Personalization of the Children's Museum

INF3/4260 "Human Computer Interaction"

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Contents

1. Introduction

This document is a collaborative effort from 4 students from Bulgaria, Norway, China and Iran. In the subject INF3/4260, communication within the group has been in both English and Norwegian since we don't all speak one language. One of the lectures in this course is given by a woman who comes from Oslo Children Museum. She shows a segment video about one of the running projects in museum about children "play with water". That's a good example for our group. Faced with the options of Trafikanten and the children's museum, we decided to make something for the children's museum planned in Oslo.

The idea we came up with, is a Badge with a radio chip inside that every child that visits the museum will receive. Our idea is that the child's movement and behavior will be recorded to this badge as they move throughout the museum, visiting exhibits. The recording will be done in several ways:

1. We have cameras at every exhibit, activated when the child comes within a certain radius of an exhibit (e.g. 3 meters. As described in appendix A, distance can be set farer or nearer), taking a picture or video of the child.(this part need others device to realize, just need the id from the chip then decide which picture or video is going to send to which child.)
2. Some installations are activated when the child comes within the activation zone, and starts the exhibit by addressing the child directly by a speaker or a screen.

Our idea also includes some more personalization. The children will choose an avatar when they enter, so they can recognize when they are be addressed by screens at the different exhibition hall. In addition when the child leaves the museum and returns the badge, the data recorded is updated into a central server. Then the pictures and videos taken of the child and their scores and answers from certain exhibition halls, are uploaded to a web server as a personalized webpage for the child, and all details in webpage will be made to a VCD to bring home.

Till now we know our project is a huge system, including more technicality we just hear from the news or internet. It's a difficult for us to "make it true", I mean a demo in the public (like museum), and it is even difficult to get the RFID chips (one technical part of our system needs) for us. But as we had interviews with some parents, they think it is a great idea, and if we can realize it, they would like to go there with their children. In addition, almost all parts of the system can be used for many relational places for children.

2. Design Problems

2.1 What do we want to create?

We want to create a system for personalization in The Norwegian Children's Museum (CM) and to provide enjoyable and exciting entertainment for the visiting children. In addition we want the children to have a good learning experience.

Our product is designed for children and parents equally. Our main intention is to help the parents and teachers who will take care about the children in the museum. We want to make so that they can also enjoy the exhibits and try to feel free like children. That is why we want to give them freedom. The main benefit of IT, according to us is to make the people more free. They don't have to worry about a lot of everyday common tasks, because the new technologies allow the humans to enjoy the life and to start to think creatively, they allow us to live in another, higher level.

Although all modern parents have the most fashionable cameras, they have to hold them and to look ½ of the time in the camera's objective/screen. It means that ½ of the time they lose for watching and trying to fix their lovely children. We suppose that the parents would like to live and present longer now and here, to be active players, not observers. Also the children would prefer their parents to play with them, instead to take pictures of them. That is why we want to automate the process of creating photos and movies. The children and the parents will be happier with our offered solution.

This project also can be used for a primary school or children's park. And this project can be altered easily when the environment is changed. It depends on what kinds of graphical result you want.

Children will think its fun to see themselves or their avatar on screens throughout the museum. They appreciate a personalized reward with pictures of them doing stuff. A reward system will make the learning even more interesting for the kids with added incentives. By showing the child's avatar on the screen giving them a personalized effect and by receiving a video-cd documenting the child's visit, children will feel pleasantly during the visiting time and hold the beautiful memory in the museum.

2.2 Possible Problems

When kids enter an area at the same time, the exhibit needs to have rules for its behavior. The kids might not enjoy seeing their picture or avatar on the wall. The kid may lose their device. Some kids might not understand some exhibits. The interface might not be simple enough. We will need to test and evaluate our concepts on a test group of kids.

2.3 User Experience

When designing for a children's museum some research on the users is required.

- Will the child be able to use our system?

- Will they understand it?
- Do they have to understand it?
- What are their learning possibilities?
- How will they perceive their use of our system?

