Available online at www.sciencedirect.com

ScienceDirect

Procedia Manufacturing 3 (2015) 2175 – 2182

Procedia MANUFACTURING

6th International Conference on Applied Human Factors and Ergonomics (AHFE 2015) and the Affiliated Conferences, AHFE 2015

Designing humor for playable cities

Anton Nijholt*

University of Twente, Human Media Interaction, Faculty EEMCS, 7500 AE Enschede, the Netherlands

Abstract

Smartness, made possible by intelligent sensors and actuators, is invading our home, office and public environments. This smartness monitors, anticipates and supports our activities, increasing efficiency of our activities. Smartness is usually associated with efficiency, but it also allows environments, virtual humans and social robots to display emotions, empathy and provide environments to introduce and support humorous events. We review examples of playful and humorous street furniture in 'playable' cities and projects that allow residents and visitors to interact with objects and environments in playful and humorous ways. We add observations on humor theory, in particular observations that deal with physical, visual and multimodal humor. Our emphasis is on introducing incongruities and on exploring different forms of incongruities in order to introduce humorous situations. Inventories of incongruities are explored. These inventories have been obtained from observing humor in everyday situations, in comedies, in movies, and in TV commercials. Shortcomings of these inventories from the point of view of multimodal and interaction humor are discussed and some preliminary views on additional approaches are provided.

Keywords: Playable cities; Incongruities; Computational humor; Human-computer interaction

1. Introduction

"Play cannot be denied. You can deny, if you like, nearly all abstractions: justice, beauty, truth, goodness, mind, God. You can deny seriousness, but not play."- Johan Huizinga, Homo Ludens, 1944 [1].

We investigate the role that humor can play in future playable cities. Nowadays we are interested in social, not necessarily task-related or efficient, interactions mediated by digital devices and environments that support our

* Corresponding author. Tel.: +31-053-4893740.
E-mail address: a.nijholt@utwente.nl

doi:10.1016/j.promfg.2015.07.358

interactions with friends and relatives. However, we can expect that in addition to computer supported mediated human to human communication, we will communicate with Artificial Intelligence (AI) embedded in devices and environments. That is, AI embedded in the nodes of the Network of Things. 'Things' can be in our home and office environments, but they can also be in public spaces and urban environments, for example, in street furniture, billboards, escalators, elevators, and ticket machines. Humans are as well nodes in this network. They are equipped with wearable or implanted sensors and actuators that allow them to make changes to the environment or to have it adapt to the user and to cooperate with the user in performing his or her task, and when appropriate, do this in an entertaining and humorous way.

Humor plays an important role in our everyday activities. Will this role change when our everyday activities will be invaded with digital technology? Or, can we exploit technology in order to increase humor experiences in our everyday activities? Can we learn from humor theory and use this knowledge to design smart environments that are able to analyze and understand humor, and that are able to make changes or suggest changes to an environment that facilitate human humor generation? And, as a next step, autonomously decide about such changes and deciding about sensor and actuator activity that leads to unexpected, surprising, incongruous and humorous events?

Humor research has a tradition that goes back to Greek philosophers such as Plato and Aristotle, and contributions to its field have been received from later philosophers such as Kant and Schopenhauer. More recently psychology and cognition researchers entered the field, and a computational approach, trying to find algorithms to analyze humor, was introduced in computational linguistics (CL) and human-computer interaction (HCI). In the latter case the aim was to look at the possible role of humor in human-human interaction and to introduce humor in interactions with smart devices, embodied conversational agents, and social robots. Research focused on linguistic characterizations of humor, that is, on verbal humor, in particular on jokes and wordplay, and linguistic models of humor were introduced in the last decades of the previous century [2]. These models are based onAI descriptions of real world events and objects and situations. Scripts and frames introduced by AI researchers were adapted and elaborated in more detail to include verbal humor characterizations. Although CL researchers introduced detailed human-human dialogue models, ambiguous language use, humorous language use (including irony, sarcasm, and wit) and deceptive language use never received much attention.

Physical (nonverbal) and visual humor, humorous activity and interactivity, practical jokes, mischievous humorous acts, slapstick humor are examples of humor forms that have hardly been subject of research and attempts to analyze them. In our future smart environments sensors and actuators provide us with tools to facilitate and support these forms of humor or even have their smartness used to generate humorous events autonomously.

