Mobile Augmented Games in Playable Cities: Humorous Interaction with Pokémon Go

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Abstract. Mobile Augmented Reality (AR) games are changing the way players interact with other players and in cities in the real world. The game's content influences players' decision to explore the outside world (whole body movement outside the house) instead of staying inside playing stationary games (not whole body movement required). While users interact with these games in the real world, humorous experiences may occur while players attempt to accomplish a goal. In this paper, we discuss the humor interaction implications that Pokémon Go has in the player's experience in the real world. We also describe how these games can provide humor occurrences based on the theories of humor. We aim to provide a discussion on humorous situations that players experience and contribute design guidelines on incorporating humor in mobile AR games based on what players have experienced.

Keywords: Playable cities · Augmented Reality · Humorous interaction · Pokémon Go · Mobile augmented reality games

1 Introduction

Niantic Inc. in collaboration with Nintendo have released a mobile location-aware Augmented Reality (AR) game, Pokémon Go. This game is a location-based AR game in the real world where the user interacts with the virtual game while physically moving from one location to another. It allows users to meet other players and form a small community based on their interest (community and social networking features are not included in the game). Therefore, this new user-game interaction outside the home is changing the way people interact with mobile games and people and behave in cities. These mobile AR games also bring happy moments where users get into small accidents like falling in a small lake for trying to achieve a goal. A goal can consist of identifying and catching a virtual character at a particular location in the real world. Also, it consists of collecting items to help players get to the next stage of the game and upgrade their levels. Humorous cases are also based on Pokémon spawning in specific locations.

People sometimes consider the spawning of virtual monsters creepy, but humorous at the same time. Based on online articles and social media postings, players would try almost anything to accomplish their goal. Therefore, it is essential for cities to start discussing regulations and laws to protect players and non-players; especially, when these games start having life events. A life event can consist of players traveling from all over the world to a particular city to catch a rare virtual character (i.e. legendary Pokémon), and they would not be able to accomplish their goal unless they go to the particular city for a specified period on a specific date range.

Mobile AR games need to be adequately studied to deliver the best user experience, induce humorous situations, and to teach users to play within the laws of the given location. Therefore, guidelines on creating such games are needed. Blum et al. conducted a study with 60 players to understand the relationship between presence and game design factors, realism, city context, interaction within the context of AR location aware games through questionnaires, interviews, and video analysis in the wild [2]. This study shows an example of utilizing user experience methods to evaluate these games. These games may introduce humorous situations and enjoyment in smart playable environments. Games such as Pokémon Go are designed with unintended humorous interaction and conditions as discussed by [10]. Therefore, the effectiveness of humorous content also needs to be investigated.

In this paper, we provide a discussion on humorous events caused by playing Pokémon Go. Also, we specify a correlation of the provided humorous occurrences with the theories of humor. Lastly, we discuss design guidelines and characteristics for mobile AR games with humorous interaction in mind.

2   Mobile Augmented Reality Games

The research area of mobile AR games is growing steadily. This growth is because of the advancement of AR technologies (hardware and software) and the improvement of mobile phones processors and their RAM. These improvements allow researchers and industry to design, develop and investigate user-game interaction. Woodard et al. developed an AR game where players can play table tennis where they can see the other player through the webcam. The racket and the ball are both virtual; the players hit the ball with the virtual racket by planning the time and distance of the virtual ball on the camera. The purpose of this work is to investigate the mechanics of interacting with AR virtual objects in a constant environment [17]. Although this work is not based in the real world (outside a building or house), it requires users to use their whole body, which is one of the characteristics of mobile AR games. It also demonstrates player to player interaction during competitive play.

