A Context-Aware Amusement Park

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1 Introduction

When we think of amusement parks, there are several different ones such as Disney World, Universal Studios, Six Flags, Busch Gardens, Sea World, Kings Dominion, Coney Island, and many more smaller ones. Each of them have different types of rides or activities and atmospheres, but they all have a common audience or target market - young people, particularly children and teens. Kids come with their parents and occasionally grand parents, and teens come with parents or with friends. People in their early twenties are also a smaller audience for amusement parks. Amusement parks are a very popular destination for these audiences, and combining the entire experience with context-aware computing would make the experience easier, more enjoyable, safer, and more time and resource efficient for everyone.

A context-aware system for amusement parks would have to put context from various stages or periods of the entire experience into consideration. These stages start once the person or family has decided that they will like to visit an amusement park. The stages that follow are ticket or reservation purchase, at-home preparation for entry, at entry or gate of the park, doing activities inside the park, and post-visit. A description of a proposed context-aware system and how it incorporates these stages are explained in detail in the rest of this paper.

2 The context-aware system for the amusement park

In this section, a context-aware system is proposed that incorporates context of an entire experience of visiting an amusement park to make the experience easier, more enjoyable, safer, and more time and resource efficient for all visitors. The context is everything that includes or is related to proximity, people accompanied with, and resources nearby to make context-triggered actions [4]. The system must recognize key pieces of information and map them to a unified view or structure [3]. The system will also be briefly defined using ontologies [3, 1, 2]. The context is recognized and mapped from five periods or stages defined below and associating actions would be triggered at various times during the stages.

2.1 Ticket purchase stage

At the the ticket purchase stage, a person or family is willing and has decided to go to a particular amusement park. The person purchasing the tickets is either a teen, an adult without dependents, or a parent. The teen purchasing a ticket usually will visit the amusement park with friends. The adult without dependents would also usually visit the amusement park with friends. The parent would usually purchase tickets for an entire family which may include young children, teens, or even the elderly.

At the time of ticket purchase, required visitor details are provided. A Facebook connect can be possible and highly recommended, which allows easy personal detail population. If Facebook is not connected to, manual entry of required personal details of the visitors are prompted. If Facebook is connected to, demographic and age details can be retrieved to make the visit more suitable for the visitors. The relationships of the visitors are analyzed to gain an understanding of preference of ride or activity and amenity choices. For example, a group of visitors including parents traveling with only young children would only prefer rides or activities and amenities for young children. However, if parents traveling with both young children and teens would have a preference for two different types of rides or activities and amenities. The teen may not necessarily do everything alone in the park.

Many visitors may be visiting from other states or countries, and would require accommodation such as hotels and car rental. These choices can be

assisted with the personal details combined by the system. All these details are stored in the visitor class of the ontology of the system. It specifically consists of personal details such as name, age, emergency contact details, and duration of stay which may be multiple days.

2.2 Preparation for visit

The purchase of the tickets to the amusement park might have been done quite some time before the day of the visit. Reminders for the trip and accommodation would be sent out to the visitors as the day of visit approaches. Park details and safety precautions are also given. Using the previously acquired personal details, certain preferences for activities can be predicted and a proposed itinerary or schedule can sent to the visitors. This schedule can be modified by the visitors based on knowledge or research about the park. Additional details are provided to the system, such as health or special needs, which will be incorporated for decisions inside the park.

2.3 Entry to the park

At the time of entry to the park or accommodation, the park representatives can verify the visitor's provided details and update emergency contact details. Next, personal mobile phones should be connected to the park wifi network and mobile application. This gives insight to location and may assist in several notifications to the visitor including a schedule and status for rides or activities. Next mandatory bluetooth tags are given to the visitors to hang around their neck. These tags are very small and light. These neck tags are used for park entry and exit, ride or activity usage, and amenity usage. Furthermore, the bluetooth tags provide proximity detection using several bluetooth sensors around the park. The tag is also encoded with a visitor identification number that can be used to identify a visitor. This is especially useful for lost children, which is a problem at large amusement parks. All of these details are also added to the visitor class of the system ontology.

2.4 Inside the park

Most visitors come in groups and most of them will roam around together. The mobile phone is used as a notification center and tracker for friends and family especially if the group splits up or for parents. The bluetooth

tags and wifi network seamlessly integrate with the mobile application. The main context being acquired is proximity data and activity history. Based on this context, decisions are made and suggested for the visitors. A suggested schedule which may have been modified prior to entry is used on the mobile phone. Rides or activities are suggested based on proximity and wait time. Even after being suggested, the visitors may not even follow the suggestions and choose other rides or activities. All activities are tracked via sensors as visitors do them and are stored in the visitor activity class of the ontology of the system with proper links and mappings. Based on ride or activity history and proximity further events are suggested.

As time is also part of context, certain events are suggested based on time. Examples of such events are meals, reminders, or set meeting times. The system would know time of entry and activities and based on durations suggest nearby eateries based on visitor demographics and age and incorporated Facebook likes. For instance, parents with children would be suggested child friendly eateries with kid meals and certain activities. The wait time is an important contextual information that is received through the bluetooth tags. This constant real-time analysis is reported to visitors around the park. Reminders or notifications can be sent to visitors when a ride or activity of interest is available or has a shorter wait time. Visitors who split up in groups can notified about set meeting times and locations for the split groups.

Most amusement parks have cameras on rides and record videos and capture pictures of visitors as they are on rides such as roller coasters. The system knows the visitor identity, and can report these pictures to the visitor on the mobile device. These pictures can then be instantly posted to social media websites. Additionally, just textual activities can be posted. For example, after a visitor has rode on a roller coaster, and left the area of the roller coaster, the system knows that the activity was performed. The visitor is then prompted to post this activity on a social media website of choice, such as Twitter or Facebook.

In cases of emergency or panic detected, automatic distress signals are sent to family or friends. Parents can track their children or teen activities and ensure they are safe. The system can assist the elderly by providing immediate representative or medical assistance based on previously provided context.

2.5 After leaving the park

After the visitors leave the park, which is known using the bluetooth tags, decisions can be made using context such as accommodation and time. If the system knows that the visitors should be returning to the park on another day, the activity of the current day is used as historical context for the next visit. This is useful for visits spanning multiple days. If this was the final day of the visit, the system assists the visitors with safe exit to their original location or next destination if known. Additionally, all activity and pictures can be bundled to allow easy usage and publishing to social media websites. The visit summary is stored in the ontology for future visit usage. Basically, all these events after leaving the park are ensuring ease and satisfaction for the visitor's visit, and possibly creating an urge for a future visit.

3 Conclusion

A context-aware system for an amusement park was proposed in this paper. Using several contextual details from various periods, smarter and better decisions are suggested and made for the visitors of the park. Part of the context includes personal details, demographics, age, preferences, proximity, accompanying family and friends, and event history within the park.

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