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Interactive elements

Interactive screens in Helsinki Design museum

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1 Introduction

Museum as an institution has changed its social role dramatically for last 20 years. Besides its traditional function as a place for storing, exhibiting and researching art objects, nowadays museums become an important platform for social communication, interaction and education. That's why creating an environment for communication is an important part of the museum work.

People come to the museum for many different reasons. For example to visit exhibition or to see specific object, to relax, to spend time with friends, to be in a popular place, that everybody are talking about, and so on.

One of the questions that every museum is facing is how to attract visitors and what will influence their decision about whether to come or not to come to the museum.

In order to increase an amount of visitors Museum offers different services in form of guided tours, brochures and books, educational programs, workshops. In general, through those services, museum offers a memorable positive experience.

An interesting and engaging experience remain in people's memories for a long time, actually much longer than information about exact objects, except for those cases then visitors are coming to the museum specifically to see those objects.

The good experiences at certain place or at certain activities will encourage people to come again and again to experience the similar emotions.

As far as museum an important social platform it should also accommodate modern life style including modern technology.

Technological development attract people, like never before, a possibility to access an information in easy and convenient way, basically just by pressing one button.

Such interactive elements as table and screens becoming more and more popular in the museums around the world as one of the ways to support educational or informational needs for children and adults. Interactive elements allow people to enrich an experience and make a visit to the museum more educational and entertaining.

One of the examples is an interactive display for the exhibition called "In the Shadows of Dinosaurs" at the National Museum of Natural History in Paris France.

“Illuminate multi-touch tables present interactive dinosaur-inspired game content in a modern and innovative way that would educate and entertain both children and parents alike. Another example is Gallery On at the Cleveland Museum of Art. Innovative gallery which blends art, technology, and inspire visitors to explore the museum collection.

2 Aim of the project

The aim of this project is to create an interactive element for the permanent exposition in Helsinki Design Museum.

The permanent exhibition in Design museum represents Finnish Design from the middle of 19th century until today. The Design Museum has a central role in exhibiting and researching Finnish design and its social and cultural significance.

The museum explores the domestic international design history as well as contemporary phenomena and works in the field of research. The museum of Finnish design is also known in the world of exhibitions and publications.

Walking around Design museum rooms you can see many different objects carefully selected and arranged according to the period and the theme.

Each object is a small piece of history, by combining correct pieces we can recreate an image of certain period in the past.

The idea for this project is to add to the exhibition halls screens with visual elements, presenting animated visualisation of leaving-room furnished and decorated with different object.

Short videos and visualisation give an unique opportunity to peck into the past, and to see the ideals of previous generations about everyday beauty and comfort, modern, at the time, technology and material.

Each screen will also contain an interactive element with additional information about objects, time and designers.

Periods of 1930s, 1950s, 1970s are chosen for this project.

3 The sources

The Idea of the project and all material used for it were approved by Design museum education department representatives Hanna Kapanen ja Leena Svinhufvud, with objects being chosen in close cooperation with museum personnel.

Main sources of the material will be the permanent collection of the museum and museum library.

The objects for each model were selected based on importance and significance of its design for the time period and overall aesthetic look of the room.

Although the whole project originally included three interactive screens for 1930; 1950 and 1970, this work will describe, as an example, only one model for the period of 1950.

4 Tasks for the project

- Research and select objects for the scene. The furniture and objects in the room will represent the most typical, commonly used or significant achievement in design of that period from Design museum collection.
- Reconstruct 3D models of a room and each object.
- Create introduction video that will show the room from different perspectives. The duration of video is 15-20 seconds.
- Create a still picture from the final frame of the video
- Create interactive elements for the picture. Interactive elements will include some additional information about designers, objects and time.

5 Researching and selecting objects for the scene

5.1 Room

The first task was to choose the interior and furniture. The important points for the interior was to create a warm atmosphere of living space, which would also include all desirable elements. Finding



and choosing object for the project can be compared with process of arranging an exhibition. Virtual exhibition that opens up door to the past, presenting objects that tell the story about time, ideas and people.

The main floor layout and room design were influenced by photographs from "Kaunis koti " magazine 1959. Pictures were published in "Heroism and everyday" book as an illustration for new design living room at the end of 50th with a label "...An architect's home"

5.2 Objects

The post war period of shortage of the 1940s was followed by a boom period in the 1950s, when the concept of Finnish design was born due to success at the international exhibitions.¹

After the war the standardisation of furniture had the effect of changes for interior architects in which the design of one-off furniture was rejected and industrially manufactured standard furniture began to be used.²

The end of reconstruction period is dated to the year 1952, when the most of the war reparations had been paid and an economic upswing began in peacetime conditions which continued as far as the 21st century.

