Bart Hengeveld

DCB100: From Idea to Design

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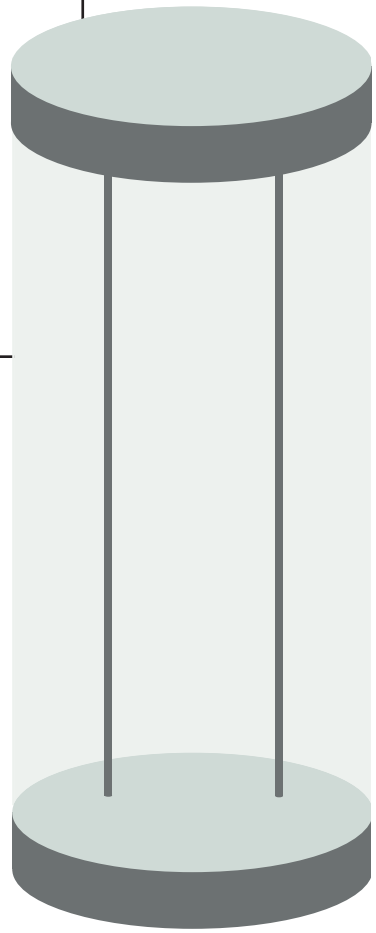

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EVA

DISPLAY STAND

1.0 Recap Case

“When people go to the store, they don’t see any good display stands. The current display stands are passive, boring and just not attracting anybody’s attention. These stands are often linked to a loyalty program. These loyalty programs are all about attracting customers and increasing their commitment to that specific store by giving the opportunity to collect and save points every time a customer buys something. These ”loyalty points” can, for example, be spent to make some of the more expensive products better affordable. CRAZE is the company behind most of these loyalty programs, and they are looking for new innovations to implement in a new innovative and smart display stand.”

CRAZE® CREATING MEMORIES

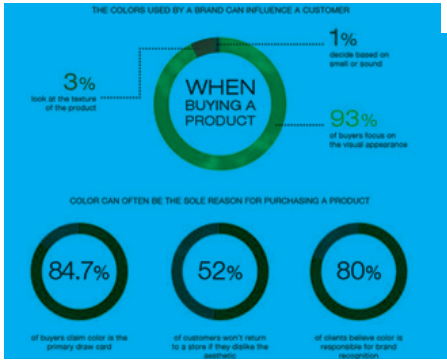
CRAZE wants to become the number-one loyalty program partner with the use of unique loyalty programs. They focus on rewarding their customers with the best possible value for money on products from high-end brands. Their unique business model in combination with the high-quality products and our smart display stand will help them grow into the next phase of displaying. At this point, they produce stands for around €200 a piece and use them for 16 weeks before discarding them. For their new innovative display stand, they need something smart and attractive. The technology nowadays allows us to implement sensors to optimize the display stand and its interactivity with the customer, while at the same time drawing the customer’s attention.

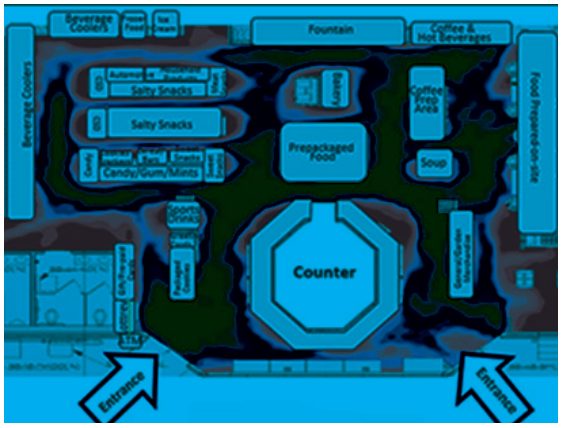
1.1 Research

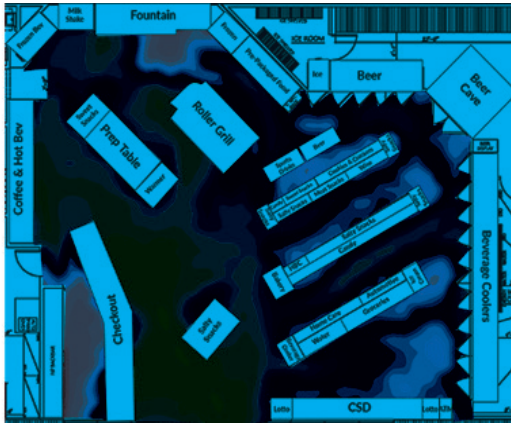
CRAZE has creativity, quality, reliability and transparency as their main values, and we want to continue this by implementing them as much as possible into our design. We researched aspects about the psychology behind attractiveness and discovered for example that things like colors and aesthetics are key factors in the loyalty process. Especially the colors change our behavior, focus and even our general well-being. That is why we decided to allocate some extra time to the aesthetics of our stand. We also chose to design a reusable stand, to not only make the display stand smart, but also make the entire loyalty program more sustainable.