In this paper we elaborate and detail our observations in [3,4]. It will be done in the context of making cities playable. Before we explore the forms of humor just mentioned and discuss attempts to model and engineer them (section 3), we will discuss playable cities first (section 2). In section 3 we will also say more about humor as it can be designed, staged or appear spontaneously in playable cities. Section 4 has some general observations on humor techniques and incongruity typologies. Conclusions can be found in section5.

2. Playable cities

2.1. What is a playable city?

What is a playable city?*"A Playable City is a city where people, hospitality and openness are key, enabling its residents and visitors to reconfigure and rewrite its services, places and stories."*This notion of 'making cities playable' has been introduced some years ago in Bristol (UK).Originally it was introduced to distinguish smart cities from playable cities, where smartness was identified with intelligent and efficient city management.This was contrasted with playfulness that could be offered to an urban environment through the use of new and advanced information and communication technology. In our view a playable city requires the smart technology that is integrated in a smart city environment. That is, sensors, actuators, displays, smart tangible objects, and wearables, can be used to improve the efficiency of city management (traffic, public transport, security, public events, et cetera), but they can also introduce playful elements in a city. Playability requires smart technology.

a b

Fig. 1. (a) Talking to a postbox;(b) Displaying shadows from previous passersby.

A city without smart technology embedded in its urban environment cannot offer its citizens playful interactions with streets, buildings, street furniture, traffic, public art and entertainment, large public displays and public events. In particular, smart technology can increase and improve social and humorous interactions between citizens.

The notion of playable cities was first introduced in Bristol (UK) and this city hosted meetings and projects devoted to increase awareness of a city's possibility to introduce playfulness and to advertise the concept to other cities in the world. Digital media artists and researchers were invited to propose projects and implement their ideas in the streets of Bristol.

2.2. Playing with lamp posts and shadows

We shortly discuss two prize winning installations that were introduced into the streets of Bristol. These projects were 'Hello Lamp Post', introduced in 2013, and 'Shadowing', introduced in 2014.

The 'Hello Lamp Post' project, realized by PAN Studio, London, in cooperation with Tom Armitage and Gyorgyi, allowed inhabitants to communicate with street furniture. Bristol residents were able to start a conversation using a code on street furniture objects and the text function on their mobile phone. Hence, people were able to talk to parking meters, lamp posts, bus stops, post boxes, bridges, cranes and sign posts. Their exchanges with the objects were stored and used in exchanges to other people. In Figure 1 (a) we see someone communicating with a Postbox. These exchanges make it possible to look at the city as a diary that can be walked through. In Figure 1 (b) we see an example of the 'Shadowing' project. This project was created by designers Jonathan Chomko and Matthew Rosier. Using infrared technology, augmented streetlights capture a pedestrian's outlines passing beneath. The outlines are played back as shadows to a next passerby and also sequences of shadows from earlier visitors could be displayed. Bristol residents and visitors started playful interactions with these shadows, responding to them, visiting their earlier shadow and introducing complex movements and gestures.

2.3. Dancing in the streets

"There'll be dancin', they're dancin' in the street.This is an invitation, across the nation,A chance for folks to meet.There'll be laughin' singin', and music swingin', Dancin' in the street" - Martha Reeves and The Vandellas: Dancing in the Streets (1965).

Apart from the playable city projects introduced in Bristol, there are many more examples of playful additions to city environments. A well-known example are the Piano Stairs, implemented in a subway station in Stockholm and providing travelers an alternative to an escalator by inviting them to use a staircase instead. The staircase steps act as piano keys. Hence, users can make piano key sounds while taking the stairs and even try to perform a song while jumping up and down the steps of the staircase (Figure 2, a).

a b

Fig. 2. (a) Piano Stairs in Stockholm;(b) Drawings appear when street gets wet.

Very playable, but not making use of digital technology are the RainWork art projects. In these projects special paint is used to draw paintings and write messages on the street that only appears when the street becomes wet, that is, when it starts to rain. In Figure 2 (b) we see a hopscotch game appear when it starts raining. Some examples of rain messages are: “ERROR 404: SUN NOT FOUND”, or “PROUD TO BE RAINY”.