The Olympic games of 1952 were of great importance of national unity and post-war development in Finland.³ At the beginning of 50s furniture in common houses was a combination of old and new, and only little by little it was replaced with a new one.⁴

Leaving room is an important place for family where everybody can spend time together.

Not every apartment had a luxury of separate social space. Most of the time leaving room also was a bedroom for one or more of the family members.

Typical set for a living room would consist of sofa or a bed sofa with two armchairs that were not necessary of the same colour or from the same set, a floor lamp and magazine racks. For the wall decoration small graphic pictures were recommended as well as indoor plants, as a family oasis.

Radical changes happened to come to an end of 50s. Leaving room had to accommodate one more object - television.

Television could be hidden behind slide door or stay at the corner of the room and would be brought to the centre of the room only then needed to followed favourite program.⁵

Cotton, wool and linen were materials used for home Textile. Silks and plush do not satisfy the taste of modern environment. Printed fabrics brought bright and happy colours to the modern interior "Interior design of our days" Colourful fabric fit well for large windows. Designs were developed by graphic designers, artists and architects.

The role of traditional carpet Ryija has changed due to work of modern Textile designers, who modernised this craft. Among them were Uhra-Beata Simberg Ehström, Ewa Brummer, Kirsti Ilvessalo, Rauha Arnio, Toini Nyström

Chair - Ilmari Tapiovaara "Mademoiselle tuoli"



Ilmari Tapiovaara design Mademoiselle-chair in 1956. He based his design on a traditional Finnish children chair. Mademoiselle chair has high backrest, low seat and delicate feet. This balanced design gives this chair a comfort of an armchair.

Ilmari Tapiovaara (1914-1999) is Finnish furniture and interior designer. He belonged to the post-war generation of modernists and functionalists. From 1933-1937 he was studying in School of Applied art in Helsinki. Since 1937 in London and later as a trainee in Le Corbusier office in Paris. After coming back he was offered a position of leading designer in Asko-Avonius Oy.



During the war he designed barracks and furniture for soldiers from local wood, the only material available. Ilmari Tapiovaara was teaching in Interior department at the Institute of Applied Arts and at the Helsinki University of Technology. During his career he designed many chairs for public and private places. As an interior designer he created designers for banks, offices, hotels and shops. One of his legendary chairs is Domus chair, that become very popular also outside Finland.

TV table - Alvar Aalto



Artek tables are based on different combinations of Alvar Aalto's L-leg and table tops. Alvar Aalto introduced the bent L-leg for the first time in 1933 and it became a standard component of Aalto's pieces of furniture. L-leg, was patented in the same year as one of the innovations by Alvar Aalto. The legs could be attached directly to the table, chair and stool tops. Judging by his importance as a designer and an architect, Alvar Aalto considered the development of the L-leg as his greatest achievement. In his opinion its revolutionary character was comparable to the architectonic column. And actually he even called the L-leg as "the little sister of architectonic column".

Shelf - Alvar Aalto



Alvar Aalto (1898-1976) is Finnish architect and designer. Master of Finnish functionalism. He was one of the leading architect of the reconstruction period and of innovation and standardisation matters.

The most important projects are: Tuberculosis Sanatorium in Paimio, Finland was the first building planned by Aalto which was entirely furnished with furniture designed by Aalto. Viipuri Municipal Library, La Maison Carré Finnish Pavilions for the 1937 Paris and 1939 New York World Fairs.

In 1935 Alvar Aalto, together with Aino Aalto, Maire Gullichsen and Nils-Gustav Hahl, founded Artek - furniture and lighting company. Alvar Aalto was also a glass designer and his most famous work as a glass designer is the Aalto vase – one of the most iconic glassware pieces in Finnish design.



Vase - Tapio Wirkkala "Chanterell"

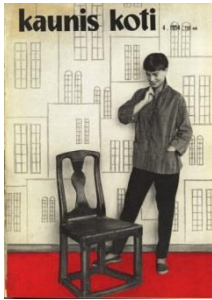


Tapio Wirkkala was born in Hanko, Finland was a genius of design. His contribution to design includes everything from glass design and sculpture to graphic design. He is considered as one of leading figures of modern Finnish art industry. During his active career Tapio Wirkkala took part in international exhibitions and worked as Director of University of Art and



Artistic of several years. He was awarded with numerous prizes, including three gold medals at the Triennale in Milan in 1951 and in 1954, designed by Tapio Wirkkala glassware for Iittala are his best-known production. Ultima Thule and Tapio have retained Iittala's popularity for decades.

Magasin - Kaunis koti



After the Second World War the magazine started to influence the consumer taste in interior decoration. Kaunis Koti was the first actual interior design magazine, which was established in 1948. While it was a period of house shortage.

The basic concept of Kaunis Koti was ideological. It meant to guide and "give impulses". Until 1960s the magazine visual world remained mostly black and white with a few four-colour illustrations.

