Mischief Humor in Smart and Playable Cities

Anton Nijholt

Abstract In smart cities we can expect to witness human behavior that is not necessarily different from human behavior in present-day cities. There will also be demonstrations, flash mobs, urban games, and even organized events to provoke the smart city establishment. Smart cities have sensors and actuators that maybe can be accessed by makers and civic hackers. Smart cities can also offer their data to civic hackers, who may create useful applications for city dwellers. Smart cities will have bugs that can be exploited for fun or appropriation. Humor is an important aspect of our daily activities and experiences. In this chapter, we explore how humor can become part of smart and playable cities. We do this by investigating the role of humor in game environments. In games, we have accidental humor, for example because of bugs, and we have humor that occurs because a gamer wants it to happen. This latter type of humor can be produced by looking for bugs, by not following the rules of the game, or by intentionally creating situations that lead to humorous events in the game. This may certainly include humor at the expense of others. We investigate how such views of game humor can find analogs in the humor that may appear and be created in smart and playable cities.

Keywords Playable cities · Computational humor · Accidental humor · Hacking · Trolling · Griefing · Bullying · Bugs · Smart cities · Games

1 Introduction

In this chapter, we investigate possible occurrences of humorous events in smart environments such as playable cities. The concept of playable cities was introduced

A. Nijholt (✉)
Imagineering Institute, Medini Iskandar, 79200 Iskandar Puteri, Johor, Malaysia
e-mail: anton@imagineeringinstitute.org; a.nijholt@utwente.nl

A. Nijholt
Faculty EEMCS, Human Media Interaction, University of Twente, PO Box 217
7500 AE Enschede, The Netherlands

A. Nijholt (ed.), *Playable Cities*, Gaming Media and Social Effects,
DOI 10.1007/978-981-10-1962-3_11

in Bristol (UK). Through various projects, citizens have been able to participate in funny events made possible by sensor and actuator technology. In other cities, sensors and actuators have been embedded in street furniture such as traffic lights, mailboxes, lamp posts, escalators, shop windows, and billboards (prankvertising). Humorous events can be staged; they can occur spontaneously; they can occur accidentally; and they can occur through nontraditional explorations of the environment, such as by looking for bugs or unusual situations that have not been foreseen by the designer and that invite or provoke humor. However, smart worlds are digitally enhanced physical worlds, worlds that are designed using sensors and actuators that can be controlled and adapted by designers, owners, or inhabitants of these environments. Can this be done in a way that encourages the emergence of humorous situations?

In artificial worlds, we can design humor. In a 'language world,' we use words, speech, prosody, and timing to tell jokes. In cartoons we integrate drawings and text. In animated movies, we are free to play with the laws of gravity and can recover in no time from the worst of injuries. In comedy and movies, the stage manager or film director can direct the actors and events in such a way that humorous situations can occur. Humor theory offers us the notions of incongruity and incongruity resolution to help us analyze, understand, and generate humorous situations in language, cartoons, animation, comedy, movies, and the physical world. To see how we can facilitate the occurrence of humor in smart environments, it is useful to consider humor techniques as they are used in language, comedy, movies, et cetera to see how these techniques can generate humor in smart environments, where (in addition to humor that occurs spontaneously) we also have the opportunity to 'stage' humorous events by introducing incongruities using sensors and actuators.

It is particularly useful to look at humor in videogame environments. Gamers are confronted with 'canned' humor. This canned humor can be integrated into the game and is triggered by actions performed by a gamer. In a way that is usually very limited, some context and history can be included in a generated humorous utterance or event that fits the narrative. Clearly, in MMORPGs teams can also discuss and introduce strategies that aim at cultivating team behavior and exploiting the game environment in such a way that a sequence of events will lead to a hilarious situation (usually including the humiliation of their opponents). In games there is not always control over the consequences of gamers' actions. Not every action of a gamer can be anticipated. This can lead to accidental humor, for example, when a collision detection algorithm is not always perfect. Creative play with a game engine or misuse of a game engine is also possible. This may include hacking the game engine to create mischief humor. Some game hackers and digital game mischief makers may also disregard the aims of the game and the game's narrative.

Herein, we argue that game environments and digitally enhanced real worlds, such as digital and playable cities will converge. In Sect. 2 we briefly review the theories and techniques of humor. Usually, theories and techniques focus on language humor (jokes, wordplay, and conversational humor). Moreover, in comedy, in (cartoon) movies and also in games humorous situations are created using exaggerations and behavior that are not always possible in the real world. Section 3 is

about game environments. The design of humor in a game needs to be carefully executed. As in the real world, the introduction of humor needs to satisfy some appropriateness criteria. There can be humor in interaction with game characters, and, just as in the real world, there can be accidental humor. Accidental humor can occur because of shortcomings in the game technology, leading to unexpected and not always gamer controlled situations. Humor can also emerge when teams of players try to trick each other. In Sect. 4 we discuss some activities in game communities that can be considered pranking, mischief or malicious behavior, including cheating and hacking of the game mechanics. Such behavior can be fun and is often used to make fun of other—not so clever—gamers. In Sect. 5 we make the transition from game worlds to digitally enhanced real worlds, such as digital and playable cities. We provide some examples of humor using real-world sensors and actuators, and we offer observations on how the various types of humor that we distinguish in digital game environments can appear and can be controlled in smart and playable digital cities. Some conclusions follow in Sect. 6.

2 On Humor: An Introduction

In this section we briefly review the various theories of humor. In the sections that follow we mainly look at the so-called incongruity or incongruity resolution theory. This theory emphasizes the cognitive shift we must make when our first interpretation of a situation has to be replaced by a second, and this second interpretation makes clear what we wrongly understood in our first interpretation of the situation. When these interpretations are truly in contrast with each other, humor results. From the point of view of generating humor in game or real-world environments, this incongruity humor viewpoint demands that we design either surprising events or situations where surprising events can happen. Sensors in smart environments allow us to detect, recognize, and interpret human behavior. Actuators and computer intelligence allow us to provide humorous feedback, including making changes to the environment that lead to (potentially) humorous situations. Sensors and actuators allow us—and the environment—to create ambiguous situations that allow multiple interpretations and to create unexpected and surprising events.