Another major key point that can make or break the effectiveness of a display stand is its location in the store. When placed in a zone with matching products, the display stand will be way more effective than when placed randomly, that is why we also researched on the layout of supermarkets, and why they were mapped out this way. After a couple of hours of searching and exploring the internet, we decided that the so-called "Golden zones"(a supermarket aisle) are the sweet spots in every store, as well as the "Gondola ends"(the exposed, short blocks of shelves at the ends of the aisles).

As the heat maps show, the "Gondola ends" in front of the store are the most visited spots in the store. So when placing the display stand, there are two things that need to be taken into concern, if the location matches the product displayed, and if the location gets enough attention based on its position inside the store. Yet we also got another option, which, in our opinion, will have even more impact, this will be explained later on in the report.







2.0 Recap midterm report

2.1 What do we want from our project?

In the midterm report we reported what essentials we wanted in our final design. This being what our main values were, what concepts we wanted to use, how we got to this point and what ideas we have scrapped.

We knew that in order to get the customers attention you have to use psychological tricks, for example by placing the products in the correct place or using noticeable color coding. We had to bring our own innovative elements to the display stand to make it stand out from the rest.

We understood from our tutor (Bart Hengeveld) that we could go outside of the normal boundaries of a display stand. One of the most important aspect of our stand was to implement a factor that makes the viewer more interested in the stand. This is why we wanted to push our ideas and go into the future and imagine what would be possible if the technology is further developed, we are talking about 10 to 50 years into the future.

2.2 Ideation

We brainstormed about ideas for ages, coming up with new and innovative ideas. Some were absurd or too silly to use. However combining some of these ideas gave us a new vision, a new horizon so to speak. We went outside of the box and then we went outside of the available technology. This broader vision gave us more space to work with. If not everything is invented yet? What can we bring to the table that might be possible in an x amount of years? We created our “perfect” world, our own utopia where everything is possible, only then can you start to realize how far you can go. We then had to bring these crazy and absurd ideas back to “our” world, to the here and the now.

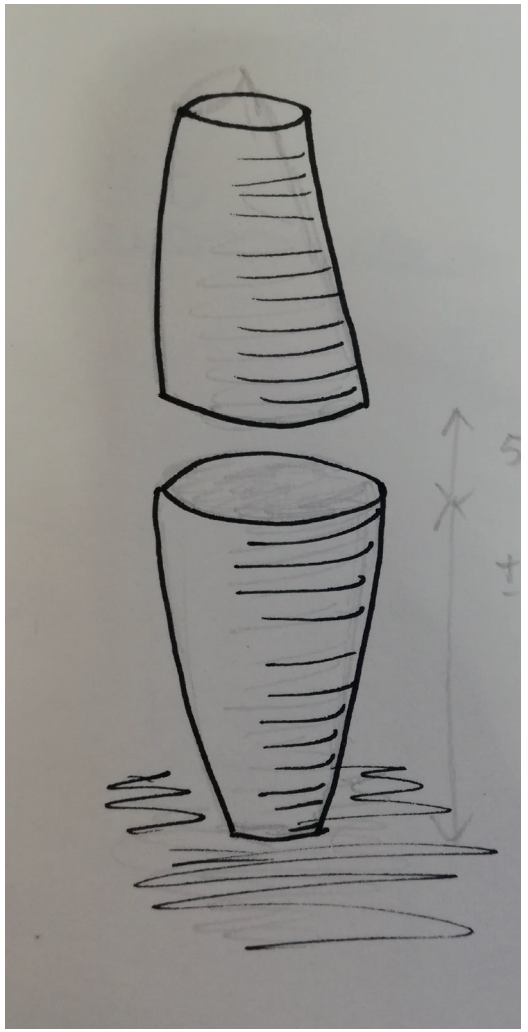
So if not everything is possible, how far can we push these idealistic ideas? We discussed and tried understanding the possibilities, this led to some fairly interesting results. Before we explain our idea, we first have to explain what our values are. We wanted the display stand to look clean, futuristic and attractive for customers. The display stand had to be interactive yet little time consuming. It also had to be simple to use the stand. The display stand had to be sustainable, reusable and produce limited, to no waste products. The goal of the stand is to attract as many customers as possible, one way we found to achieve this goal, was to place the stand in a different environment. We placed the stand on the outside of the store, which will lead to more people actually seeing the stand so customers don’t have to enter the store to see the loyalty program. This results in a broader audience for the loyalty program and will result in more sales.