Another game being studied is GeoBoids, which it is an exergame for the whole purpose to motivate people to go outside and exercise. Players run towards a swarm of GeoBoid (known as 3D creatures) and try to capture them. Each GeoBoid varies by its properties like color, shape, flying pattern, and active time during the day or night, and other affinities. The players capture these creatures by executing a swipe gesture on the mobile device that signifies a "point and shoots" interaction [7]. In another exergame,

the players move horizontally and vertically on top of an exerpad (a mat similar to the popular game Twister) while holding the phone. The players have to move the laser of the 3D cannon within the phone and physically jump to shoot the virtual aliens or balloons [3]. There are also games specifically for children to be more involved outside the house. The game consists of keeping alive a virtual character by physically finding real trees and interact with them through the game. The players interact with the tree by sending, chopping, and planting the tree, these are accomplished by moving the phone in a particular pattern (the use of gyroscope) [16]. These games show that there is an initiative to investigate various user interactions with mobile games and the physical world for the purpose to make people more physically active. These different investigations are necessary for games to be able to be used in playable cities and accidental and non-accidental humor to occur [11].

3 Pokémon Go

Pokémon Go (Fig. 1) is a mobile AR game that allows players to capture virtual monsters in the real world using their whole body (i.e. walking, use their hands for gestures). Pokémon Go was released in 2016 and developed by Niantic Inc. in collaboration with Nintendo. The game has been able to motivate gamers and older adults (non-gamers) to exercise in the real world while having fun (this is more an outcome than an objective). While users try to catch all the virtual monsters, they encounter them at different locations such as the Mall, restaurants, other people's houses/backyards, close to rivers, beaches, etc. These encounters also vary by distance in meters or kilometers, if a Pokémon is too far away and the player does not have that particular one, s/he may run to try to catch it before it disappears (limited spawn time). When users experience unexpected situations, it may lead towards accidental humorous moments. It also leads towards breaking the city's law that may get the user into trouble, but it can also still be humorous.

Fig. 1. User interface of Pokémon Go (Retrieved from http://techdrake.com/2016/07/pokemon-gos-craze-will-die-down-in-four-months-michael-pachter/)

There are discussions in using Pokémon Go as an example to design future mobile AR games. The idea is to keep the simple user interface and gesture swipe interactions from the game and incorporate their content for different purposes. An area where similar games can be useful is education [4, 5]. Students can go outside and interact with the real world through the phone and learn about zoology, marine biology, and botany [5]. Discussion about humorous interaction in Pokémon Go has not being done, which we do in this paper.

4   Mobile AR Games and Humor Theories: Pokemon Go

There are various theories of humor identified in the literature: incongruity, relief, and superiority/disparagement [1, 10]. Users interaction with AR mobile games can have "accidental humor" varied by these theories. In this section, we discuss how AR location-based games can lead towards accidental humor based on incongruity, relief, or superiority/disparagement, specifically for Pokémon Go.

4.1   Incongruity

In incongruity theory, the object of (comic) amusement is a perceived incongruity through a surprising juxtaposition of events, views or thoughts. In a sequence of events (either in a story or the physical world) an initial interpretation of an event needs to be replaced by a second interpretation. Usually, because of available or suggested context information, the first interpretation is the 'more' stereotypical interpretation. The second interpretation comes into view because of new incoming information that does not contradict earlier information but makes clear that the initial interpretation was based on insufficient and therefore wrongly interpreted information. The two interpretations need to be 'opposing,' not just slight variations to be humorous. This incongruity view is the one that is used to explain jokes, where information is provided sequentially. Incongruity can also emerge when a particular situation allows or asks for two different and opposing views. There is not necessarily a sequence of events, the object, the event or the situation itself allows the two separate interpretations.

There are different kinds of incongruity, the use of context (something that is inappropriate in a particular context), function (use something in a way it was not supposed to be used), or appearance (give an object an unusual appearance that nevertheless has some relation with its function). Other types of incongruity exist as well. They sometimes have been collected in typologies of humor [8]. Interesting are cross-modal incongruities where a view provided by one modality is contrasted by a view obtained from another modality. In incongruity theory understanding the shift from one interpretation to the other is called the resolution of the incongruity.

In Pokémon Go and other AR mobile games, incongruous humor can be more visual than verbal. Figure 2a shows an illustration of a Pokémon appearing in a gay bar. The user tweets the screenshot stating, "OF COURSE a wild Machop spawned at the gay bar last night," this is indicating as a joke that the Pokémon "Machop" can be lesbian/gay. This "joke" can be considered inappropriate to the gay community, but for the

heterosexual community, this can be a funny moment because some users may say that this particular virtual creature is gay and this event can be a clarification. Therefore, if the joke is negatively affected by a person, it may be insulting [9]. How would the lesbian/gay community perceive this humor? Is there a difference in perception of this humor between communities at all? These questions should be investigated by utilizing user experience methods to evaluate the use of the gaming content between communities. It is important that this kind of jokes do not necessarily frustrate the gamer but keep them enjoying the gameplay along with their friends [10].