Theories of humor focus on verbal humor. We (very) briefly review these theories. In humor research a distinction is often made between the cognitive aspects of humor, the function of humor and the effect of humor. The cognitive aspects address unexpectedness, surprise, incongruity, and resolving or understanding incongruity. This view of humor is known as the *incongruity* or *incongruity-resolution theory*, and it usually requires a cognitive shift. We interpret a particular situation and do not expect anything unusual, but we are then confronted with new information that requires us to reinterpret the situation. When these interpretations are sufficiently opposed, humor results. It has been argued that humor always requires some incongruity. In language this incongruity usually appears sequentially, requiring a shift in perspective in time. In visual or audiovisual humor (or humor that involves other modalities)

incongruities can appear at the same time; we have a simultaneous interplay of perspectives. However, most research on incongruity theory addresses language humor and the simultaneous display of incongruities is not part of these studies. However, it should be part of the discussion when we discuss nonverbal humor in physical or virtual environments. In 1779, James Beatty was already talking about "two or more inconsistent, unsuitable, or incongruous parts or circumstances, considered as united in one complex object or assemblage, as acquiring a sort of mutual relation from the peculiar manner in which the mind takes notice of them" Kant, Schopenhauer and Kierkegaard are among the other philosophers who paid attention to incongruous humor.

As mentioned above, most existing theories of humor apply to modeling verbal humor. These theories can be found in humor textbooks (Raskin 2008). The second theory we want to mention is the *theory of superiority or disparagement*, which is linked to names such as Plato, Aristotle and Hobbes. It assumes that we laugh at the misfortune or inferior position of others. Slipping on a banana peel is an example. However, mostly we experience it in verbal jokes. For example, "*How do you make a blonde laugh on Saturday? Tell her a joke on Wednesday*."

A third theory of humor is associated with Sigmund Freud and is called the *relief theory*. Freud describes humor as a necessary means of releasing pent up frustration originating in unpleasant experiences or social and sexual taboos (Freud 1905). Freud cites the following joke as an example. *A royal personage was making a tour through his provinces and noticed a man in the crowd who bore a striking resemblance to his own exalted person. He beckoned to him and asked*: "*Was your mother at one time in service in the Palace?*" "*No, your Highness*" *was the reply*, "*but my father was*." AI expert and philosopher Marvin Minsky built on this by mentioning cognitive taboos that are breached when jokes defy logic (Minsky 1981). For example, "*Ethel orders a pizza. The waitress asks her whether she would like it cut into four or eight slices. Ethel answers* '*Just four, I'm on a diet*.'"

These theories emphasize different functions of humor. Superiority theory addresses the social aspects of humor. We observe or are told about a person or a situation where we would want to behave differently or be treated differently from the protagonist. We do not want to be the person who is slipping on a banana peel, and we do not think such a thing will happen to us. Often a joke makes us laugh because of someone's stupid behavior or because of behavior that is not in agreement with the professional or moral behavior we generally expect. The relief theory point of view addresses emotions, particularly the relaxation of tension. This may concern the teller of a joke or the creator of a humorous situation, as well as the listener and observer who experience the humor that is created. Incongruity theory tries to identify the cognitive mechanisms of humor. How do we experience unexpected events? How do we address new perspectives and potentially ambiguous interpretations of events, whether in language or in the real world? Incongruity theory emphasizes the stimuli that produce humor. When considering how to introduce humor into game or smart environments, including smart and playable cities, we have sensors and actuators that can be employed to design stimuli that may lead to humorous events (Nijholt 2014, 2015a, b) or that can help mischief makers to create humorous events

in smart environments. For that reason, in the remainder of this chapter we will focus on humorous events and behaviors that can be created using (virtual) sensors and (virtual) actuators in virtual, mixed reality and real worlds. Obviously, embedding smart technology in our 'real' world makes our real-world properties of virtual worlds, in which there are many more opportunities to control events and users or inhabitants participating in these events.

The concept of 'Computational Humor' was introduced in 1996 with the organization of a conference on computational humor at the University of Twente (the Netherlands) (Hulstijn and Nijholt 1996). The focus was on verbal humor, and in recent research the focus is still on verbal humor. This is understandable because research in linguistics, and in particular computational linguistics, looks at formal properties of language and dialogue. Among the issues being investigated are nonliteral language use, ambiguities in language use and, to a lesser extent, irony and sarcasm. Recent research on computational humor often involves machine learning algorithms that use 'big linguistic data,' for example, sentences and texts collected from the Worldwide Web (Mihalcea 2007). This research does not address physical humor, humor that involves physical behavior, or events that take place in a physical environment. Currently, it also does not address events that take place in digitally enhanced physical environments. There exist, however, typologies of humor that do include physical humor (Morreal 1983; Berger 1993; Buijzen and Valkenburg 2004). These typologies are useful in characterizing humorous events generated by gamers in game environments, and they can inspire game designers to introduce scripted humor in their games.

3 Humor Tracks in Game Environments

Game designers must make intentional decisions about including or not including humor in their games. Humor can be included in cut scenes and thus not really included in the flow of the game. However, humor can also be included in game play through sounds, music, and language. In addition to a sound track, there can be a humor track included in a videogame. Such a track must know the history of interactions that have occurred during game play; it needs to learn about a gamer's knowledge and preferences; it needs to know about possible humorous interruptions or continuations of a game situation; and it needs to know about possible humorous interactions. Despite all the research into artificial intelligence and affective computing, game environments and their non-playing characters have only very limited 'intelligence' and can only make limited and preprogrammed assessments of situations and decisions about how to continue. Apart from being able, using the elements that are available in a particular game situation, to generate humor or create a potentially humorous situation, there is of course also a decision to be made about whether it is appropriate to do so.