In a pilot issue 1948 Eva Palohelmo characterised the main idea of magazine: "A truly beautiful home is one that meets the requirement of its own time, with nothing unnecessary and with each object having its own important place and role"

Lamp "Sipuli"



Sipuli Pendant lamp (1954)

The angular Sipuli pendant lamp was designed for Innolux company. It was created from blown opal glass and received a gold medal at the Milan Triennial in 1954.

In Innolux collection it also had a name Bulbo. The symmetrical and harmonious Sipuli is particularly suitable for general lighting or for installation in groups, for instance, in large lobbies.

Lisa Johansson-Pape 1907-1989

Lisa Johansson-Pape was the most influential Finnish lighting designer in the second half of the 1900s.

Graduated in 1927 from the Central School of Arts and Crafts and started to work for Kylmäkoski as a furniture designer. In 1933 she became a member of Friends of Finnish Handicraft. In 1937 and in 1942 She designed furniture for Stockmann owned lighting



factory Orno. She became co-founder of the Illuminating Engineering Society of Finland and she the artistic director of the Friends of Finnish Handicraft from 1951 – 1985. Johansson-Pape also created installations for 150 churches a children's castle, a rheumatic clinic and for the ships. She participated in New York's World Fair of 1939 and the Milan Triennale, where she won an award in 1951. Lisa Johansson-Pape was awarded with many prizes including golden prize in Milano Triennale and Pro Finlandia prize. In 1963 she designed several vases for Iittala.

Wallpaper-2+3



Annikki and Ilmari Tapiovaara designed wallpaper "2 + 3" in 1958. The wallpaper "2 + 3" is an elegant geometric pattern, with numbers of different sizes.

Carpet



Whitsun Bonfires Designed in 1956. Woven at weaver of the artist Eva Brummer (1901-2007)

Art teacher and textile designer Eva Brummer was one of the significant modernist artist working with a traditional Finnish wowing technique Ryijy. From 1920 she developed technique in which threads were mixed with different shades length and were cut with unshapen knife. The surface of her Ryijy is very soft and blurry where one colour emerging into another creating a painting affects.

Eva Brummer was awarded with many Finish and International prizes. She played a key role in the industrial art of the Golden Age of Finnish design.



Tapiola garden - View from the window



Tapiola was the first post war reconstructed area in Finland where social housing reform concepts played a leading role. Examles and models for developing Tapiola came especially from Sweden (the design of the houses, collective space and electric power and heating systems), Denmark (garden and environmental design), England (new towns and suburbs developed on ideology of garden city in the United States).

TV

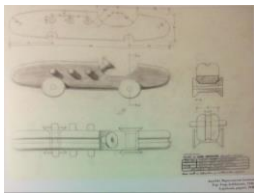


Salora manufactured their first own television set, TV 59/17, for seven months, from the beginning of September 1958 to the end of April 1959. Before this, during the year 1957 they had manufactured Salora 58/17, a television with Telefunken's mechanism. Salora tv 59 was available in 17 or 21 inches.

The television had 21 tubes and a separate, laminated protective glass in front of the picture tube.

The receiver was advertised in a local newspaper in a following way: " Now is the time to start television time! Salora television with automatic tuning, a receiver yet to find its equal in the whole Europe". Television transmissions reached approximately 60 places in Finland at that time.

Toy



Baby boom of post-war time inspired

Ilmari Tapiovaara and Annikki Tapiovaara to design wooden toys for children to enjoy and learn. The toys were one of the first examples of eco designs, because the material used for the

toys was leftover from furniture production.

Wooden car toy Trip-Trap was designed by Annikki Tapiovaara.

6 3D model reconstruction

The next step for the project will be reconstructing the room with furniture and props in 3D environment.

In this project we have two different types of objects:

1. Objects that available only in a picture format, like for example the room itself, wooden car toy and TV with some additional information available about sizes and materials.
2. Objects that are well-known and available in detailed pictures with measurements as well as real objects from Design museum collection. The objects

such as Ilmari Tapiovaara chair Mademoiselle, Alvar Aalto shelf and table.

While objects from the first group can only be modelled in 3D environment using an Image Plane from available photos, drawings and measurements, many other technologies available for modelling already existing objects from real world.

Although all objects for this project were modelled in Autodesk Maya programme. There are different and sometimes much faster ways to build an object in 3D environment.

3D scanner

3D scanners allowed to capture an object from the physical world and create a digital model of it. 3D scanners can scan wide range of objects from small toy to the whole buildings.

Scanners collect large amount of data consisted of thousands of measurements and create point clouds or meshes, which is later process in special software.

This process called "reverse engineering", different software, which build a CAD models directly from data, are used for that, for example programmes like Geometric Digital X.