2.3.1 The cognitive abilities of children

First of all a child has a different set of cognitive abilities depending on the age. Starting at age 0-2 they have mainly sensori-motoric abilities to understand the world around them. At this stage the child is quite dependant on outside stimulation to develop their cognitive skills.

At ages 2-7 the children learn to think, even though it is often in unstructured an illogical manner. They're in a so called preoperational phase, unable to see things from another person's perspective. Plays and role-players are excellent at this age to develop social skills.

At ages 7-11 the child is now able to think systematically and they also have a better attention span. They have however problems imagining abstract things. They do understand simple concepts and still like to draw and play.

It is first at 12 to adult age they are available to think abstractly and hypothetically.

2.3.2 What Experience Our System Can Offer a Child?

Not much in the tangible sense, but much in their user experience… seeing their avatar and their name as they walk through the museum we hope they will experience this as thrilling. Our system can on the other hand offer much for the child indirectly, by saving some of their behavior at the different learning games at the museum, their parents can see at what areas they excel, in what areas they are confused, and what areas they really appreciate.

They can then choose how they use this information in ways to stimulate their own child's cognitive abilities.

Other than that our system is almost invisible to the child. They don't have to understand it. They don't really need any skills to use it. All they have to do is wear it, and it will hopefully have a long term impact on them. In addition the photos of them make a nice scrap book, which is basically a nice thing to have.

2.4 User Requirements

As mentioned in the "Interaction Design" (book for this course), user requirements capture the characteristics of the intended user group. The project is designed for Children's Museum. So in

usual ways talking about user, here in our project, user is the children aged 3-12 years (arguably higher for max age) visiting museum. For those ages 0-3 there will hopefully be a separate section. But there are also other kinds of "user", such like parents who come with their children, persons who work in the museum, participating in project's normally running, etc. All of these users interact directly in our project.

The basic technique that will be used here is RFID (Radio Frequency Identification). This technique has been undergoing development for a few years, and is used in many places. RFID is easy to get and an available technology. (It is also possible to use this to keep track of where everyone is. For private or public use)

3. Conceptual model

Conceptual model is "a description of the proposed system in terms of a set of integrated ideas and concepts about what it should do, behave and look like, that will be understandable by the users in the manner intended" (Rogers, 2002).

At the beginning of our work we had only one proposed idea which main goal was the opportunity the children to choose their avatar and the system to show it on the screens. That is why we named our project Personalization of the CM. Afterwards during the process of working and reading literature we began understanding the subject of HCI deeper and deeper. Then we came up with new ideas which were more practical, because we started to think about the users, about their needs, we connected with them emotionally and mentally. We wanted to be useful, we wanted to create something brilliant, something inspired, and we wanted to be creative like Leonardo da Vinci.

We came up with a lot of ideas for our product – some of them were very different from the main concept, main intention, so we don't include them in the document. Other ideas were much closer to the main goal for personalization and they are described in this paper.

Prototyping and scenario are two techniques that helped us to explore ideas and make design decisions. For the evaluation part the low-fidelity prototype was presented to the users in conjunction with scenario and the users were asked to comment the situation.

3.1 Interaction types

"Interaction types (e.g., conversing, instructing) provide a way of thinking about how best to support the activities users will be doing when using a product or service" (Rogers, 2002) "The basis for designing this model is the set of user tasks the product will support." (Rogers, 2002)

For the conceptual model we use the following interaction types based on activity. After each concept of interaction type we describe the tasks that the users will carry out.

- Instructing – "issuing commands using keyboard and function keys and selecting options via menus" (Rogers, 2002).

    1. When a visitor chooses avatar, s/he touches a screen to activate the chosen avatar.
    2. After the activation an administrator enters the visitor's data in the system to activate his/her profile. The administrator is using a keyboard to type the data and menu with option to enter the data.
    3. Before the visitor exits the CM, another administrator instructs the system to deactivate the visitor's profile and to deliver the web page address.
    4. The users can instruct the web album to print pictures.