The design of humor in games has been discussed by psychology and human–computer interaction researchers (Dormann and Biddle 2009) as well as by game

designers. We discuss mischief humor in games in the next section. Obviously, mischief humor is not about humor that has been designed to be embedded in a game or an entertainment application. Rather, it explores how to surprise, tease or even annoy people by performing unexpected and surprising activities.

There is growing interest in the possible role of humor in games. In Dormann (2014) a distinction is made between game-to-player humor, player-to-player humor, and player-to-game humor. In the game-to-player trajectory the emphasis is on scripted humor. Although the humor is scripted, some context awareness (including current game play history) can nevertheless help create variations in the humor that is generated. The player-to-player humor trajectory is about spontaneous humor in online multiplayer games, in which players use a meta-channel to discuss game events or where gamers share the same physical location. In the player-to-game trajectory, humor is generated by the gamers in the game world. This can happen accidentally or deliberately. In Dormann (2014) it is called emergent humor.

In the next section on mischief humor, we discuss the various forms of emergent humor that can be intentionally invoked by a gamer or a team of gamers. In this chapter, we do not discuss scripted humor or player-to-player humor. This does not mean that we think these forms of game humor cannot have their analogs in smart or playable cities. Accidental humor is usually regarded as humorous events that occur because of bugs in the game software. Bugs are almost unavoidable in complex software, particularly in software that is accessible to gamers and tinkerers. We cannot expect that all actions by gamers, who may not necessarily follow the rules of the game, may disregard the narrative, and may not be interested in the rewards that can be obtained, have been anticipated by the game and game mechanics designers. Mischief makers are exploiting vulnerabilities in game design. They 'screw around' and try to generate funny events, often recording them to show to other gamers.

4 Mischief Humor and Games

As mentioned in the previous section, humorous events and interactions can be designed and integrated into a game in such a way that we can talk about a humorous videogame. Unfortunately, spontaneous humorous interaction between a gamer and an NPC that requires real-time interpretation of a specific situation, including understanding the history and the context of the interaction, cannot be expected given the current state of artificial intelligence research. For this reason, it is easier to introduce humor by giving characters an unusual appearance or unusual and difficult-to-control physical behavior. We can give a character the ability to 'see' what is happening behind its back, or we can have characters that become vulnerable when they make eye contact, or we can have characters that have other nonhuman characteristics that can lead to humorous behavior. In some games, we can introduce characters that display slapstick behavior. Accidental humor appears when a gamer or its role-playing character unknowingly enters a game situation that has not been anticipated

by the game designer. This is not unusual. We cannot expect a game designer to anticipate all possible actions of a gamer. This is not different from real life. For example, bridges are designed to allow traffic to travel from one side of the river to the other. Nevertheless, bridges can be destroyed, despite whatever safety coefficients have been introduced by the designer. There is a trade-off between safety and economy, where 'economy' also includes a company's attitude toward making its games hack-free.

Mischievous behavior can be a social skill in a computer game. In Sim's 4, a life simulation game, it is possible to reach various levels of Mischief Skill. Mischief behavior can lead to hilarious animations. Pranks vary from kicking over trash cans, to clogging a drain in a sink or tub, to social interactions such as asking the due date of someone who is not pregnant, or convincing someone to streak or slap a conversational partner (avatar) in the face. However, this mischievous behavior is scripted and fully embedded in the game. We are more interested in gamers' activities that allow them to prank other gamers, play tricks on other gamers, cheat during game play, or be a spoilsport. Moreover, we want to investigate how gamers amuse themselves by modifying a game, exploring bugs, hacking games, and teaming up to distort game play and the enjoyment of others. All such activities are reported in forums where gamers discuss games, strategies, cheats, hacks, and game modifications, and where their cleverness (and sense of humor) is demonstrated in 'walkthroughs' (video clips that show strange character behavior resulting from bugs or loop holes in the game mechanics) or by instructions on how to cheat, hack or modify the software.

The underlying assumption of this investigation is that we can expect similar behavior from the inhabitants of the smart and playable cities of the future.

4.1 Humor While Exploring Game Environments

In games things can go wrong. That is, in a game we can encounter a situation where the game environment is unable to react in a way that suits the aims of the game and the gamer. We have entered a situation that was not foreseen by the designer of the game. It is also possible, and gamers have adapted to this way of behavior, to search for situations where games go wrong. Can we, forgetting about the aims of the game, find game situations that lead to humorous events? Clearly, this is not about accidental humor but rather about exploring the game environment in such a way that unexpected situations will happen and preferably in such a way that we can laugh or smile about it. During this exploration, we can encounter bugs in the design of the game, we can find weaknesses, and we can find unforeseen ways of communicating with other gamers. Games have glitches. Discovering a glitch that leaves Lara Croft topless is an achievement that has to be shared with other gamers and will be rewarded with many smiles. Incongruities represented by sight gags can occur. Gamers have introduced a new genre of cinema, the genre of videogame movies called 'Machinima.' With in-game editor tools, a gamer's actions can be recorded

and edited so that exploring a game environment in search of humorous situations can become part of a narrative that underlies a video that can be presented to others. This 'Machinema' genre has been discussed in Švelch (2014). Exploring a virtual environment for possibilities of humor can be called 'mischief humor.' As mentioned by Švelch (2014), this behavior can be compared with the mischief humor introduced in what was likely the first comedy movie, L'Arroseur Arrosé of 1895. In this very short movie we see a boy stepping on a garden hose and cutting of the water flow. When the gardener inspects the nozzle the boy releases the hose and the gardener gets sprayed. Rather than exploring the possibilities of a garden hose in video games, gamers can explore digital technology and have fun when they find a way to fool the game environment. Usually, this is done by disregarding the narrative and the aims of the game. In his study of Machinema humor, Švelch (2014) was able to distinguish incongruity, coincidence, slapstick, and nonsense humor as the main categories of mischief humor. "Humorous walkthroughs" is a genre in which a gamer shows how a game environment can be explored in a humorous way and where his or her comments on the game adds to the humorous effect.