3D scanners allow to create digital model of the object much faster and more accurate than a traditional way of designing model in 3D environment from side and front pictures.

7 Applying material in Maya

There are several types of materials used for this scene.

- *mia_material_x*
- *Maya Blinn*
- *Maya Lambert*

The mental ray *mia_material_x* were used for some object in a scene, because it supports almost all effects of the real material used in architecture and product design, especially glossy reflection and refraction and high-quality glass.

Mia_material_x materials tend to be physically accurate and depend on colour mapping during rendering. For the better visual effect gamma correction is recommended.

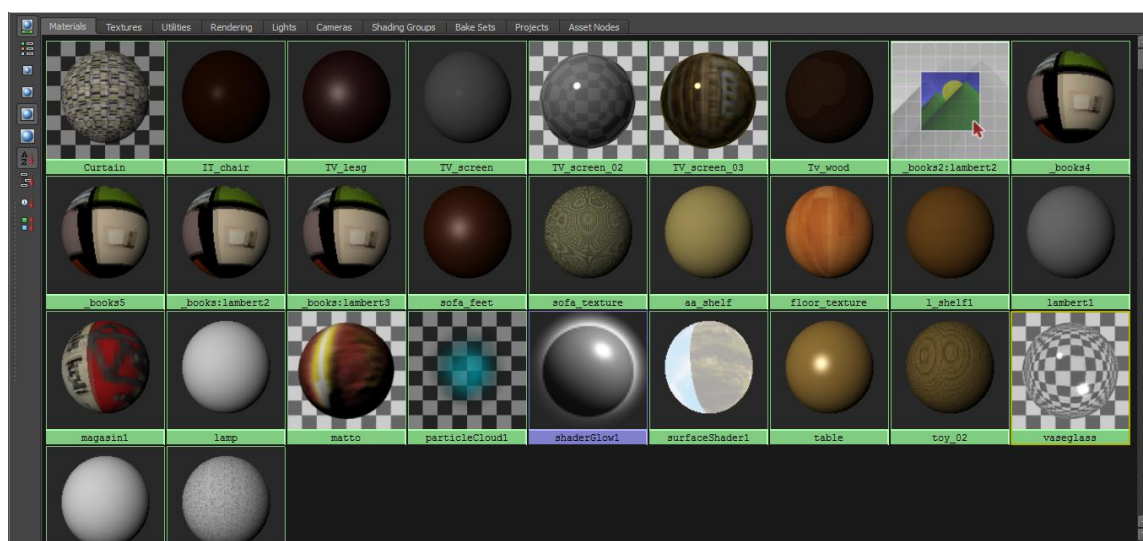
The material comes in two variants, the original *mia_material* and the new extended *Mia_material_x*. These are just two different interfaces using the same underlying code, the functionality is identical, except that *Mia_material_x* has some additional parameters relating to bump mapping.

Blinn is a material that is used for simulating metallic surfaces with soft specular highlights. The attributes of Blinn materials control the size of shiny highlights and the ability of the surface to reflect its surroundings.

Phong shader a material that is used for glass and glossy plastic or metal surfaces.

There are surfaces for which both *Mia_material_x* and Blinn materials can be used, but there are a lot of differences between them. First of all, *mia_material* is more physically correct, it controls the intensity of reflected and incoming light. *Mia_material_x* also uses reflection for both specular and reflection, as well as transparency effect and is also more realistic than in other shades like *blinn* or *phong*.

Lambert shade is the better option for flat surfaces, with no reflections or highlights on it for matt and unpolished surfaces.



- *mia_material_x* - vase glass, TV screen; Rug
- *Maya Blinn* – Chair; TVlegs; TVscreen; Floor; Lamp; Sofa_feet;

- *Maya Lambert – curtain; TVbox; Books; Book_shelf; Magasin; Sofa_upholstery; Wall_left; Wallpaper*
- *surfaseShader – outside view*

8 Video rendering settings in Maya

8.1 Light and rendering.

Light and rendering playing an important role in creating visualisation of 3D environment. The goal for this interior was to design the room that lit with midday sunlight, creating nice, warm atmosphere.

The *mentle ray* Physical sun and sky shader would be the best option for that goal, because it especially designed for daylight simulations of daylight scene.

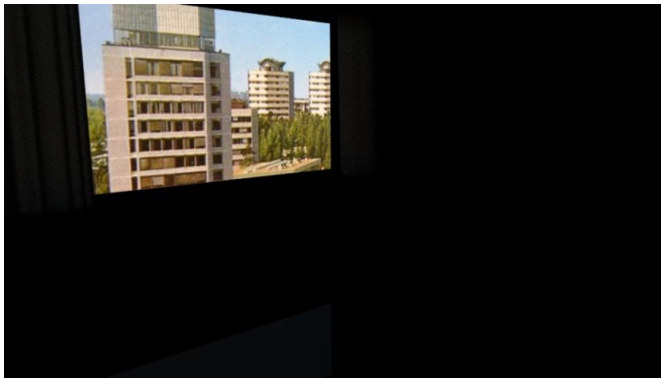
The mia physicalsun and mia physicalsky are used together.