- Manipulating – "interacting with objects in a virtual or physical space by manipulating them. Virtual objects can be manipulated by moving, selecting, opening, and closing them." (Preece, Rogers, Sharp, 2002)

    1. The users can move, select, and delete the pictures and videos from their web album.
    2. Administrators can select avatars from the system

- Exploring and browsing – "moving through a virtual environment or a physical space" (Preece, Rogers, Sharp, 2002)

    The visitors of CM, their friends or parents will explore and browse photos and videos in the web album.

3.2 Expanding the Conceptual Model

Photos are a popular form of visual information.
We assume that the users want to have their photo album made in the CM, they want to send the photos to their friends to confirm, capture and relieve their experience in the CM.

"It is not surprising that visual information is a vital component of the new computing. Most people depend on visual input for much of their understanding of the world around them and as a basis for further creative activities. Information visualization is becoming the next big success story as designers are succeeding in showing hundreds of times more information than tabular displays. These novel approaches show stock market trends, reveal disease patterns, or uncover flows in manufacturing processes. Mainstream stories are inherent in the popularity of visual media such as photos, short videos, and clever animations. "(Shneiderman, 2003)

"Users wanted to send photos to reminisce with the participants about the event and tell stories to others who weren't there. The appeal of photos is that they are proof that something happened, the testimony that you did…" (Shneiderman, 2003)

Photos are fundamental technology, and they become compelling when they are used to support human needs for self-expression, collaboration, and creative endeavours. (Shneiderman, 2003)

Technology we use:

1. RFID technique
2. Multimedia – pictures, videos.
3. Web-based materials
4. Input devices – ***touch screen***, keyboard.
5. Output devices

What functions will the product perform? See scenarios.

How are the functions related to each other? See scenarios.

What information needs to be available? See scenarios.

From Wikipedia, the free encyclopedia

Touch screens *are displays which also have the ability to detect the location of touches within the display area. This allows the display to be used as an input device, removing the keyboard and/or the mouse as the primary input device for interacting with the display's content. Such displays can be attached to computers or, as terminals, to networks.*

3.3 Using Scenarios in Conceptual design

Scenarios are "informal stories about user tasks and activities" (Preece, Rogers, Sharp, 2002). Scenarios "are powerful mechanism for communicating among team members and with users." (Preece, Rogers, Sharp, 2002)
We used the scenarios as scripts for users' evaluation of prototypes, to provide a concrete example of a task the user will perform with the product.

The scenarios helped us to express proposed and imagined situations and to check out potential conceptual models. We also used the scenarios as scripts for users' evaluation of prototypes, to provide a concrete example of a task the user will perform with the product. We had the next variant of scenarios:

Scenario 1

Pippi, Thomas and Anikka are the characters of our scenario. They want to visit the Children's Museum in Oslo and go there together with Tom and Anikka's mother. They know that first they have to buy tickets and go to the ticket office. Here they see a big lay out shelf with a lot of their favorite characters on it. There are sundry crowns, necklaces, hats, cats, badges, angel's wings, periwig, bags, gloves and even famous cartoon icon, etc. RFID chips have embossed in those stuff. They love to play games where they imagine that they are fairytale's characters and immediately they choose who they want to be. Thomas and Anikka's mother have read pedagogical books and know that it is important for the children's growth to have good models of heroes.

The woman who is working in the ticket office explains them that if they want they can choose one of the stuff in the shelf and if they want, they could be taken pictures automatically from the installed system in the museum and they can have web albums with these pictures. The children didn't catch the idea very well, but they understood that they will have pictures without needing to pose. They like the idea. The mother understands the idea very well and she is happy that she will enjoy freely the exhibits and not lose time to take pictures all the time; she also needs to be free and to play like a child. They all choose an avatar and the woman gets the information of each child first, then she uploads their information and picture to RFID chip in it. Pippi has a badge with a picture of Pippi, Anikka – of Anikka, Thomas – of Thomas and Anikka and Thomas's mother – of the Ice queen.

