importance programmers attach to the feel of a keyboard? Remember that players will do the same thing with your game." [6]

We may observe a *tangible* articulation when there is *direct contact* between the player and the actors. This is a moment where the player is able to directly touch the representation of the actor and exert direct influence upon it. When a game resorts to a tangible or natural user interface (NUI) this becomes evident.

Finger Tied (2012) uses this articulation to force the player into making (sometimes) harsh physical movements. By means of a touch sensitive interface, the player has to guide certain elements across the screen, through pretty narrow twisted paths, with zero tolerance for getting out of the predetermined trail. Sometimes she has to use both hands simultaneously in order to make reach their goal.

Fingle (2012) possesses a similar approach but it increases the sensation of touch by adding a second player, where both have to imitate the movement suggested by the game's actors. As the hands of both players touch each other and get intertwined, the game may quickly become a rather physical and sensual experience.

In *Fruit Ninja* (2010), the player has a goal of cutting as much fruit as possible while it is being launched into the air, or into the framing of the screen. To do that the player slides her fingers across the screen as if she was actually cutting the fruit, thus establishing direct

contact with the visual representation of the actors (the fruit).

Angry Birds (2009) constitutes another example when the player aims and launches the bird through the slingshot.

3. Conclusions and Future Work

We are aware that from this perspective most interaction experiences consist in a mixed modal fashion, and we cannot classify a video game as consisting exclusively on one of this modes. But by distilling them we become more aware on how to effectively use them, and start questioning how these modes function together. What kind of experience may emerge from playing in a game system that resorts to a mimetic and a tangible articulation, for example? Can they occur at the same time, or for the same intervenients?

We are also currently seeking more modes that express this relationship, and we are at present time interested in studying how indicators of affective engagement, through brain computer interfaces or other devices that aim at monitoring the visceral functions of human body, such as heat-rate, skin galvanic response, temperature may have a place within this perceptive. In this context we raise the following concerns: We have provided several ways in which the player acts upon the system, but what about when the system acts upon the player? Can force feedback from the game system, or even the electro shocks and whippings in the *Painstation* (2001), for example, be considered a tangible articulation between the system and the player?

We are currently seeking subsets within these modes as well. Subsets that will help us to better understand the different nuances within each mode.

And lastly, we are also mapping the relationship between several types of hardware and these modes in order to understand which may or may not promote the use of a given mode, or vice versa.

With further research we are aiming at an understanding of how the deployment of these modes may strengthen or weaken the experience of the game itself—including gameplay, player engagement, and even the narrative—thus revealing their role in creative game design processes.

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