4.2 Humor at the Expense of Other Gamers

Exploring a game environment to create humorous events and to collect these events in a video presentation does not necessarily require cooperation or interaction with like-minded gamers. In multi-player games there is the opportunity to create humor at the expense of other gamers. Players can team up to create an unexpected and humorous situation in which they can defeat their opponents. Communities of players will develop their own particular senses of humor and make other teams the victims of their humor. Obviously, as in the real world, gamers can find fun in pranking and bullying. Here, they are helped by digital technology and by the anonymity the Internet offers. Some games, such as the aforementioned Sims 4, offer the possibility of offending or even slapping another player.

In the Internet world and in multiplayer videogames in particular, to play a hoax on someone is also called trolling. This can be done in a friendly way, not intending any harm and making the unsuspecting victim laugh when he discovers he has been deceived. One well-known troll tactic is the 'rick roll' meme, wherein someone is led to believe that a certain action, for example, clicking a particular hyperlink, will be relevant to his aims but instead the victim is unintentionally directed to a music video for the 1987 song "Never Gonna Give You Up" by Rick Astley. When one is a member of a game community where such trolling is not only accepted but also part of communication, trolling becomes part of the game and can develop into an art. With clever trolls, initial confusion or irritation later becomes appreciation and laughter. In Fig. 1 (left) we see a troll's face on a vertically held smartphone. Not being satisfied with its orientation, we turn the device and are being trolled because the orientation changes, but not in the way we expect.

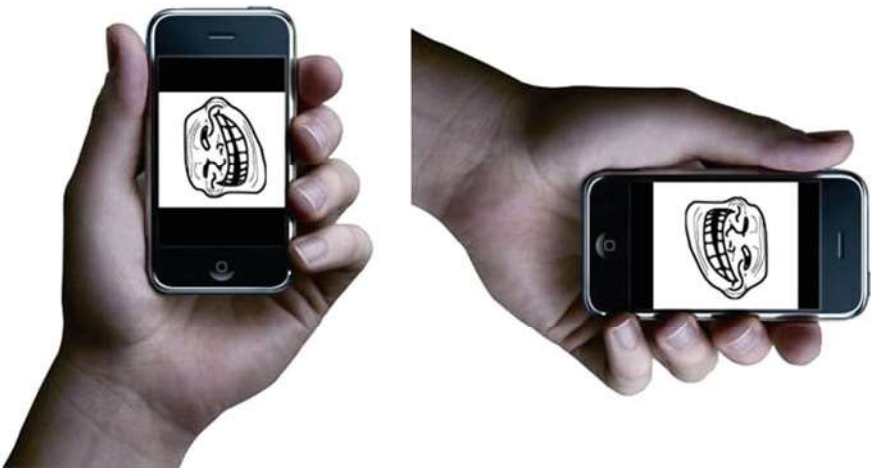

Fig. 1 Being trolled by a troll face on a smartphone

There is no clear-cut definition of trolling. Trolling can be fun and it may lead to hilarious events. In its innocent form, it should probably be called pranking. However, it can become annoying or turn into bullying and can disrupt a person's game or other Internet activity; it can even turn into digital vandalism. Trolling can include racism or sexism, and it can be done to provoke, to enact revenge or to ruin someone's game. Obviously, all this can be done in a humorous way and, if not for the victim, it can certainly be amusing for the troll or pranker and for the witnesses of the prank or the trolling.

4.3 Taking Pleasure from Grief Playing

In one game community, trolling can be considered an art, while in another community it is considered harassment, flaming or cyberbullying. Clearly, without the anonymity the Internet provides, trolls would be less popular. Various scientific papers have focused on the negative aspects of trolling (Thacker and Griffiths 2012; Buckels et al. 2014). The latter paper concludes that "… cyber-trolling appears to be an Internet manifestation of everyday sadism." This is not a view that is supported by gamers in general; however, griefing or grief play may be a different matter.

Massively Multiplayer Online Games (MMOGs) can allow players to cooperate in guilds or clans that act as communities with their own 'religions' (moral codes) and rules of conduct. Guild members are friendly to each other, but not necessarily friendly to members of other guilds. Clearly, tricking opponents is allowed, which supports spoilsports, or persons who spoil the pleasure of others. This can take rather

extreme forms. Griefing is the act of purposely annoying other players, including team members. Griefers want to cause distress to other players, and they take pleasure in despicable and antisocial behavior and in sabotaging game play (Dibbell 2008; Grönroos 2013). Griefing is well known in multiplayer games such as Counter-Strike, Team Fortress, Minecraft, and EVE Online. Well-known examples of griefing are the spamming of game chart areas, blocking players, killing your own team members, infecting players with diseases and causing a plague, destroying work created by other players (Minecraft), and 'camping', or repeatedly killing the same player by waiting for him to resurrect. In Second Life, examples of griefing include invading houses and disturbing press conferences, (virtual) funerals or other activities. Griefing may inflict emotional damage on players, and inflicting such damage is one of the aims of grievers and increases their fun. Newbies and lower level characters can be easy prey for griefers, who can also team up and form 'gangs.' Ethical questions related to griefing are discussed in Warner and Raiter (2005).