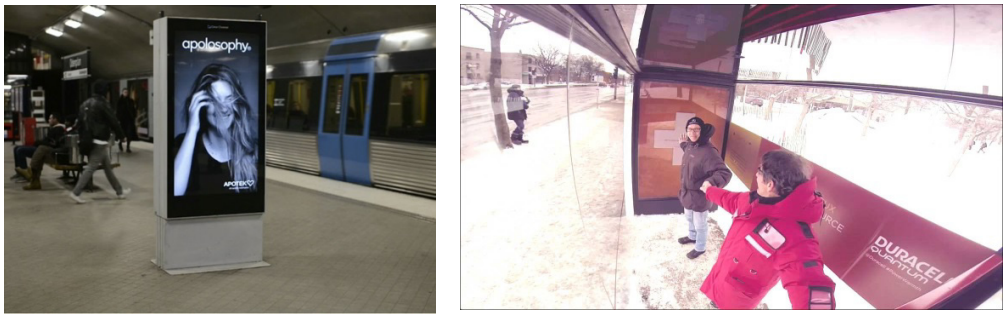
There are also projects in which digitally augmented street furniture invites and persuades pedestrians in a playful way to wait for a green light before crossing a street.Offering them to play the game of Pong (StreetPong) with an opponent, also waiting, but on the other side of the street, is a street furniture game that has been implemented in certain areas in the German cities Hildesheim and Oberhausen. See Figure 3 (a). More interestingly is a project initiated in Lisbon, Portugal where pedestrians are invited to a booth and are asked to dance. Dance movements are captured with computer vision and then displayed in real-time on a traffic lightduring a red light period (Figure 3 (b)). It was reported that 81% more people stopped at the red light.

Two more examples are illustrated in Figure 4. Figure 4 (a) shows a billboard in a Stockholm subway station. This high-tech subway billboard ad is for a shampoo product. The display is fitted with ultra-sonic sensors that detect the arrival of trains in the station. When a train enters the ad is animated and shows the model's hair moving around her face as though being windswept by the vehicle's breeze. In Figure 4 (b) we see a heated shelter at a bus stop in Canada. However, it only provides heat when people make physical contact with two sensors on opposite sides of the shelter. This requires two or more people holding hands, that is, requiring physical contact between people who not necessarily know each other.

Obviously, more can be said about making a city playable. What about flash mobs where a group of people mobilized by social media suddenly assemble in a public space to perform some unexpected and unusual activity?Urban games or location-based games are other examples of playful activity in a city. These are usually multi-player mobile games that exploit localization techniques and sensors to make the city environment part of the game.There are also examples where videogames are transformed to urban games, where mobile devices, sensors and actuators in the urban environment try to take over the role of a video’s game virtual environment that knows all about the activities of its role-playing and non-player characters.

a b

Fig. 3. (a) Playing Pong while waiting for the green light;(b) Dancing traffic light human.



a b

Fig. 4. (a) Billboard that senses arriving trains;(b)Holding hands to heat bus stop shelter.

2.4. Play, fun, humor

Humor is a form of play. This was already mentioned by philosophers such as Aristotle, Thomas Aquinas and Kant [5]. Fun characterizes the essence of play [1]. So maybe fun characterizes the essence of humor. Play often involves or leads to humorous situations, events, interactions and exchanges. Humor theory is usually about jokes or with humor as it appears in conversations. In a digitally enhanced world we can think of physical social robots or embodied virtual agents (virtual humans) that engage in a humorous conversation with their human partners or tell jokes in appropriate situations. These virtual humans can appear on screens or devices present in the environment or on our wearables. This use of humor in face-to-face interaction receives attention, and it requires humor supporting non-verbalization (gestures, posture, facial expressions, and prosody). Although conversational humor intelligence embedded in smart agents and smart social robots is helpful in having humorous experiences in smart and playful environments, we want to focus on an even less developed area of humor research. That is, we like to focus on humorous events that can happen in real life, whether accidentally, spontaneously or staged. Obviously, also spontaneous humor can involve the manipulation of a particular situation or interaction in order to have some real-time construction or staging of humor. Can we facilitatehumor generation by our design of a smart (urban) environment, and can we try to embed some humor intelligence in the environment? It would mean that an environment draws our attention to the possibility of creating a humorous event by configuring its sensors and actuators. Or, as a next step, design environments that can make their own decisions leading to the autonomous creation of humorous events, therefore helping in making a city more playable?

3. Humor in playful everyday life contexts

Playful activities often involve or lead to humorous events, situations or exchanges. A playful state of mind is a mind that is open for humor. Fry [6] introduced this state of mind as the ‘play frame’. In Apter [7] motivational states were introduced and a state of mind inclined to being playful is the so-called ‘paratelic’state of mind, opposed to a serious, more task-oriented state of mind. But clearly, also in a task-oriented state of mind humor can be appreciated, for example, when it is task related and helps to relief tensions or when it is able to surprise us in a nonthreatening way even though our thoughts have been focused on performing a serious task.