2.3 Conceptualization

To catch this futuristic feeling in the stand we wanted to use a pillar like shape, assembled from two parts: one bottom part and one floating upper part, making it look like a floating pillar. The upper part of the stand will float with the use of magnets. In between the two parts is an open space where via a magnetic field the Nano-technology can be controlled. This Nano-technology can change shape, color, texture and size. An ideal material for displaying products, you don't need the real products in the stands, creating a zero waste solution where you have endless possibilities.

The stand would display all the products in the loyalty program, in a catalogue that's simple to browse through. By interacting with the stand using hand gestures (swiping from left to right) the customer can browse through the catalogue of the loyalty program products. This Nano-technology can take shape of the wanted product and create a one-to-one replica, ideal for showcasing products. If the customer for example doesn't like the color of some type of shoe, he/she can change it within seconds.

For our prototype we used two cups with see-through paper to let through light and lighten up the product inbetween the two paper cups. The two paper cups were a great base for our design. A simple yet effect shape that creates a futuristic look. The light will give a dynamic look to the stand and the product. This prototype was only meant for a visualization of the actual stand, it was not near the final design. It gave us , the tutor and Craze a clearer vision of what a stand of this kind could look like.



2.4 Video and prototype

With futuristic aspects as one of our main values we wanted the video to have this same atmosphere. We implemented multiple aspects from Apple's introduction videos. They use different pitch and camera characteristics that illustrate a futuristic design. They want to push their technology and show that they are innovative in their products. As a group we agreed we could use an Apple video as the main guideline for our prototype introduction video.

We then used some of their iconic one liners, like: "This year we've come up with the utmost revolutionary design". We used the same Apple format for the video: an introduction with a person on screen telling the viewer what we have come up with this year, then showing the product from a close-up perspective with moving lights around it, emphasizing our design is futuristic and clean.

Still our design and concept were a little out of our reach so we had to come up with other ways to display how our stand functions. This is where we implemented 3D models of the stand and animations to get a clearer idea for the viewer. With the Apple introduction video in our mind we still wanted to make it our own. That's why we made the video a little funny, almost parody like. We did this by giving the actors important but fake roles like Vice-President Co Designer.

> "This year we've come up with the utmost revolutionary design"

2.5 Feedback

Our tutor (Bart Hengeveld) gave us a not so descriptive explanation on what we could do to improve the design or the product itself. He rather gave feedback on what we missed in the midterm report or what we should have emphasized more on. This is somewhat helpful in the way that we can implement this feedback in our next report, however it doesn't bring us further with our project. Bart appreciated our ambition to go into futuristic technology, but he wants more solid arguments to go so far into the future and not only the argument that we want to be original.

From this feedback we knew we had to step up our game a bit. More hours had to be invested and more research had to be done. The report has to contain a lot more information and should summarize the process thus far.

On the other hand, we also knew that we were looking in the right direction. However, we had to take a step back to make it realistic for the current world. We took this very serious and went back to the drawing board. While working, we kept this question in mind: what can we create that is just as innovative, interactive and simple as our previous design?