4.4 Humor Created by Cheating, Hacking, and Modifying

Game cheating and game hacking communities are well known and respected communities in the world of video gamers. Cheat codes and game enhancement codes are usually shared among gamers (Consalvo 2007). Hacking a game can mean finding ways to modify game files during gameplay to manipulate game event decisions and be more successful in the game. However, hacking is also done for the fun of finding weaknesses in a design. Sometimes hackers collaborate in hacking teams and define weekly challenges to concentrate their efforts. Using hacks in online multiplayer games to obtain advantages over other players is usually disapproved of, but cheaters may use hacks or bots to win a game. Making changes to a game that affects other and future users is usually also disapproved of by gamers. Cheating and hacking do happen and are, obviously, considered problems by game designers and game companies. Categories of cheats and how to prevent them are discussed in Pritchard (2000). A multiplayer game can be ruined when there are many cheaters and their cheats are propagated.

Another way to adapt and change game environments are mods, or modifications of a video game. These can be add-ons to a game, they can replace content, or they can implement a total conversion in which only the original game engine or a modified game engine survives. Modding (Unger 2012) is part of game culture. Mods can be created by gamers and distributed using the Internet. Game companies sometimes provide mod-making tools to assist mod makers. A special category of mods are art mods; they modify games into humorous or performance art versions. These mods are also introduced with the aim of creating Machinema videos.

4.5 *Humor Emerging from Controlled and Autonomous Agent Behavior*

In game research, there are attempts to imbue virtual nonplaying characters with intelligence, emotions, and autonomy. That is, these attempts aim to make it possible for such characters to assess situations and act in human-like ways. Research on intelligent agents, emotional agents, and embodied conversational agents is becoming part of game research. We also meet these agents in smart urban environments. They assist us with our mobile and other wearable devices and they appear on public displays, in tangibles, as holograms or as physical social robots. Humorous interactions and humorous cooperation is possible with devices that have human-like characteristics (appearance, intelligence, emotions, sense of humor). As mentioned above, human behavior can be predicted, anticipated and, for example, using persuasion, controlled. In (serious) game and virtual reality research, we see attempts to give a 'director' role to a mediator who is able to assign roles to participants, who can guide their actions and who can introduce new events into the environment and make changes in the narrative. However, such a role can also be given to a user or gamer interested in creating his or her own game narrative and who, for that reason, needs to make changes to the environment and the behavior of its inhabitants, whether they are human or artificial.

We briefly survey some research in game environments that addresses modeling, action planning and reasoning for agents in smart environments, where planning and reasoning aim to create humorous situations. And, moreover, as discussed in this literature, it should be possible to give a human player or someone monitoring the game some responsibility for guiding others into preferred behavior and involvement in activities. As mentioned in Cavazza et al. (2003), when we want interesting behavior, we need planning mechanisms and models that do not necessarily aim at rational and optimal problem-solving behavior. A smart environment can try to understand and affect human behavior using such models, for example, with the aim of creating humorous situations. Similarly, a smart environment can use such models to affect or direct the behavior of 'autonomous' agents, tangibles, and other devices that inhabit the smart environment, whether they are human or artificial. And of course, tools based on such models and mechanisms can be used by smart city dwellers, including pranksters and mischief makers, to control and personalize their part of the smart world. This may include cheating and hacking.

Cavazza et al. (2003) introduced planning mechanisms that allow agents to continue following their aims even if certain preconditions are not fulfilled. Their research attempted to visualize the failure of the continuation of regular behavior or of adherence to the narrative in the hope that a corresponding animation of the situation becomes comical. Hence, failing plans need to be considered as dramatic mechanisms. As human residents of the smart city, we can participate, initiate and 'just' be observers of humor created by activities that fail. In this paper, heuristic search planning (HSP) techniques are used to 'control' the characters in a 'Pink Panther' script. Script writing, narrative control and role authoring are issues that need to be

considered when embedding action failure and its dramatic visualization in a game narrative or in a smart environment narrative in which we want to include humor. As mentioned earlier, a comic act of (action) failing not only addresses superiority theory, it usually also includes aspects of incongruity theory.

Carvalho et al. (2012) also look at modeling the behavior of agents that act in a storytelling context, but in addition to action failures, they look at incongruities that emerge with the expected (predetermined) behavior and personality of an agent. In their architecture, personality aspects follow the well-known OCC model for emotions. This allows them to introduce characters into a narrative who behave differently from regular characters. Again, as in the previously mentioned paper, this research provides us with handles to use in creating humorous situations in smart environments. We can model the behavior of artificial agents (representing smart environments, intelligent displays, tangibles, social robots, virtual agents, et cetera) to generate humor or potentially humorous situations. Film culture and digital media center But with the help of these models, we can also embed real-time human behavior in these models in which the humans are agents in the smart environment and the models help to predict and anticipate human behavior and embed it in the smart environment. In keeping with the aim of this chapter, the models also help to introduce humor or potentially humorous situations in smart environments.

A third example we want to mention here is the research reported in Olsen and Mateas (2009). In this research, the game environment resembles a Wile E Coyote and Road Runner cartoon. Thus, we have characters (the Coyote and the Road Runner) with particular goals and a game engine that is fed by a planning mechanism to make decisions about the characters' actions. Usually, Coyote needs objects to reach his goal (to catch Road Runner). 'Gag plans' can interfere with Coyote's plans. The player or gamer in this game environment can direct the story by the manipulation of objects in this world. For example, he or she can decide to make certain objects with variable attributes available to Coyote. Entering a 'gag' plan with, for example, a rocket that will explode, will result in a failure of the original plan (to catch Road Runner).

These research examples illustrate how future smart environments can model and guide the behavior of artificial agents and their human partners in smart environments. The smart environment can offer opportunities that seem attractive and are expected to suit the goals of a human participant but will nevertheless cause the failure of his or her plans. This may lead to a humorous event. It may also be the case that someone (player, gamer, hacker, mischief maker) has control of the environment and can make changes to it to create humorous events in which human and artificial agents are involved because we can predict or model their behavior.