Fig. 2. (a) Pokémon shows up in a gay bar, (Image retrieved from: http://www.telegraph.co.uk/technology/2016/07/11/30-of-the-funniest-tweets-about-pokmon-go/) (b) Pokémon appeared while woman is on labor (Retrieved from http://nerdist.com/19-of-the-funniest-Pokémon-go-finds-fans-have-shared-with-us/)

Another humorous moment and one of the most famous occurrences, occurred when a woman was giving birth, and the husband was catching a Pokémon (Fig. 2b). Some people may consider this joke inappropriate because the "giving birth" moment was possibly not taken seriously while the woman was in pain. Therefore, there can be a perception difference between gender or culture rather than sexual orientation. However, it is humorous how a Pokémon shows up exactly in the room on the bed where the gamer's wife is in labor.

4.2 Relief

Relief theory is the release of frustration that originates from unpleasant life experiences or social and sexual taboos [6]. Mobile AR games elicit positive life experiences and negative life experiences. An example of a negative life experience in Pokémon Go is when players perform a significant amount of physical effort to obtain a 3D character, but fail to capture it because it disappears or escapes. The physical effort can be running for several meters or kilometers. Players become frustrated because they feel their effort was a waste. However, they feel relief when they capture a rare 3D monster in the area

or when their friends start providing jokes about his run towards the Pokémon hunting. These events are common while playing the game.

4.3 Superiority/Disparagement

The superiority/disparagement theory refers to when people laugh at the misfortune or inferior of others [13]. We can safely say that this type of humor is very common in human to human interaction. This kind of humor can also be common in player-game interaction, particularly when players compete against other. Superiority humor can happen when a specific player has never been able to defeat another player but was close to accomplishing it. The unbeaten player can recall the occurrence of almost being defeated but never had been.

In Pokémon Go some occurrences can lead towards superiority humor:

- The amount of captured virtual monsters
- The levels and strengths of the captured virtual monsters
- The number of defeated Pokémon gyms
- Their personal level showcased in their virtual character

The occurrences above are achievements that a player can currently accomplish that can lead towards discouraging others based on their inferior achievements but in a humorous way. In games, superiority humor emerges from the competitive mindset that players have while they are playing and after the outcome, they feel relief through humor.

5   Humorous Acts

Nijholt described Humorous acts (HAs) from a telephone conversation and face-to-face conversations perspectives. In telephone conversations, the speaker uses intonation and timing to deliver a humorous act. There are exceptions of paralinguistic sounds on purpose or caused by accident. In face-to-face conversations, HAs can be supported by nonverbal cues. HAs include implicit or explicit references made to the environment that is perceived by the listener in the conversation [9]. Therefore, in this section, we describe similar patterns of HAs when users interact with other users or the environment about Pokémon Go.

5.1 Humorous Acts in User vs. User

In Pokémon Go, users interact with other users by walking around the physical cities and catching Pokémon together by swiping on the mobile device. They also collaborate to defeat another team's gym if they are both on the same team. During these collaborations, there are face-to-face humorous acts while trying to catch a virtual monster or trying to take down a gym. Some of the HAs can consist of one user catching the same Pokémon at the same location as his partner, but stronger. This situation could be judged as an unexpected superior humor. One of the biggest humorous events that happens consistently is the takeover of a gym. For example, when a team takes over another

team's gym, then either team can place a new Pokémon on the gym to protect it. However, if there is another (third) team around, they can deposit the Pokémon without the need of beating the gym, because the gym is not protected. When this happens, superiority humor occurs because the team that took over the gym without beating it feel that they have a faster response. It also leads towards frustration from the other team which had to do all the work, but with a little bit of humor.