Mia physicalsun shader applied to a directional light that represents the sun light,

Mia physicalsky shader used as the camera environment shader.

The environment shader is used to illuminate the scene with the Final Gathering creating bounced light from the sun or with GI (photons).

Following pictures illustrate different steps in creating light for the interior:



1. Street view outside the window:

surface shader from Maya materials In hypershade menu.

The picture is applied as surface shader outcolore



2. Directional light Default setting

Directional light will simulate a very distant source of light, the sun.
A directional light lit the scene evenly in one direction.



3. Area light, default settings.

Area lights simulate the rectangular reflections of windows on surfaces and particularly good for high-quality images

Area light is placed right outside the windows and has approximately the same size as windows itself



4. Area light

intensity- 0

emit diffuse - not used

emit specular - not used

In Mental ray settings=> Caustic and global illumination

Emit Photons option is selected

Photon intensity 5000 000.000

Global illumination Photons 50 000

Render settings:

in Indirect lighting menu, option Global illumination is selected.



5.Area Light

In order to spread light more evenly, in light settings also activate option "Use the light shape"

Render setting =>

indirect light menu => global illumination options

Accuracy 800

Radius 80

Final governing

final governing traising

Reflection 10

May Trace Depth 10

Quality= Raytracing

refraction -10

refraction_10

Max Trace Depth -20



6. Directional light colour

In Mental ray => mental ray light=>mid-cie-d1=> Kelvin colour temperature daylight 5500-6500K

The colours of realistic light can be adjusted according to the Kelvin chart colour.

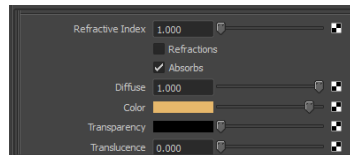
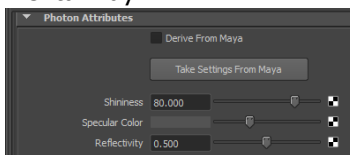
Visible colours are relative to the Colour Balance(White Balance)of a film camera, with two most common settings: 3200K indoor colour balance and 5500K outdoor (daylight)colour balance. There are different charts that represent RGB value of the light colour are available specifically for digital lightning and Rendering

WB SETTINGS	COLOR TEMPERATURE	LIGHT SOURCES
	10000 - 15000 K	Clear Blue Sky
	6500 - 8000 K	Cloudy Sky / Shade
	6000 - 7000 K	Noon Sunlight
	5500 - 6500 K	Average Daylight
	5000 - 5500 K	Electronic Flash
	4000 - 5000 K	Fluorescent Light
	3000 - 4000 K	Early AM / Late PM
	2500 - 3000 K	Domestic Lightnring
	1000 - 2000 K	Candle Flame



7. Floor material settings

Mental Ray=>



8. Camera settings

Tone mapping is used for High Dynamic Range Images (HDRI for short) to compensate limited dynamic range of computer displays.

The architectural library provides two solution for this problem:

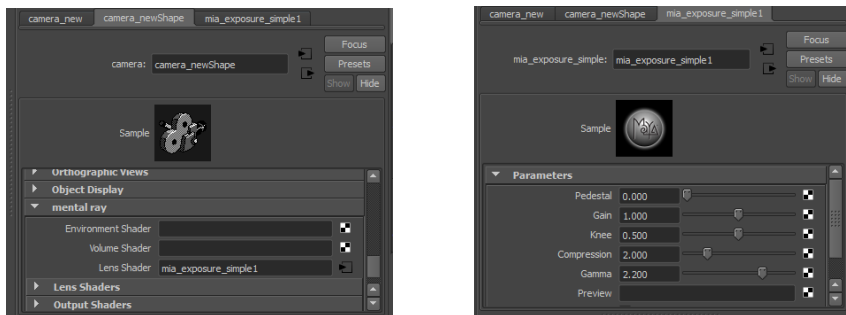
1. simple shade that simply adds a knee compression to effect over-bright areas
2. complex "photographic" version that converts real photometric luminance with the help of parameters found on a normal camera into an image.

These shaders can be applied either as a lens shaders or as output shaders.