3.0 Final design

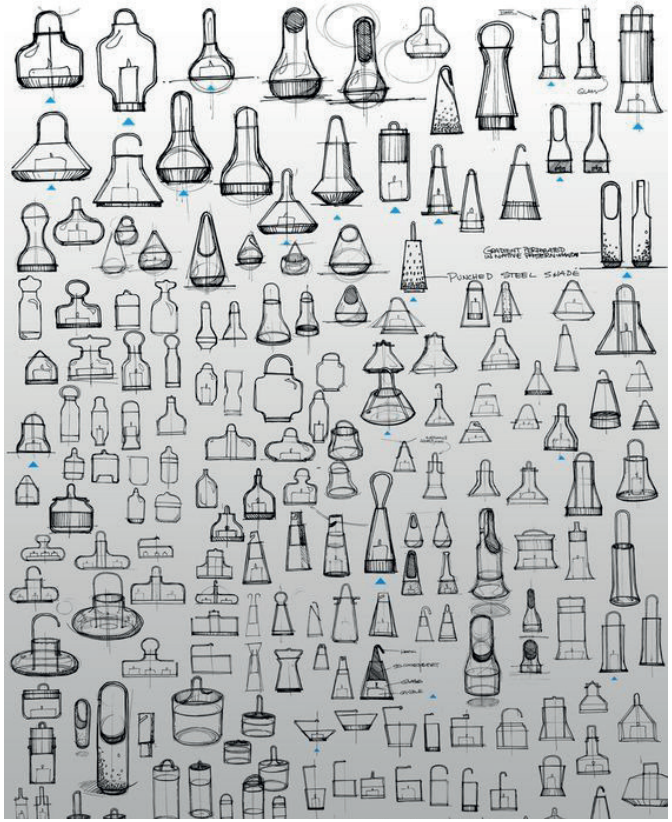
3.1 Values that matter

At the start of this project we set a couple of main values we wanted to keep throughout the whole project. Some of these are more valuable than others but we set these values as guidelines as to what we wanted to accomplish. Also these values make the project overall worthwhile, if these values are accomplished and executed in the right way the main goal of creating a new display stand is satisfied from our perspective.

Futuristic yet simple

One of the main values we wanted to keep in our design is that we wanted our stand to be futuristic. Not only in the looks but also in the technology used. We searched for out of the box concepts that would fit in our design best, for example: Nanotechnology, 3D holograms, spinning LED fan panels from HyperVSN and screen projection. These are all reasonable technologies that are still in development, but could have a huge outbreak in the next coming years.

As of the design of the stand we wanted the stand to have a futuristic shape. After various different examples from Pinterest (picture 1) and other concept websites, we found some interesting shapes. They are fairly simple, clean and calm, however they maintain their futuristic vibe. This is what we were aiming for, a simple, clean and futuristic look in our display stand. By using EVA, the AI system based on the robot Eve from Wall-E, we also created this future like vibe.



360 Degree view

We wanted our stand to have a 360 degree view, this makes the stand more immersive. Adding another dimension to a stand will make the products displayed better. Customers can go around the stand to view the products without having to touch the products, not everyone is keen on touching stuff other people have had their hands on. In the end product we did not managed to implement this function due to a switch in technology and design.

Outside of the store

Another value we really pushed in our design and project is that we wanted a different environment for our stand. We figured that if we want the display stand to attract more people, we have to place the stand in a place where it's shining and catching everyone's attention. This is one of the reasons we placed one stand on the outside of the store. More attraction, means more involvement, which leads to more sales and that means an overall more successful display stand.

Two seperate stands

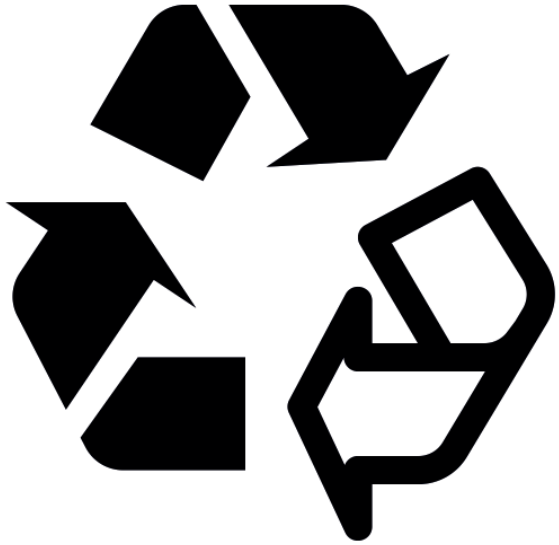
Of course if we place one stand on the outside of the store, people still have to get the product from somewhere else. This is why we needed a second stand, an inside display stand. The purpose of this stand is to give additional information about the loyalty program and the products involved. This stand is also meant as a pick up place for the products. Two separate stands is a must have to make this project work.