In Fig. 3, we can see players sitting in different places of cities to catch Pokémon, show their friends and acquaintances their current record. It can be seen that they all sit close to each other even when they do not know each other. When a group of people stays in the same location it is because there is a "lure" (Fig. 4). A lure within the game is placed at a location relatively to a real-world location to attract Pokémon for 30 min. When the activated lure runs out, another player places another one. Therefore, it is a collaboration between players. When many people are attempting to catch the same virtual monster, humorous situations can emerge between verbal and non-verbal cues.

Fig. 3. Players catching Pokémon together at various locations

Fig. 4. Swarms of lures in different locations. Locations are identified by blue boxes and lures are the pink petals surrounding the boxes. (Image retrieved from: http://www.philstar.com/radar/2016/08/11/1612394/are-you-ready-pokemon-go-lure-party-weekend) (Color figure online)

5.2 Humorous Acts in User vs. Environment

There are two types of environments that users interact with when they play the mobile AR games: physical (real world) and virtual (projections from the mobile device). Virtual monsters spawn in different places in the physical environment like the park, restaurants, a person's house, in the middle of the road, and others. When players try to get to those locations there can be causal accidents, where the user falls or almost get hit by an automobile. Although at the moment it happens, tends to be scary, the experience becomes humorous, especially when the user tells the story to their friends over time.

Here are some scenarios that can be considered humorous where players made the decision to do whatever it took to catch Pokémon retrieved from [14]:

- There was a player that broke into a zoo in Ohio, USA overnight to play near a real tiger.
- Two players in San Diego, California, USA fell off a cliff trying to catch a Pokémon. One player was found unconscious, but not severe injured.
- A player catches a Pokémon while his wife gives birth (Fig. 2b).
- A person's house was mistakenly chosen as a Pokémon Gym. Therefore, random players started gathering at that house.
- Pokémon Go gets you cheap beer.

The aforementioned are examples of humorous cases (sometimes dangerous) that players go through in an attempt to catch a Pokémon or take down a gym. These also show that mobile AR games need to incorporate intelligent warnings through machine learning to players to diminish the amount of rule breaking and accidents. Also, there is a need for cities to incorporate new laws and policies to have a safer city and for players still enjoy the game.

Fig. 5. Humorous art of team captains introducing themselves to the professor

5.3   Users and Virtual Avatars

In Pokémon Go, there are human-looking avatars that interact with the player besides the virtual monsters. These virtual humans provide information about how strong a particular Pokémon is when it is captured. Each avatar has a different personality; one is brave (red captain), another intellectual (blue captain), and the last one is funny and clumsy (yellow captain). Based on his clumsiness, users created memes and other types of illustrations of his clumsiness compared to the other characters. These illustrations have been set up for the purpose to provide humor to the Pokémon Go gaming community. These illustrations show that humorous content within games motivates the players to create their humorous representation of those contents to extend the humor. These illustrations can come to mind when the players are hunting virtual monsters in the physical environment and provide further amusement. In Fig. 5, we can see a meme created by a user where each captain introduces himself to the professor that players interact with for different features. The yellow captain was not professional compared to the other two and was juvenile. The professor was not expecting that type of attitude, therefore displayed a surprised expression. Players from the yellow team would end up doing something similar just to imitate their captain. These imitations are humorous and enjoyable to the players.

5.4   User Interaction with Pokémon Go in Humorous Workplaces

Humorous workplaces have physical locations where workers can relax by interacting with humorous smart technologies as humanoids or computers that provide humorous content [1]. According to a poll done by FORBES, employees are playing Pokémon Go during working hours. During gameplay, they build new friendships with coworkers outside their group and obtain more exercise [15]. According to the poll results, nearly 21,000 people spend more than an hour playing the game at work. It shows that Pokémon Go can be an essential experience for workers at companies for them to decrease the probability of disengagement at work. Mobile AR games can be a part of the humorous interaction at work, but new regulations are needed to maintain productivity and make sure coworkers do not encounter conflicts, but enjoy the experience. Specific locations within the workplace should be determined where they can catch Pokémon. Niantic can collaborate with major workplaces, so these virtual monsters can spawn at specific locations within the company, so they would not disturb other employees. Andujar et al. communicates that superiority humor in the workplace can start tensions between coworkers. This type of humor can be the most common when it is obtained from a game. Therefore, if workers are already experiencing inferior comments from peers and also in the game, this may contribute towards depression or disengagement at work [1]. Therefore, it needs to be investigated how these types of humor can be controlled or delivered in a humorous manner and prevent negative experiences and emotions.