They walk to the first hall and enter in it. There are a lot of games, but they see one with balls and go happily there to play. On the nearest wall is installed a small machine that communicates with the chip in the badge in a way that the system can recognize the avatar on the budge: The machine "asks" the badge "who are you" and the Pippi's chip in her badge answers "I am Pippi". The device sends signal to the nearest camera to take a picture and to a server to "tell" to whom the picture belongs. The camera takes a picture and sends it to the server. The server put Pippi's pictures to Pippi's web album, Anikka's pictures to Anikka's web album, Thomas's pictures to Thomas's web album and their mother's pictures to the Ice queen's web album. Every character

has its first picture. Other children also came and played together and everyone has a picture from here. They liked the balls game and stayed here 7 minutes. Every 3 minutes the device is "asking" the chips: "Who are the avatars that are playing here?" the avatars are answering and the system is taking picture and sends to the entire avatar's web pages simultaneously. The "Ice queen" has a great time here chatting with "Cleopatra", they become friends and decided to meet to go for shopping together.

Scenario A

The device sends signal to the nearest camera to take a picture and to a server to "tell" whose the taken picture is. The camera takes a picture and sends it to the server. The server put Pippi's pictures to Pippi's web album, Anikka's pictures to Anikka's web album, Thomas's pictures to Thomas's web album and their mother's pictures to the Ice queen's web album.

Scenario B

The device sends signal to the nearest camera to take a picture and to send it back to the reader. The reader sends the picture to the transponder.

After evaluation we have understood that scenario B doesn't work, because the transponder doesn't have enough memory for all the pictures and video. The only decision in this case is the photo and video have to be send to the server.

There is a room furnished like a bottom of ocean. Varied fishes and halo bios are "living" in this room. If you touch the fishes, they are speaking. An instance here, Pippi touched the biggest fish's face, and fish says:" I am the biggest animal in ocean, my name is blue whale. The biggest blue whale's heart is as large as a small car. Fifty people could stand on its tongue." At the same time Anikka finds a fish, who looks the same as the movie "finding nemo", and she touched a small fish, then the fish says:" Hello, I am Nemo. Nice to meet you! I am one kind of the Amphiprion ocellaris, and I live together with my family in actiniae. Do you know what actiniae are? You can find it just around me! " Then Anikka is happy to touch the actiniae that is just under the Nemo. Children find a screen in the entrance. Mama reads the information and knows that it a "question machine". It will give a question when children close it or show the badge they have. At the same time the machine reads the information from chips and knows who is going to answer this question. Then children find the answer in this hall, when come back to the machine, and machine knows who this is, it will find data in database (system), knows s/he is going to answer the question or give a new question. Then children answer the question, and this will be written back to the chips.

There are several rooms as mentioned above. Anikka, Thomas, their mother and Pippi spend 3 hours in the museum. So they have approximately 70 pictures from the museum on their web album. Before they exit the museum they return the badges and receive a VCD with their own web album (it made by people who are working at museum). When they go home they can share the digital album with all their friends and show them how wonderful is the Children's Museum

in Oslo. The next time when they visit the museum they could compare the pictures and to see how growth in stature they are.

Scenario 2

A group of children are visiting the museum. It could be a group from a kindergarten or from a school. There is probably 1 teacher of every 10 children.

Use case for input system

1. The system shows options for choice of avatars on a big screen
2. The visitor chooses an avatar and touches it on the screen
3. The administrator receives the choice on its monitor
4. The administrator registers the visitor with its name and age
5. The system programs the transponder with this data
6. The visitor receives a badge with a picture of its avatar and with programmed RFID chip inside
7. Personnel help the visitor to put the badge on its sweater

Use case for internal system

1. In every hall there are RFID readers and cameras installed on the walls closer to almost each game
2. The visitor chooses a game and comes near to it and the RFID reader sends a signal to the visitor's transponder
3. The transponder responds to the reader by sending its unique ID number
4. The reader sends data – time, date, name of the game to the chip

4* The reader sends data – time, date, name of the game to the server for statistic

5. The reader recognizes it and sends signal to the camera to take a picture or video; somewhere it is more enjoyable to watch video with a game, it depends on the games
6. The camera writes the ID number on the first blank frame and takes a picture/ movie
7. The camera sends the photo/ movie to the server
8. The server reads the ID and sends it to the proper web album