"Also, both of the supplied tone mappers include a gamma term. It is important to know if one is already applying a gamma correction elsewhere in the imaging pipeline (in an image viewer, in compositing, etc.), and if so, set it to 1.0 in these shaders. If one is not applying gamma correction anywhere but simply displaying the image directly on screen with a viewer

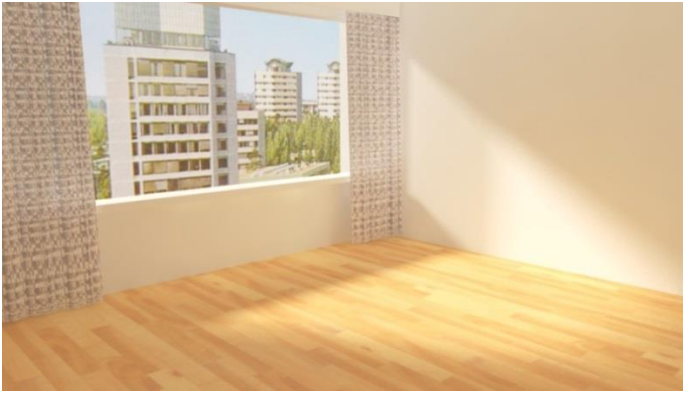
that does not apply it's own gamma, one should most likely use the gamma in these shaders, set to a value between 1.8 and 2.4." ⁶

For this project mia_exposure_simple will be applied.



mia exposure photographic

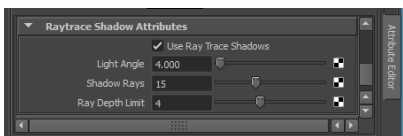
The photographic tone mapper converts actual pixel luminance (in candela per square meter) into image pixels as seen by a camera, applying camera-related parameters (like f-stops and shutter times) for the exposure, as well as applying tonemapping that emulates.



9.Smoothing the edges of the directional light shadow.

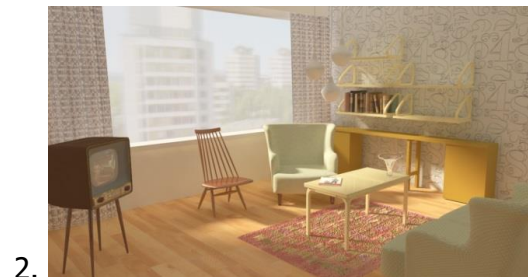
Dirrectional light shape settings=>RayTrace Shadow attribute=>

Use retrace shadow option is selected=>



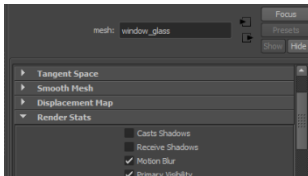
10.All objects are placed in the room

Rendering time is 58 minutes.



While focusing on the interior and objects inside the room, sharp and bright picture of outside view, creates unrealistic illusion. In order to keep outside picture, but make it less contrast couple of different methods can be used.

In Pic.1 Semi-transparent screen was added in Maya scene to function as a window. As a result the directional light was also blocked. To avoid that in window_glass object setting Render Stats menu Casts Shadows and Receive Shadows options has to be removed.



In Pic. 2 The outside view picture was edited in Photoshop with some bluer filters and semi-transparent layers of white colours.

Final picture is representing the interior with the middle of the day light from the window, which would be a respond to the task of the given interior visualisation. With the current light and rendering settings the rendering time for one frame is 60 minutes, which is too long, considering, that this project also includes 200 frames animation video of this interior.

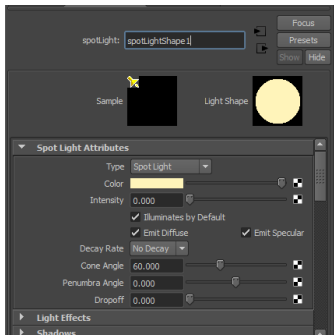
In order to preserve similar visual effect but reduce rendering time several changes has to be made.

8.2 The light, corrections:

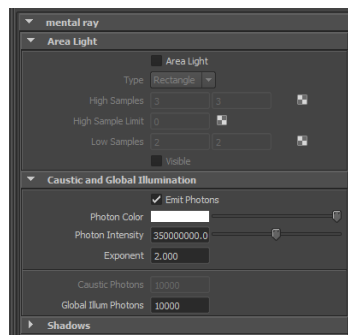
One of the reason for the extended rendering time might be the use of the Area light. In this interior the window is very large, which is also affecting the size of the Area light.

Replacing Area light with a SpotLight.

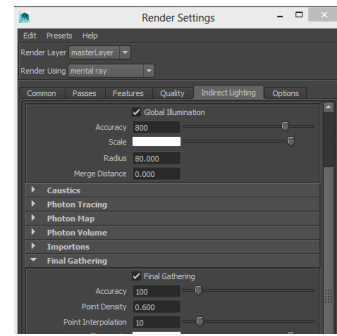
For the SpotLight Photon emit will be applied.



SpotLight Attribute.



Mental ray settings.



Render Setting.

8.3 The material, corrections:

The other reason for the extensive rendering time can be material, especially Reflection and Glossiness attributes.