3.1. Traditional humor research

When considering the possibility to design humor-sensitive digitally enhanced environments we should ask what we can learn from humor design and humor engineering in virtual worlds such as in literature, language and non-verbal language constructs, videogames, augmented and virtual reality. In such worlds we have some control over the elements that can be used to compose and generate humor. It does not mean that we always have fully control over how humor can be created or emerges in such environments. Making a witty remark or otherwise using language to create humor is different from guiding a gamer into a humorous videogame situation.This latter effort more resembles the situation in a digitalenvironment where we want to offer humorous situations to its inhabitants.

Humor research usually distinguishes between superiority theory, relief theory and incongruity (-resolution) theory. While superiority and relief theory mainly deal with the function and the effect of humor - certainly useful when we want to design humor - incongruity theory is mainly about the role of cognitive processes when having to deal with humor. This latter role allows us to look at the introduction of surprise, not meeting expectations, the role of ambiguity and incongruity, and cognitive shifts that are invited by cues that change our perception of a particular situation. When interpreting jokes the usual approach is the incongruity resolution theory. Here, our first interpretation of a situation turns out to be wrong because of new and conflicting information, and this conflicting information provides us, when understood, with a new and second interpretation of the situation which resolves the conflict and makes clear that this second, less obvious interpretation of the same situation is the b one. This change of interpretation is a necessary condition in this approach to humor. It is not a sufficient condition, but sufficiency of this condition increases when the second interpretation is not just a slight change from the first interpretation but contains elements that make it really opposes the first interpretation. Someone who was assumed dead in the first interpretation appears to be alive in the second interpretation;a respectable person in a first interpretation turns out to be much less respectable in the second interpretation, et cetera.This incongruity view on jokes has been detailed and formalized [8,2].Scripts[9] are used to represent procedural knowledge, that is, sequences of events and their properties.So, to describe humor of a joke we need script overlap and script opposition.Oppositions can be represented in knowledge representation formalisms such as WordNet or more advanced variants of semantic networks. In addition researchers have introduced observations on other differences between the two scripts involved and observations on how incongruity theory can also account for aspects of superiority theory or the other way around. Here there is no need to go into details.

3.2. Humor indigitally enhanced (urban) environments

There have hardly been attempts to generalize thistraditional language-oriented theory to nonverbal, physical, visual or other types of humor. This certainly makes it difficult to introduce guidelines that tell us how to employ sensors and actuators in smart environments in order to design humorous events, whether they are introduced by the smart environment designer (similar to a game designer), whether they are introduced by an inhabitant of the smart environment making use of its sensors and actuators, or whether they are created on the fly by the implemented humor intelligence in the environment (and its sensors and actuators) itself.In comedy, sitcoms, movies and videogames humor is often embedded in the narrative and makes use of context information. The playable city projects Hello Lamp Post and Shadowing certainly have narrative aspects. In general we can think of sequences of events in public environments, where such sequences can be designed, manipulated or prompted by triggers in the environment, and triggers are activated using available context information or by human subjects. One may even think of possibilities of manipulating smart city environments in a way that resembles ‘reality television’, where we also have humorous situations, but where despite its name scenarios control activities and encourage certain behavior. “The Truman Show” (1998) by director Peter Weir is an extreme example of such environment control.

In contrast to the sequential structure of a joke, in real-life situations (including present day digitally enhanced real-life situations) or in simulated real-life like situations such as in movies, videogames or augmented and mixed reality situations, in the latter we can also have situations where there is simultaneous play of two interpretations rather than a sequential play. Again, this simultaneous play is usually embedded and part of the narrative. Maybe some examples are useful. In “A Fish called Wanda” (1988) by directors Charles Crichton and John Cleese we have a bed scene with Wanda (Jamie Lee Curtis) who can only have an orgasm when during love making her lover addresses her in Italian. Hence, we have a scene where we have a ‘love making’ script and a script that describes a tourist’s use of a ‘How to Say Things in Italian’ booklet (Dov’ e la Fontana di Trevi?). A ‘mimed metaphor’ [10] appears when in “The Gold Rush” (1926) Charlie Chaplin is eating a shoe. Again we have a simultaneous play of interpretations where shoe laces are spaghetti, the sole is a steak and the nails in the shoe are bones that have to be removed before eating.