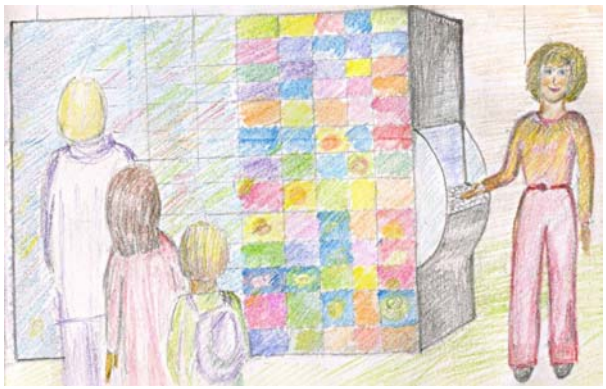
Figure 1: Portable reader

Figure 2: Transponder

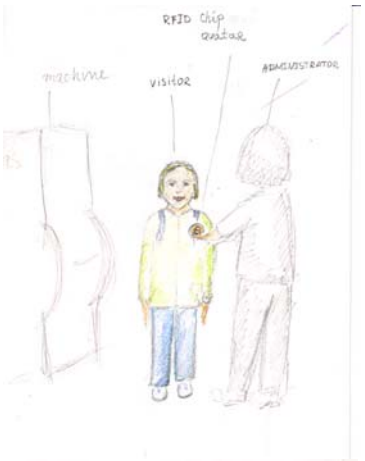
3.4 Using Prototypes in Conceptual Design

We chose to use a low-fidelity prototype because it is simple, cheap, quick to produce and modify and because we wanted to get rapid feedback by users. At the beginning we started to evaluate the product (the system) using some simple sketches for low-fidelity prototype. After some evaluations we made more concrete decisions for our final product (the properties and functions of the system) and we made better and more beautiful drawings. As the idea got clearer about the final product, the pictures we use for the prototype became more precise. "One approach, called evolutionary prototyping, involves evolving a prototype into the final product." "If an evolutionary prototyping approach is to be taken, the prototypes should be subjected to rigorous testing along the way" (Preece, Rogers, Sharp, 2002)

We build the prototypes by our drawing picture. It is not a demo version for system, but you can understand our project by it.



Touch screen shows avatars to the visitors and an administrator supports the visitors



A child gets the badge with a picture of its avatar and implemented RFID chip

The ball machine is supposed to be a scene in a hall, and the camera will take pictures of the visitor when s/he plays with the ball machine

4. Evaluations

In the beginning we will see what is meant by evaluation and why we need to evaluate our system.

Users want systems that are easy to learn and to use, as well as effective-efficient- safe, and satisfying. Being entertaining- attractive, and challenging, etc. is also essential for some products. Evaluation is needed in order to check that users can use the product and like it. Furthermore nowadays users look for several more aspects of products such as icons, colors. And so on.

Evaluations done during design to check that the product continues to meet users' needs are known as Formative evaluations.

Evaluations that are done to access the success of a finished product, such as those to satisfy a sponsoring agency or to check that a standard is being upheld, are known as Summative evaluation.

There are many evaluation techniques and they can be categorized in various ways, these techniques are:

1. observing users
2. asking users their opinions
3. asking experts their opinions
4. testing users' performance

Be aware that some techniques are used in different ways in different evaluation paradigms.

Here in our project we have decided to use DECIDE framework to evaluation in our product.

4.1 Determine the Overall Goals That the Evaluation Addresses

In this case we should consider to evaluate the high level goals of the evaluation and to find who want it and why.

We can also describe the goal of our statements as:

- Check that the evaluators have understood the users' needs.
- Identify the metaphor on which to base the design.
- Check to ensure that the final interface is consistent.
- Investigate the degree to which technology influences working practices.
- Identify how the interface of an existing product could be engineered to improve its usability

During our user analysis we found the need for the child to have fun, and we think our product is quite user-friendly.

After some questions we found that not all children like the same avatars, so we will often swap, or add more avatars, to the available selection of avatars.

We have also researched that our product is not dangerous for the user. E.g. no radiation and the technology we use, is completely plausible for our use. The technology we use is already used in several technical applications in the real world.