Reusability and sustainability

These stands won't be cheap as they contain high end technology. With this in mind we need the stand to be reusable in and adjustable to any environment. The inside stand will be made out of bamboo wood, which is cheap and has high quality. Bamboo wood grows fast and is a great resource to use in a display stand like ours. The stands are easy to disassemble and reassemble at a new location.

User experience

When creating a display stand like ours there needs to be a good interface for the customers to interact with. The customers need to have a good experience with the stand to find comfort into using it again. We want to emphasize this quality in the stand as much as possible. This is why we came up with EVA: the AI system in the display stands. We want EVA to give the customer a nice and pleasant feeling, like the customer is at home. She will help the customer with information and explain the loyalty program. The interaction with the stand is, in this case, also a huge part of the user experience. The interaction needs to feel natural and has to be simple to understand. In this way, customers are more likely to use the display stand more frequently.



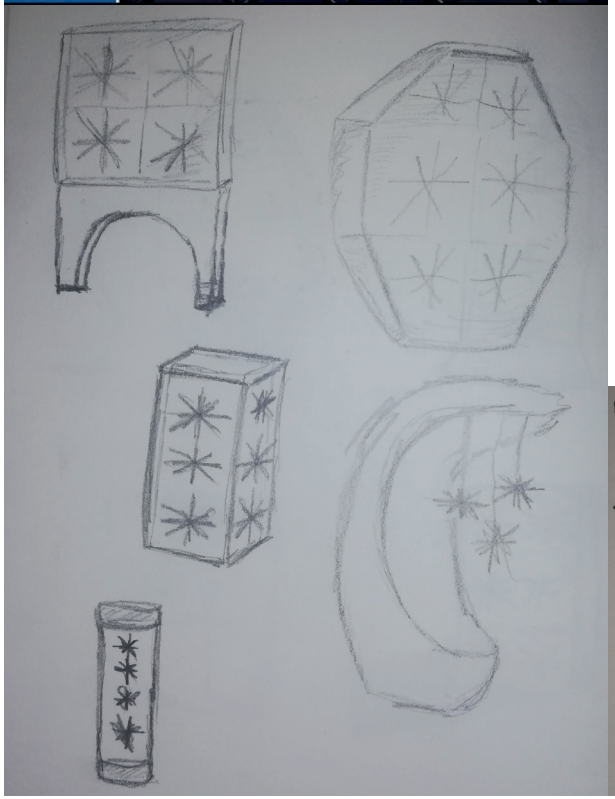
3.2 Ideation

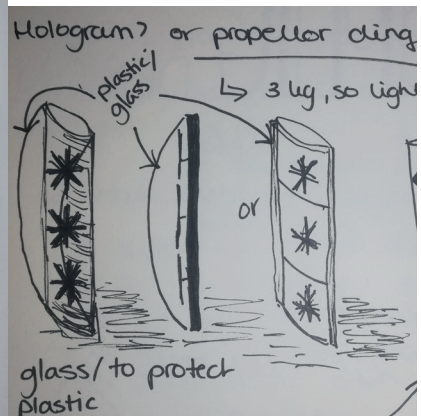
During the ideation of our final design we did brainstorming, sketching, 3D modeling, prototyping and whole body techniques. Having in mind the values explained in the previous paragraph (futuristic yet simple design, 360 degrees view, outside of the store, two separable stands, reusability and sustainability, user experience) and the feedback on the midterm, new ideas emerged. In this paragraph, the ideation phase we went through will be visualised and explained per ideation technique.

Brainstorming/sketching

During the brainstorm sessions we immediately started sketching as well, we combined the two techniques at the same time. This really worked for us because we immediately could have a better picture of the idea we came up with.

In the brainstorm sessions we first explored two different kinds of technology we could use to replace our original idea of nano like organisms to display the loyalty product. After doing some research, we came across holograms, Kinect sensors, Orbbec sensors and HYPERVSN props as technology we could use.