We can also have a second look at ‘prankvertising’, as it was applied in the shampoo ad. Here we have a female-on-platform script. It assumes a long-haired female standing on a platform in the Underground. When a train arrives it pushes a breeze that makes the hair flow around the female's face. When the train stops the hair flows back to its original shape. We also have a rather eventless billboard-on-platform script. People waiting on the platform can

walk around it, get closer, pay attention to it, and walk away. With traditional paper billboards people don't assume animate or context-aware behavior of a female on a paper poster. So we have the usual billboard-on-platform script behavior that changes to the co-occurrence and integration of the female-on-platform and the billboard-on-platform scripts.

Clearly, it is easier to cite staged humorous incongruities than those happening spontaneously. But future smart physical environments controlled by sensors and actuators that also can persuade their inhabitants to particular behavior converge with audiovisual environments such as interactive videogames, digital entertainment and virtual or augmented reality environments, serious and entertainment games and interactive TV and movies.

3.3. Accidental and 'trickster' humor in smart urban environments

There is quite a contrast between the joke modelling attempts in humor research and attempts to generalize them to other forms of humor (cartoons, physical humor, visual humor), that we can find in videogames and how a gamer employs and exploits such an artificial environment..Gamers can have fun and introduce humorous events by doing unusual things, having unusual game behavior, exploiting bugs or by hacking the game environment. Neither has the environment control over the content of interactions between gamers who discuss strategies and how to team up and try to mislead their opponents. Humor also appears in game audience interactions at a meta-game level. Hence, when we think we can learn from humor in videogames, it is useful to view a smart environment as a videogame that can be explored in an unusual way to create humorous situations, or that can be searched for bugs that allow a digital prankster privileges that can be used to enter humorous situations or introduce digital practical jokes that amuse, confuse or frustrate other gamers. That is, an inhabitant of a smart environment can behave as such a gamer and can do similar unusual things in order to create humorous situations that involve other inhabitants. In games we can also have accidental humor and we can also assume that accidental humor appears in digitally enhanced physical environments. For example, by first-time users who try to use their more familiar ways to get something working in an environment with devices that assume different interaction technology.

4. Humortechniques and incongruity typologies

Humor researchers have made attempts to introduce typologies and categories of humor techniques. These typologies do not always make references to humor theories. Nevertheless, what we need to do is to look at these categories and see how they can help to introduce humor in digitally enhanced worlds, worlds that assume that objects, devices, and humans are part of an Internet of Things. Surveys of techniques are available, but they have been constructed during times that Internet, Worldwide Web, videogames and social media were not yet available. Hence, available categories of humor techniques do not address humorous situations and humorous events that make use of embedded sensors and actuators.Typologies of humor techniques can be found in [11,12,13]. Except for [13], where humor in TV commercials is investigated, these typologies focus mostly on verbal humor, in particular jokes. Exceptions mainly come from researchers who study comedy on stage or in silent movies [10]. Slapstick humor or conceptual and visual surprise humor are often mentioned as techniques. In movies and comedy we can also have interfering sequences of events that lead to humorous situations. Descriptions of humorous events that emerge in real life can inspire us to create or support humorous events with the help of sensors and actuators are however hardly available. Nevertheless, funny situations spontaneously happen or can be deliberately introduced. The expression "You had to be there to know why it was funny." illustrates the difficulty of describing funny situations.

Incongruities are essential for humor to be realized in smart environments, including humor that does not depend on language or language alone. Incongruities can appear, intentional or accidental, in our communication with others, in our behavior, in our activities, and in our perception of the (real-time adaptable) world around us. Typologies of humor techniques are useful, but it is also useful to focus on typologies of incongruities and their characterizing oppositions.Space does not allow us to elaborate on these typologies and how they can fit in script [2,9] or frame [14] knowledge representation formalisms. In Holland [15], Wu [16] and Nielsen [17] we can find observations on different kinds of incongruities. A nice example can be found in [18]where products are characterized by three dimensions: Appearance, Function, and Context of Use. It means that we can introduce

incongruities that address each of these aspects. We can have an incongruity in appearance, or an incongruity in function or an incongruity in context of use. In a similar way we can introduce dimensions for products that allow interactions, or events that have incongruities in location, date, period or participants. Again, when discussing script overlap and script opposition, we can discuss serial and parallel script invocations and various types of opposition.