4.2 Explore the Specific Questions to Be Answered

In order to make goals operational, questions that must be answered to satisfy them have to be identified. In this face we have interviewed some parents, asking them if they think the product is

a good idea, if they think it will work. They all found the interface to be simple, so that the child can choose an avatar easily.

4.3 Choose the Evaluation Paradigm and Techniques to Answer the Questions

In this face of the evaluation we have 4 evaluation paradigms and 5 different techniques. We have used some of them, including usability testing, asking users, and asking experts, interviewing parents and our preliminary answers tends toward our product being usable and effective.

4.4 Identify the Practical Issues that Must Be Addressed, Such as Selecting Participants.

As for the practical issues, after researching the RFID chip we assume our product is easy to produce, and will not e very costly. Through our interviews we have been told that children like to be taken pictures of, at least the older children in our range (2-12). They like to play interactive games, so we think they will enjoy the system.

4.5 Decide how to deal with the ethical issues

We are not saving any private or sensitive information about the children, so ethically we're ok. We then assume in this phase that our system only stores pictures of the children.

4.6 Evaluate, interpret, and present the data

Type of data: Øqualitative and quantitative.

The way typically define them, we call data quantitative if it is in numerical form and qualitative if it is not. Notice that qualitative data could be much more than just words or text. Photographs, videos, sound recordings and so on, can be considered qualitative data. The quantitative types argue that their data is hard, credible, and scientific. The qualitative proponents counter that their data is sensitive, nuanced and detailed.

We have used mostly qualitative data: 4 personal interviews and we have received an expert review from one of the other groups with lots of useful feedback

4.7 Part of Original Evaluation Data

We modify and redesign our system according the following's evaluation data.

1. Some parents might not want to put chip on their children

   Decision: They have to be explained that the chip and low frequencies are harmless for humans.

2. Some children do not want to have a badge on them

Decision: They have to be let free to decide

3. Some parents might think they will be spied on

Decision: They have to be explained that this is illegally and that a government agency see to confidentiality of the information which the museum possess

4. We are not sure how the system will work if it should communicate with many visitors at the same time

Decision: We have to make experiments in order to estimate the system's behaviour

5. This is a good idea
6. You should use the child's name on all the exhibits to personalize, on screen or spoken
7. Children love to be taken pictures of, just look at any TV-interviews, with children jumping up and down in the background.

4.2 Redesign

By using a method called SCAMPER, developed by Bob Eberte, we tried to redesign our device by brainstorming. SCAMPER is an acronym for Substitute, Combine, Adapt, Modify, and Put to another use, eliminate and reverse. SCAMPER is designed so that we will get fresh ideas and views on our product. Since all the words in SCAMPER are verbs, it will induce action on our product.

The main part of system is let visitor, special for children, have the enthusiastic sentiment visiting museum (like the game "treasure hunt", find/visit all exhibition hall, make a mark for self), at the same time the system will take pictures for you.

In the redesign the whole system, we can add others interaction designs in our system. In instance, we can build the "special matter or subject" hall, such like ocean hall, forest hall, universe hall. And all halls will be furnished to relate its certain subject. For example, there are varied birds or trees in the forest hall. The stuff in the hall can talk to visitor, if you touch it. Then visitor can get knowledge under the visiting. The entrance in the hall will place a "question machine", it will give you a question, and when you finish visiting in this hall, you will get the answer. Visitor can give the answer back to the "question machine", and if they like they can ask for another question. Mean part of this redesign is we use the RFID technical to recognize the user and send a certification during the user answers the question. This process and data can also be sent back to server, and saved by it. The goal of this part is let children learn knowledge in the games.

We can also add others interaction designs in our system. The museum has it own webpage. And they can build webpage for those children visited museum. This webpage holds the photos or others information of the child when s/he visited museum. This redesign part let the museum website more popular, and it add the interaction between museum and visitor.

These two redesign parts we have mentioned above, in the "using scenarios in conceptual design" part.