5 From Game Environments to Smart and Playable Cities

All the world's a stage,
And all the men and women merely players;
As you Like It, William Shakespeare, 1599

In de Lange (2015) examples are presented of serious games that allow city dwellers to participate in urban planning and design. Other urban games that are discussed provide people with an urban experience, making them aware of the environment, stimulating social interaction and inducing urban connectedness. Presently, we also see videogame worlds (e.g., Quake, Pacman, Space Invaders) that are mapped on the real world or on mixed-reality worlds. Urban games are designed in such a way that we have a game narrative in the real world (with its sensors, actuators, smart mobile devices) that usually involves some exploration of an urban environment. In this way, a game or game-like engine becomes embedded in the real world. We can take a more general view. Humans have their routines and preferences. Their behavior can be predicted and anticipated. Smart technology can also be used to persuade humans to act in a particular way and to change their behavior. So, from the point of view of a smart environment, it can 'control' a human inhabitant, just as a game engine controls a gamer by offering him or her certain choices and guiding the gamer along the possible game tracks. This happens in urban games, but it certainly is not yet the case, as we explored in Sect. 4.5, that these games exploit models of human behavior that can help to control, guide or predict actions to create humorous situations. But, as is the case with games, smart cities, or more generally, smart environments, also rely on complex software. This software contains bugs, and it can allow mischief makers to create incongruous situations by doing unusual things. It can simply allow civic hackers using publicly released data to create legal applications, in addition to built-in humor generators, that aim at bringing enjoyment to other users. Clearly, smart cities are vulnerable to criminal attacks too. Cerrudo (2015) provides an overview of the cyber security problems and possible cyber-attacks that threaten smart cities. Of course, this vulnerability can be exploited by hackers who have humorous, rather than criminal or terrorist, intentions.

5.1 The Smart City as a Stage

Smart environments are not only inhabited by humans but also by social robots, digital pets and virtual agents. This allows the environment to create situations in which humorous interactions between these human and artificial agents can emerge. However, when sensors and actuators can be manipulated or controlled by the 'gamers' among the inhabitants of smart environments, then they can also try to introduce humorous events. The smart world is a stage for mischief humor makers.

Mischief humor makers can use their access to smart urban environments in a way that is similar to that surveyed in the previous section. That is, someone can

Fig. 2 Passers-by in Bristol communicating with a mail box

explore a smart urban environment with the aim of seeing where things go wrong and how this may lead to funny situations. However, of course, pranksters will try to make fun of others using digital technology, and we can expect that cyber-bullying and trolling will not only happen in social media and virtual game environments but will also be explored using sensors and actuators in the digitally enhanced world. Cheating, hacking, and modifying are other activities that will be exported from game environments to smart urban environments.

At this moment, we see several cities introducing playful applications of digital (Internet) technology in their streets and public spaces. Citizens have access to this technology and can play with it. Because these applications are experiments and have not yet been fully integrated into a network of things, there are not yet examples of pranking, trolling, cheating or hacking in smart urban environments. Some examples of playful digital technology applied in a city environment should be mentioned. For example, in Bristol (UK) the 'Hello Lamp Post' project was introduced in 2013 under the slogan: "Bristol street objects are waking up and want to talk with you." The project allowed citizens to exchange text messages with lamp posts, mail boxes and other street furniture that had some knowledge of the environment and memories film culture and digital media center consisting of previous exchanges with passers-by (Fig. 2) that could be consulted and used in future communications.

A more recent project (2014), also realized in Bristol, is the 'Shadowing' project. In this project, lamp posts are equipped with sensors that can capture the shadows of a passer-by and can reproduce these moving shadows when someone else passes the same lamp post. Clearly, when people recognize what the lamp post is doing they start to play, introducing strange shadows and playing along with someone else's shadows (see Fig. 3).

A 2015 interactive installation, suggested by the Happy City Lab (Geneva), is an LED-sensored bench that attracts people's attention, encourages movements, attracts other potential sitters and gets them to interact (Fig. 4). More examples of introducing playful and humorous applications of digital technology can be found in Nijholt (2015b).

Fig. 3 Two examples of a lamp post casting shadows from its memory

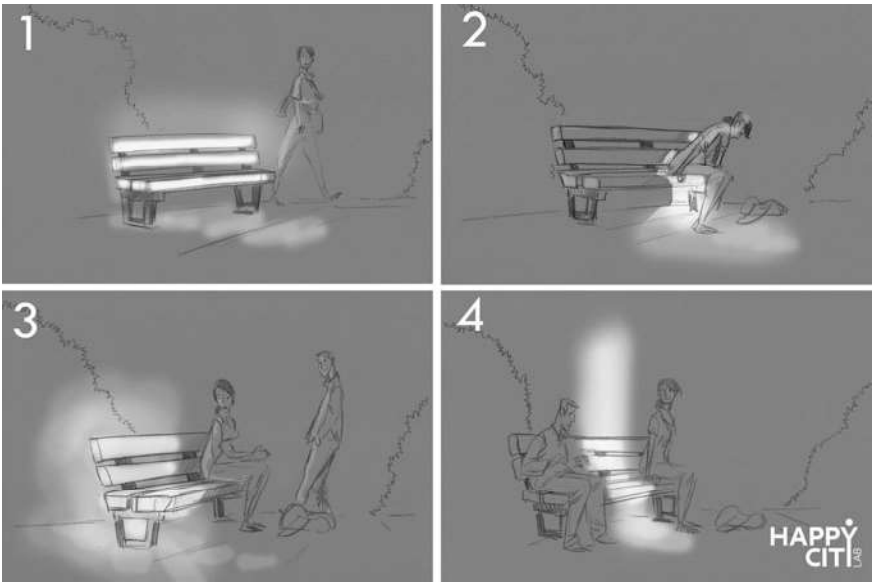

Fig. 4 Sensor-covered bench inviting people to sit and interact

5.2 *Mischief Humor in Smart and Playable Cities*

> We know that smart cities will have bugs.
> Anthony M. Townsend, Smart Cities (Townsend 2013, 298)

Smart and playable cities require complex software. In Cerrudo (2015), we find a list of technologies that are used to make cities smarter. They range from smart traffic control, to smart public transportation, to smart waste management to security issues. Unfortunately, this list focuses on traditional issues and possible threats to conventional smart city issues. We should look beyond this list at smart city dwellers and civic hackers who are interested in playful and humorous applications in smart cities, that is, applications that make smart cities playful and playable and allow or even invite the organization of unusual and creative events.