There are several objects in this scene that has those effects.

Despite of the real quality of the material, not all of the effects are necessary seen and doesn't have to be applied for photorealistic visualisation.

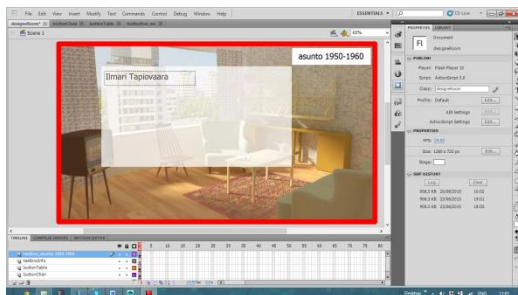
For example for the shelf on a right wall and the table in a middle of the room the same material were used.

This material imitates polished wooden surface. As we can see on the picture, only table remains in a sport light with material effects seen, while shelf is almost completely remains in the shadow, without reviling much of the polished surface. In that case the shelf material can be replaced with Lambert material of the similar colour without additional Reflection or Glossiness effects on it.

The same ideas were used for the floor, curtains and sealing lamps.

As a result of those changes the rendering time reduced from 58 min to 15min.

9 Interactive elements in Adobe Flash



Creating interaction navigation

Interactive movies allowed viewer to receive more information on the display based on an action such as mouse click or key presses from the keyboard.

For this project interactive elements will be designed in Adobe Flash programme is using ActionScript.

ActionScript provides the instructions that tell each button or a movie clip what to do when the user clicks on them.

For our project we will have 12 interactive buttons on the screen. By pressing each button, the viewer will see a textbox with some pictures and additional information.

There are several ways to do that in Adobe Flash.

9.1 Method #1

For each interactive elements we will create a separate layer. The length of the animation will be 40 frames.

In order for the viewer to be able to control buttons, we will start our script for a Stop Action:

```
stop()
```

Event Handlers for Buttons.

An Action script code detect events such as mouse click and respond to it with an Event handler.

```
nameoftheobject.addEventListener (MouseEvent.CLICK, showimage1
```

the next step is to create the function, that will respond to event_the mouse CLICK

```
function showimage1 (myEvent:MouseEvent):void
{
    gotoAndStop(...);
}
```

For each button the action script will be created to listen for a mouse click. The script will make Flash go to particular frame on the timeline to show different content

```

Stop()
nameoftheobject_btn. addEventListener(MouseEvent.CLICK,showimage1);
function showimage1(event:MouseEvent):void{
    gotoAndStop(...);
}

```

This method is applied for a simple projects with one or two buttons, but for more interactive elements in the same scene this method is will create problems and complications for editing and changing separate parts.

9.2 Mehtode#2

For more complicated projects, involving more interactive elements we can use a method of Loading the External Content. Loading external content make the further changes to the content much easier, because it keeps each interactive elements of the project in a separate parts.

To load the external files, we will use two Action Script objects: one is So called Loader and another called URLRequest.

For this method we will need one more layer for the ActionScript. ActionScript will include scripts for all buttons and movie clips in the scene.

Before starting with a script, we will have to create the interactive buttons. For this project outline of some objects will become a shape of the buttons. creating outline for the button convert in to the movie clip give a name the instance of the movie clip create a graphical elements, for the viewer to distinguish which object has an additional information by placing cursor over the object (Graphic elements are created in object own layer. Each new appearance created in the separate frames).

For example for the button Chair interactive element the script will look like this:

```

var myLoader:Loader=new Loader ();
buttonChair_mc.addEventListener(MouseEvent.CLICK, buttonImgcon-
tent);buttonChair_mc.addEventListener(MouseEvent.MOUSE_OVER, buttonOver-

```

```
DashedLine);buttonChair_mc.addEventListener(MouseEvent.MOUSE_OUT, button-
OutDashedLine); myURL:URLRequest=new URLRequest(e.currentTarget.name +
".jpg");
    myLoader.load(myURL)
    addChild(myLoader);
```

We will do the same for each movie clip on the scene.

In order to remove the content from the scene we will use `removeChild()` command

```
myLoader.addEventListener(MouseEvent.CLICK, unloadcontent);
function unloadcontent(myevent:MouseEvent):void{
    removeChild(myLoader);
```

Function is ready and the next step will be to add an animation to the scene.

10 Rendering, exporting and editing animation

10.1 Rendering

Rendering settings for the file format depending on further use of the animation and a programme applied for postproduction proses.

10.2 Method #1

One of the ways to export animation from Maya is to render each frame with in JPG format with following editing in, for example, Adobe Premier or Adoben After Effects. FLV or MOV video file format can be used for exporting video.

For this method FLV format is applied which will be further imbedded into Flash file as a part of animation and exported as a SWF file.