6   Design Implications for Location-Aware Mobile AR Games with Humor in Mind

6.1   Humorous Emoticons for Expression

When teams get their gym stolen, there should be humorous images showing comical emotions of getting defeated by another team with sounds. This supports the humorous emotional experience. For example, the mobile game "Clash Royale" contains expression images called "emotes" (Fig. 6). Pokémon Go and other mobile AR games can benefit from incorporating these types of images that help other players express themselves. These images may elicit positive and humorous responses from users.

Fig. 6. Emotes for users express their feelings towards other players from the mobile game clash royale (Retrieved from https://clashroyale.com/blog/news/emotes)

6.2   Mobile AR Games Characteristics

Location-aware mobile AR games have their positive and negative characteristics of many other types of games. These types of games can lead users to break the law in order to achieve a game play goal. Breaking these rules become humorous events for the users. This is the case because the players feel they are not doing anything to negatively impact the city while playing the game, but it is not legal.

Some characteristics that humorous mobile AR games need to have for the games to be engaging and provide positive user experience:

- Swipe gestures, visual feedback, the use of accelerometer and gyroscope, camera
- Integrated share capability in social media to show funny experiences
- Game elements within the mobile device [2]
  - Environment: world exploration and emotional storyline
  - Interactions: action scenes and moral decisions
  - Characters: human-like behavior and believable characters

Nilsen et al. explored and consolidated the characteristics of AR games in the real world with the use of a computer. The real world and the computer have features that affect the user: physical, mental, social, and emotional [12].

According to Nilsen, the areas of real world and computer are constructed as follows:

- *Physical:* the physical feeling of playing the game, the physical movements and skills a player's use of mouse, and the game's use of physical artifacts.
- *Mental:* problem-solving and deductive thought and reason. Also, decision making with accomplishing game tasks within or outside city regulations.
- *Social:* this is when players play with each other, collaborate, negotiate, compete, and build further relationships.
- *Emotional:* When the game affects the player emotionally (positively or negatively)
- *Humor:* The accidental or planned humor content provided by the developer within the game. Also, the accidental humor that happens when players attempt to accomplish a gaming goal in the real world. Humor was not discussed by Nilsen, this is a novel contribution provided in this paper.

In Table 1, we formulated different characteristics of what a mobile AR game would signify along with humor. This table is motivated and adapted from Nilsen et al., where it was meant for AR games in a computer. Also, humor was not considered in their consolidation. We recommend these characteristics to be taken into consideration when designing, developing, and evaluating mobile AR games with humor in mind.

Table 1. Aspects of real world and mobile of AR mobile games

Characteristics	Real world	Mobile
Physical	- Players use their whole body to accomplish a goal. - The physical world represents the virtual world.	- Players accomplish missions through gestures, touch, voice and the use of pedometer (shake device).
Mental	- Players willing to break city rules to achieve a goal.	- Provide AI opponents, agents, creature avatars.
Social	- Increases face-to-face communication with other players.	- Allows written and audial communication with other players.
Emotional	- Associate the personal feelings of a location along with game play.	- Can stimulate players through sound and mission outcome.
Humor	- Accidental humor when players attempt to achieve a goal.	- Humor occurred from virtual characters.

7 Summary

In this paper, we aimed to provide a discussion of the type of experiences that Pokémon Go exerts on players in the physical world. Humorous situations tend to occur when users interact with the game and with other players and non-players in cities. This unintended humor can be associated with theories of humor: incongruity, superiority/disparagement, or relief. We recommend for these mobile AR games to have humor integrated into the game goals just as games for computers and consoles contain. Humor can improve the user experience and elicit a more positive emotion. We also provided design guidelines and characteristics that researchers and developers should consider for understanding how to deliver a positive and humorous user experience. We hope that this paper also serves as a "jump start" to further investigating humorous interactions with mobile AR games.

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