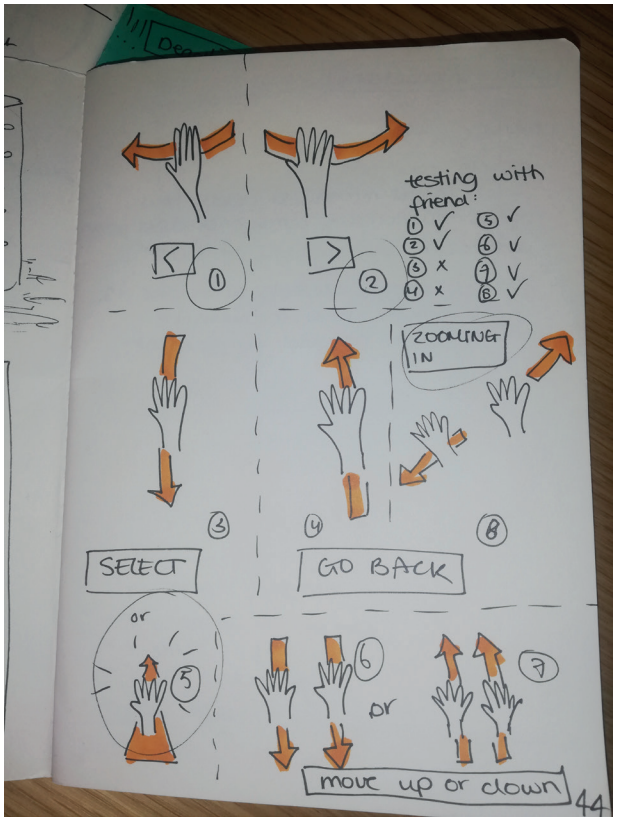
Continuing on the HYPERVSN props we sketched out some shapes of the stand while brainstorming. For the outside stand we came up with several sketches, see pictures. As can be seen in the pictures, we first sketched some non see through stands, attaching the HYPERVSN props on a plain stand in various shapes. We later sketched some see through stands, attaching the props on a pole inside the stand. For more sketches, see appendix 1.1. We also did some brainstorming and sketching on the inside stand. We had some characteristics we wanted to implement (having a storage, displaying Eva, displaying the loyalty products and being interactive) and worked from there on. See appendix 1.2 for sketches of the inside stand.

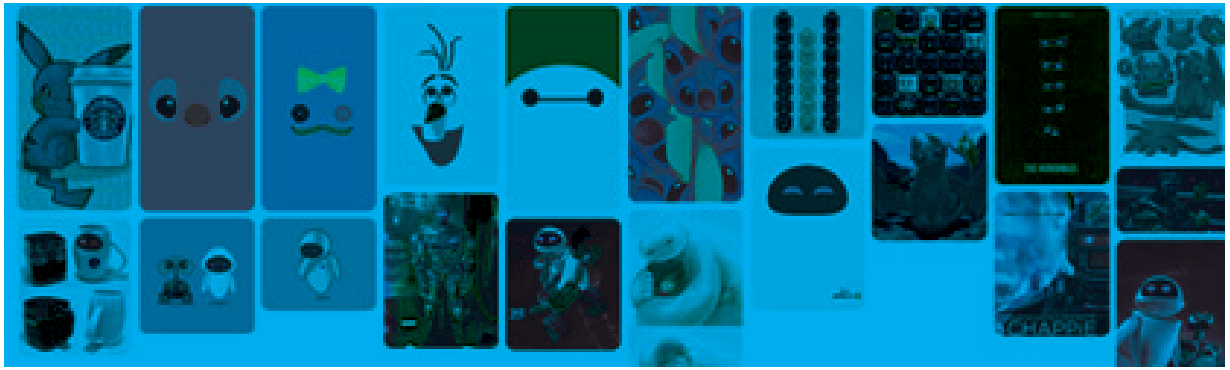
Furthermore, we brainstormed/sketched about the movements the customer needs to do to swipe through the catalogue. The movements needed to be easy to understand, and recognizable for the ORBBEC sensor. The movements in the picture were the result of this brainstorming. Later on some embodied testing was done, more about this in 'Whole body techniques'.

We brainstormed about our concept of the AI, what it will say and how it will interact with its customers: "Nice seeing you again Karen!" "Hello Suzan, how are you today?" "Would you like to see this product?" "Buy this now! Or face your demise!" "I hope to see you again soon!" "For this products you need still need ten points to collect it."

During the brainstorming and sketching of EVA we found inspiration in existing fictional animated characters, for example Eve from Wall-E, Toothless from How to Train Your Dragon, Pikachu from Pokémon and Baymax from Big Hero 6. These fictional characters have a friendly look and are able to show complex emotions. See the picture for sketches based on these characters. See appendix 1.3 for more sketches.