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Appendix A: Use case Diagram

A use case diagram is a diagram that shows the relationships among actors and use cases within a system. Use case diagrams are often used to:

Provide an overview of all or part of the usage requirements for a system or organization in the form of an essential model or a business model
Communicate the scope of a development project
Model your analysis of your usage requirement in the form of a system use case model.

A use case model is comprised of one or more use case diagrams and any supporting documentation such as use case specification and actor definitions. Within most use case models the use case specifications tend to the primary artifact with use case diagrams filling a supporting role as the 'glue' that keeps your requirements model together. Use case models should be developed from the point of view of your project stakeholders and not from the (often technical) point of view of developers. There are guidelines for:

1. Use case
   A use case describes a sequence of actions that provide a measurable value to an actor. A use case is drawn as a horizontal ellipse on a UML use case diagram.
2. Actor

An actor is a person, organization, or external system that plays a role in one or more interactions with your system (actors are typically drawn as stick figures on UML Use case diagrams).

3. Relationships

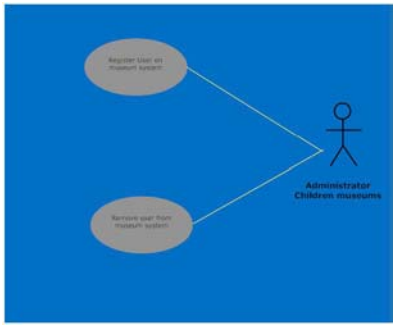
There are several types of relationships that may appear on a use case diagram:

An association between an actor and use case

An association between two use cases

A generalization between two actors

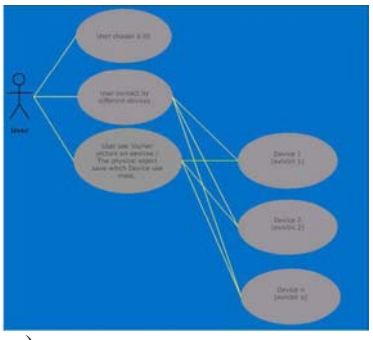
A generalization between two use cases



Administrator of museum children (Actors):

Administrator at children museum registers the user on museum system.

Administrator removes the user from the museum system.



User: (Actors)

User choose an ID, This Id can be an avatar of a comic figure or get their picture taken.

User take contact with different devices (exhibits).

User sees his/her picture on different devices (exhibits).

Appendix B RFID Introduction

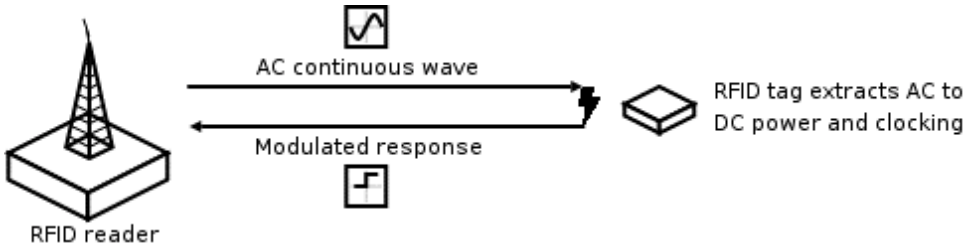
Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader.

Most RFID tags contain at least two parts. One is an integrated circuit for storing and processing information, modulating and demodulating a (RF) signal and can also be used for other specialized functions. The second is an antenna for receiving and transmitting the signal.

A technology called chip less RFID allows for discrete identification of tags without an integrated circuit, thereby allowing tags to be printed directly onto assets at lower cost than traditional tags.

Today, thrust in RFID use is in enterprise supply chain management, improving the efficiency of tracking and management. However, a threat is looming that the current growth and adoption in

enterprise supply chain market will not be sustainable. A fair cost-sharing mechanism, rational motives and justified returns from RFID technology adoption.



The diagram shows a typical backscatter scheme for RFID tags, which are powered using the energy contained in the requesting wave from the reader device.

In our project, we just use the RFID technology, either develop or improve it. The RFID chips will be place in the devices that the children museum provides, and RFID reader will be place at entrance of every exhibit hall. Details will be described in the thesis.