Whether or not the smart city wants to allow it, there will be opportunities for mischief humor. There will be bugs that can be exploited, trolls can be introduced, and cyber bullying will also be possible. Civic hackers can add humor to applications they develop. In fact, all possibilities for mischief humor that were mentioned in Sect. 4 can be introduced in smart city environments as well. Moreover, end-users can be expected to have the opportunity to modify and customize their environment (Callaghan 2007); therefore, they will also have the opportunity to allow humorous events to occur in their environment.

We cannot expect that all sensors and actuators in a smart city environment will be easily available to mischief humor makers. Those that are available and those that can be hacked will be sufficient to generate humorous events for individuals or for groups of city dwellers. In our future, smart environments we will have connected devices and objects that accept traditional input from human users (keyboard, joystick, Wii remote). However, there will be many other ways to provide input, using touch, gestures and information obtained from devices that collect (neuro-) physiological information from a human's body or brain. Smart textiles, using conductive yarn that is woven into the fabric of clothes, and smart materials (Minuto and Nijholt 2013) can also act as sensors and actuators that offer the opportunity to make changes to the appearances and interactive properties of materials, (mobile) objects, social robots, interactive pets, environments, and even human beings who have become smart from a technological point of view and are addressable as well. Townsend (2013) and Cerrudo (2015) focus on Internet and Worldwide Web analogies for smart cities and do not take into account an Internet of Things world, where it is possible to customize, change and control an environment, including devices that happen to be there and characteristics of smart objects and smart humans, including their interaction behaviors. Software agents with physical or virtual embodiments, moving around as social robots, as augmented realities or as holographic humanoids (imaginary people), inhabit our smart environments and can add to their playability but are also vulnerable to hacking, accidental humor and intended but unwanted mischief humor. The same is true for real humans inhabiting smart environments and having sensors and actuators in their pockets or in their clothes, in their smart

eyewear, watches or jewelry, on their skin (such as in tattoos), or even in their skulls, brains or other parts of their bodies.

6 Conclusions

In this chapter, we presented our views on the facilitation of humor creation in smart environments. In particular, we looked at humor embedded in games and at attempts to create humorous situations in games. We looked at the behavior of pranksters, cheaters, and hackers and also at legal ways to modify a game in such a way that it becomes less goal-oriented and more oriented toward artistic and mischief-making aims. With smart sensors and actuators, we can design digitally enhanced real worlds that resemble videogame worlds. And as a consequence, we can expect gamers' videogame behavior to also appear in these smart worlds; that is, pranking, trolling, cheating, modifying, and hacking can be expected to occur in smart urban environments, especially given a convergence of game and digitally enhanced real-world environments. This convergence may lead to the introduction of 'game engines' that control parts of our (digitally enhanced) real-world activities. Game-like engines enter and control daily life, in our homes, kitchens and bedrooms, when using public transport and when visiting public places. For this reason, in his enthusiastic talk on gamification, Schell (2010) argues that game designers are needed to design digitally enhanced real worlds.

As argued in this chapter, introducing game elements in the real world will also introduce activities of the smart world or smart city 'gamers.' When they team up, as is happening in multi-player games, they can act as 'smart street' or 'smart city' gangs. 'Flash mobs' that are now organized to take part in the physical world will have their equivalents in the smart world, with participants not only employing social media but also employing a city's digital smartness and playability properties. Such activities will bring humor and fun to the smart city, but we can certainly expect mischievous activities that will be annoying and cause stress and harm to individuals and communities. This will happen despite, or maybe because of, 'smart city protocols' and 'urban operating systems' (Townsend 2013, 289–290).

Acknowledgments I am grateful to Ben Barker (Pan Studio, Fig. 2 Hello Lamp Post), Matt Rosier (Chomko and Rosier, Fig. 3 Shadowing) and Dan Archer (Happy City Lab, Fig. 4, Idea: Dan Archer, Drawings: JP Kalonji) for giving me permission to use pictures from their projects.

References

Berger, A.A.: An Anatomy of Humor. Transaction Publishers, New Brunswick NJ (1993)
Buckels, E.E., Trapnell, P.D., Paulhus, D.L.: Trolls just want to have fun. Pers. Individ. Differ. **67**, 97–102 (2014)

Buijzen, M., Valkenburg, P.: Developing a typology of humor in audiovisual media. Media Psychol. **6**(2), 147–167 (2004)

Callaghan, V., Chin, J., Zamudio, V., Clarke, G., Shahi, A., Gardner M.: Domestic pervasive information systems: end-user programming of digital homes Chap. 5. In: Kourouthanassis, P., Giaglis, G. (eds.) Journal of Management Information Systems, Special Edition on Pervasive Information Systems, pp. 129–149 (2007)

Carvalho, A., Brisson, A., Paiva, A.: Laugh to me! Implementing emotional escalation on autonomous agents for creating a comic sketch. In: Proceedings of the 5th International Conference on Interactive Storytelling (ICIDS'12), Lecture Notes in Computer Science, vol. 7648, pp. 162–173. Springer, Heidelberg (2012). doi:10.1007/978-3-642-34851-8_16