Baymax and Eve both have a simple but robotic design. This was a big inspiration to make EVA have a simple look. Eve uses her eyes to show complex emotions.



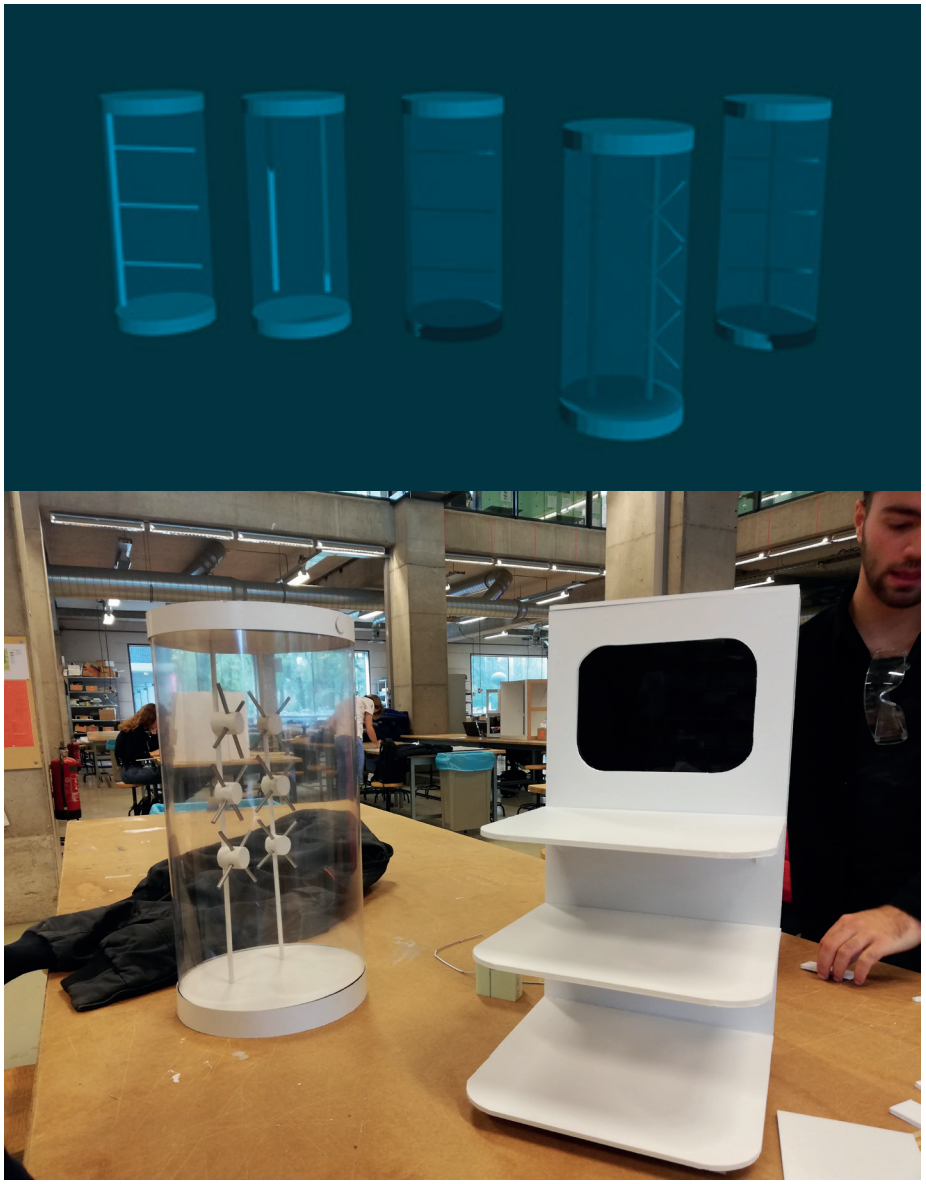


Whole body techniques

To find out whether the movements for the catalogue would work we used embodied testing. We asked a friend to give his opinion on the movements, whether they were clear and easy to understand or if they were confusing. We ended up doing all the movements, to find out which were the most natural ones, the most easy ones and which ones we should not use. In the end, we came to the movements in the picture (NUMBER).