10.3 Method #2

Another way is to render animation with Batch Render in Open(exr) format with diffuse, indirect, reflection, refraction, specular, incandesces and shadow passes with further postproduction in NUKE programme.

11 Conclusion

The goal of this project was to create an interactive element for Helsinki Design museum, which will allow visitors to learn about some objects from the museum collection in different and entertaining way.

Interactive screen can also be considered as an extension for the museum exposition, as far as 3D modelling allows to include into virtual space, objects that are not physically exists, but were reconstructed from sketches and drawings.

The project planning and production took about 4 month to accomplish.

The whole process consisted of several separate steps:

- Planning and researching.
- 3D modelling and reconstruction
- Rendering and animation postproduction
- Creating interactive elements in Adobe Flash

11.1 Planning and researching.

The first step took about 15% of the time and included research for required equipment and software programmes as well as a selection and detailed studying of the objects included in the scene.

11.2 3D modelling and reconstruction

This step took about 35% of the time and included modelling and texturing of the objects as well as setting the light for the scene in Autodesk Maya programme.

11.3 Rendering and animation postproduction

This step took about 30% of the time.

Final animation consisted of 200 frames with 15 min rendering time for each frame which took about 50 hours.

The animation was rendered with Batch Render in Open(exr) format with postproduction in NUKE programme.

11.4 Creating interactive elements in Adobe Flash

Final step took about 20% of the time and included:

designing the graphic elements

programming in AS3 (ActionScript3) the function for the interactive element using Adobe Flash programme

Incorporating rendered animation from Maya into Flash file

12 Further development of the project

This project illustrated the development and designing proses for one interactive screen for the period of 1950-1960. The similar screens can be added for the different periods.

This project can be also developed in a conceptual direction.

Using visualisation of the scene and objects as a graphic elements for the board game for children.

13 Critical analysis

Several ideas should be taken into consideration for planning and designing similar projects with interactive elements.

Planning. All object for the scene should be chosen very carefully due to some limited information available about, for example, measurement, original material or the year of production, so that scene stays historically correct.

Designing. While remodelling already existing objects, different methods can be considered in order to save some time on traditional 3D modelling. Applying material. Also careful consideration should be done while applying material. High quality material for transparent and glossy objects should be applied only if the effect is visible on the final image, otherwise it can be replaced with simpler materials, that don't require extra rendering time.

Light. Depending on final purpose of the visualisation different light settings should be used. For example, Area light can provide good real-life effects, but can expand rendering time, which is important for animation if one is used for the project.

Interactive elements. For this project Adobe Flash animation programme was used, Nowadays many interactive elements are also designed in HTML5 based system. Designing interactive part in the project in HTML5 based system, might be more convenient for final users due to possibility to use it in multi-platforms. For example Android and IOS are not compatible with flash technology.

The original idea for this project was to use it as an interactive screen in exhibition halls. For that purpose Flash file will sufficient. In case that this project is applied as an additional component on a museum webpage, HTML5 will be better option for the final user.

Abstract

This work is representing the possibility of using different interactive media element for the exhibitions and museums.

The main focus of this projected was to enrich the visitor experience by presenting objects from the museum collection in it's realistic environment.

This project was designed and developed for permanent collection of the Design museum in Helsinki, were the exhibition halls will be equipped with interactive screens, presenting animated visualisation.

This project consisted of four different steps:

Researching and selection of the objects and interior, modelling in 3D environment, rendering and exporting 3D animation, creating interactive elements.

Following programmes were used for the project:

Autodesk Maya, Adobe Flash Professional CS5, Nuke, Adobe Premier Pro CS6

This project can be also developed in a conceptual direction.

Using visualisation of the scene and objects as a graphic elements for the board game.

14 Abstracti

Tämä työ edustaa mahdollisuuksia käyttää erilaisia interaktiivisia multimedia elementia näytelyissä ja museoissa.

Projectin pääpaino oli rikastuttaa vierailijoiden kokemus esittämällä museon kokoelmasta esineitä realistisessa ympäristössä.

Tämä projekti oli suunniteltu ja kehitetty Helsingin Desinmuseoon, jossa näytely tiloissa esitelty interaktiivisia näyttöjä.

Projekti koostuu neljasta eri vaiheesta: esineiden tutkimus ja valinta, 3D ympäristössä objectien rakentaminen, 3D animaatio renderointi ja exportointi, interaktiivinen elementit rakentamiseen.

Seuravat ohjelmat käytettiin:

Autodesk Maya, Adobe Flash Professional CS5, Nuke, Adobe Premier Pro CS6

Tämä projekti voidaan kehitettää myös konseptuaaliseen suuntaan. Esimerkiksi 3D visualisointi ja graafisia elementejä voidaan käyttää lautapeliin.

Link to the video of the project

<https://vimeo.com/166550500>