Cavazza, M., Charles, F., Mead, S. J.: Intelligent virtual actors that plan … to fail. In: Smart Graphics. Lecture Notes in Computer Science, vol. 2733, pp. 151–161. Springer, Berlin (2003). doi:10.1007/3-540-37620-8_15

Cerrudo, C.: *An emerging US (and World) threat: cities wide open to cyber-attacks*. White Paper. IOActive, Inc (2015). Retrieved 1 June 2015 from http://www.ioactive.com/pdfs/IOActive_HackingCitiesPaper_CesarCerrudo.pdf

Consalvo, M.: Cheating. Gaining Advantage in Videogames. MIT Press, Cambridge, MA (2007)

de Lange, M.: The playful city: using play and games to foster citizen participation. In: Skaržauskienė, A. (ed.) Social Technologies and Collective Intelligence, pp. 426–434. Mykolas Romeris University, Vilnius (2015)

Dibbell, J.: Mutilated furries, flying phalluses: put the blame on griefers, the sociopaths of the virtual world. WIRED Mag. 16(02) (2008). http://archive.wired.com/gaming/virtualworlds/magazine/16-02/mf_goons?currentPage=all. Accessed 1 June 2015

Dormann, C.: Fools, tricksters and jokers: categorization of humor in gameplay. In: Reidsma, D., Choi, I., Bargar, R. (eds.) Intelligent Technologies for Interactive Entertainment (INTETAIN 2014), Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, vol. 136, pp. 81–90. Springer, Heidelberg (2014)

Dormann, C., Biddle, R.: A review of humor for computer games: play, laugh and more. Simul. Gaming **40**(6), 802–824 (2009)

Freud, S.: Jokes and Their Relation to the Unconscious. W. W. Norton, New York (1905). (Republished, 1960)

Grönroos, A.-M.: Humour in video games: play, comedy, and mischief. Master's Thesis, Aalto University, School of Art, Design and Architecture, Department of Media, Media Lab, Helsinki (2013)

Hulstijn, J., Nijholt, A. (eds.): Computational humor: automatic interpretation and generation of verbal humor. In: Proceedings Twente Workshop on Language Technology 12 (TWLT12), University of Twente, the Netherlands (1996)

Mihalcea, R.: The multi-disciplinary facets of research on humour. In: Masulli, F., Mitra, S., Pasi G. (eds.) WILF 2007, Applications of Fuzzy Sets Theory. Lecture Notes in Artificial Intelligence, vol. 4578, pp. 412–421. Springer, Berlin, Heidelberg (2007)

Minsky, M.: Jokes and their relation to the cognitive unconscious. In: Vaina, L., Hintikka, J. (eds.) Cognitive Constraints on Communication, pp. 175–200. Reidel, Boston (1981)

Minuto, A., Nijholt, A.: Smart material interfaces as a methodology for interaction. A survey of SMIs' state of the art and development. In: 2nd Workshop on Smart Material Interfaces (SMI 2013). Workshop in Conjunction with 15th ACM International Conference on Multimodal Interaction (ICMI'13), ACM, Sidney, NSW, Australia (2013). 13 Dec 2013

Morreal, J.: Taking Laughter Seriously. State University of New York Press, Albany (1983)

Nijholt, A.: Towards humor modelling and facilitation in smart environments. In: Ahram, T. et al. (eds.) Proceedings 5th International Conference on Applied Human Factors and Ergonomics (AHFE 2014), pp. 2992–3006, Krakow, Poland (2014)

Nijholt, A.: The humor continuum: from text to smart environments. IEEE Proceedings International Conference on Informatics, Electronics & Vision (ICIEV), Kitakyushu, Japan, pp. 1–10, June, 2015, to appear (2015a)

Nijholt, A.: Designing humor for playable cities. In: Proceedings 6th International Conference on Applied Human Factors and Ergonomics (AHFE 2015), Procedia Manufacturing, vol. 3(C), pp. 2178–2185, Elsevier (ScienceDirect), Las Vegas, USA (2015b)

Olsen, D., Mateas, M.: Beep! Beep! Boom!: towards a planning model of coyote and road runner cartoons. In: Proceedings of the 4th International Conference on Foundations of Digital Games (FDG'09), pp. 145–152. ACM, New York, USA. doi:10.1145/1536513.1536544

Pritchard, M.: How to hurt the hackers: the scoop on internet cheating and how you can combat it. Gamasutra, July 24, 2000. http://www.gamasutra.com/view/feature/131557/how_to_hurt_the_hackers_the_scoop_.php (2000). Accessed 1 June 2015

Raskin, V. (ed.): The Primer of Humor Research. Mouton de Gruyter, Berlin (2008)

Schell, J.: When games invade real life. Talks Best of the Web. Filmed Feb 2010, DICE Summit 2010. http://www.ted.com/talks/jesse_schell_when_games_invade_real_life (2010). Accessed 1 June 2015

Švelch, J.: Comedy of contingency: making physical humor in video game spaces. Int. J. Commun. **8**, 2530–2552 (2014)

Thacker, S., Griffiths, M.D.: An exploratory study of trolling in online video gaming. Int J. Cyber Behav. Psychol. Learn (IJCBPL) **2**(4), 1–17 (2012). doi:10.4018/ijcbpl.2012100102

Townsend, A.M.: Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia, 1st edn. W.W. Norton & Company, New York (2013)

Unger, A.: Modding as part of game culture. In: Fromme, J., Unger, A. (eds.) Computer Games and New Media Cultures. A Handbook of Digital Games Studies, pp. 509–523. Springer, Dordrecht, Netherlands (2012). doi:10.1007/978-94-007-2777-9_32

Warner, D.E., Raiter, M.: Social context in massively-multiplayer online games (MMOGs): ethical questions in shared space. Int. Rev. Inf. Ethics **4**(12), 46–52 (2005)