5. Conclusions

In this paper we focused on smart, playable cities. There have also been attempts to introduce smart home environments with a sense of humor [19]. Unfortunately, usually without making an attempt to relate designs to existing humor theories. Nevertheless, in future research we need to analyze these examples of playful and humorous additions to a city environment in terms of introducing safe and non-threatening incongruities. In this paper we surveyed many aspects of Incongruity Theory, in particular looking at non-language related approaches of this theory. Aspects of Superiority and Relief Theory can help to control the psychophysical effect of introducing Incongruities and the functional aspects of introducing humorous situations. As argued, we can learn from comedy and movies, since sensors and actuators can be controlled and directed similar to the possibility to choreograph a stage performance or direct a movie set. It might be the case that we only want to consider this possibility in controlled and/or smart home or recreational environments. The Internet of Things and augmented reality applications can make changes to our daily environments that are more intrusive than are changes caused by the way we can use the Internet, Worldwide Web and social media.Various ways of introducing humorous incongruities have been discussed in this paper.

Acknowledgements

I'm grateful to Peregrine Church (RainWork), Matt Rosier (Shadowing) and Ben Barker (Hello Lamp Post) for giving me permission to use pictures from their projects.

References

[1] J. Huizinga, Homo Ludens. A Study of the Play-element in Culture. Routledge & Kegan Paul Ltd, London, UK, 1949 (First published in 1944). Also: Homo Ludens. Proeve Eener Bepaling Van Het Spel-Element Der Cultuur. Haarlem, 1938.
[2] V. Raskin, The Primer of Humor Research, Mouton de Gruyter, Berlin, 2008.
[3] A. Nijholt, Towards Humor Modelling and Facilitation in Smart Environments, Proc. 5th International Conference on Applied Human Factors and Ergonomics (AHFE 2014), T. Ahram, W. Karwowski, T. Marek (Eds.), Krakow, Poland, 19-23 July 2014, 2014, pp. 2997-3006.
[4] A. Nijholt, Incongruity Humor in Language and Beyond: From Bergson to Digitally Enhanced Worlds, Proc. 14th International Symposium on Comunicación Social: retos y perspectivas, Volumen II, Ediciones Centro de Lingüística Aplicada, Santiago de Cuba, 2015, pp. 594-599.
[5] J. Morreall, Philosophy of Humor, The Stanford Encyclopedia of Philosophy (Spring 2013 Edition), Edward N. Zalta (ed.), http://plato.stanford.edu/archives/spr2013/entries/humor/. First published Tue Nov 20, 2012.
[6] W.F. Fry Jr., Sweet Madness: A Study of Humor, Pacific, Palo Alto, CA, 1963.
[7] M.J. Apter, Reversal theory: Motivation, emotion and personality, Routledge,London, New York, 1989.
[8] J. Suls, Cognitive Processes in Humor Appreciation, Chapter 3 in Handbook of Humor Research, Vol. I Basic Issues, P.E. McGhee, J.H. Goldstein (Eds.), Springer-Verlag, New York, 1972, pp. 39-57.
[9] R. Schank, R. Abelson, Scripts, plans, goals, and understanding: An inquiry into human knowledge structure, Lawrence Erlbaum Associates Hillsdale, NJ, 1977.
[10] N. Carroll, Theorizing the Moving Image (Cambridge Studies in Film). Cambridge University Press, Cambridge, UK, 1996.
[11] J. Morreall, Taking Laughter Seriously, State University of New York Press, 1983.
[12] A.A. Berger. An Anatomy of Humor, Transaction Publishers, New Brunswick, USA, 1993.
[13] M. Buijzen, P. Valkenburg, Developing a typology of humor in audiovisual media, Media Psychology 6:2 (2004) 147-167.
[14] M. Minsky, A framework for representing knowledge, In P. H. Winston (Ed.), The Psychology of Computer Vision. McGraw-Hill, New York, 1975, pp. 211-277.
[15] N.N. Holland, Laughing: A Psychology of Humor, Cornell University Press, New York, 1982.
[16] Z. Wu. The laughter-eliciting Mechanism of Humor. English Linguistics Research2:1 (2013) 52-63.
[17] J.I. Nielsen, There's something about comedy theory, P.O.V. A Danish Journal of Film Studies 26 (2008) 72-87.
[18] Y. Yu, T.-J. Nam, Let's Giggle! Design Principles for Humorous Products, DIS 2014, Vancouver, BC, Canada, 2014, pp. 275-284.
[19] The Delirious Home, A Smart Home with A Sense of Humor, http://www.fastcodesign.com/3028928/a-smart-home-with-a-sense-of-humor#8, April 2014.