Prototyping/3D models

After brainstorming about the shape and sketching the appearance of the stands we made 3D models to get an even better understanding of how the stands look. We used Blender to do this. In blender, it was easy to make several ideas of the stands, instead of physically prototyping the stand. We made 5 different stand ideas, varieng in the amount of poles and placement of the poles in the stand, see picture (NUMBER). For the exhibition we did do prototyping, making two prototypes of our stands. During this prototyping new ideas emerged, thinking about the color of the stand and Eva and extra interaction possibilities.



3.3 The big WHY's

Why did we decide to:

Place a second display stand outside?

By placing the second stand outside the store, we try to reach a way bigger crowd. Not only the regular customers will see it, people walking by, people waiting outside the store, people at the service desk, everybody will see it. The less chaotic surroundings outside the store will also lead to fewer distractions, so more attention going to the display stand.

Keep futuristic as our core-value?

Our main focus during this design process was to create something interesting, something that attracts attention. We also fancied making a timeless design, so we went for futuristic. We use technology that is currently available but gives a futuristic impression, we took a futuristic color palette and tried to give the stand a futuristic shape.

Get rid of the 360-degree view as a key-value?

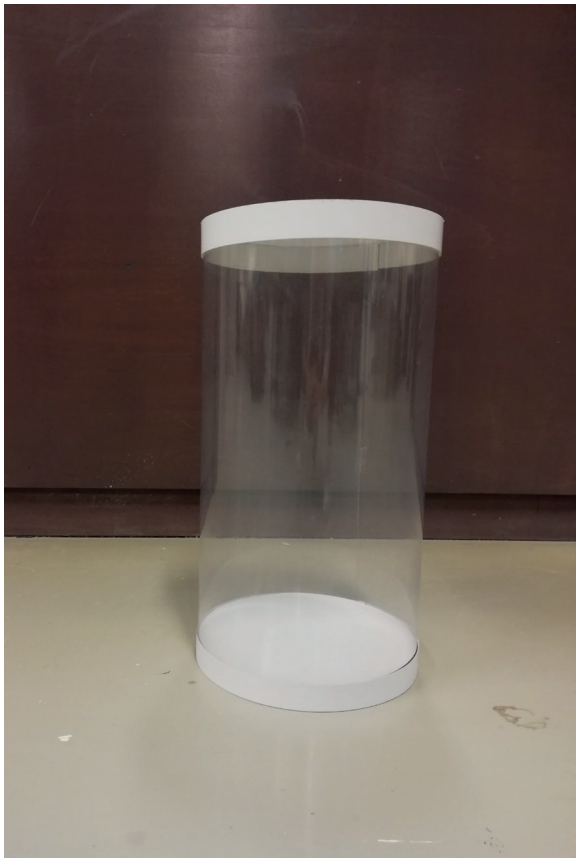
Almost from the start, we had the 360-degree view as a key-value, with the customers being able to walk around the stand and look at the stand from every angle. Yet when we decided to implement the HYPERVSN technology into our design, it became impossible to keep the 360-degree view, just because the technology isn't capable of displaying the image while keeping it visible from every angle. This was actually quite a letdown at first, however. the HYPERVSN was so perfect that we decided to drop the 360-degree view.

Use HYPERVSN technology instead of basic holographic visualization?

After our midterm, Bart told us that we were quite a lot too far into the future with our nano-technology, so we had to find technology that at least has the same visual effect, and will be widely available within the next couple years. After researching for a while, we came up with the HYPERVSN technology. Their technology gives us better visualization with 3d-like images and videos "floating in the air", it has more options regarding the interactivity and also looks more interactive. By using led-embedded rotors, HYPERVSN has a technique different from everything else in the visuals sector, which makes it a great eye-catcher as well. HYPERVSN was the perfect solution for our visualization problems.

Implement interaction by ORBBEC sensors?

The part where we struggled a bit was with the interactivity. We didn't want to use any touchscreens, so the next logical step was interaction using sensors. We decided to use ORBBEC's sensors because of all the extra options they offer. ORBBEC delivers all its sensors with face-recognition, hand gesture control and way more options. This gives us options like personal information and interaction by hand movements. Their sensors are like the 2.0 version of the Kinects from Xbox, exactly what we were looking for.



Added a plastic-like cover around the stand?

The HYPERVSN technology uses rotors, which spin at an extremely high speed. We decided to add a fully-transparent cover around the stand to ensure the customer's safety when the rotors are spinning. While offering safety for the customers, it also protects the technology itself. The weather isn't a problem anymore and most of the dust will be kept out by the cover.

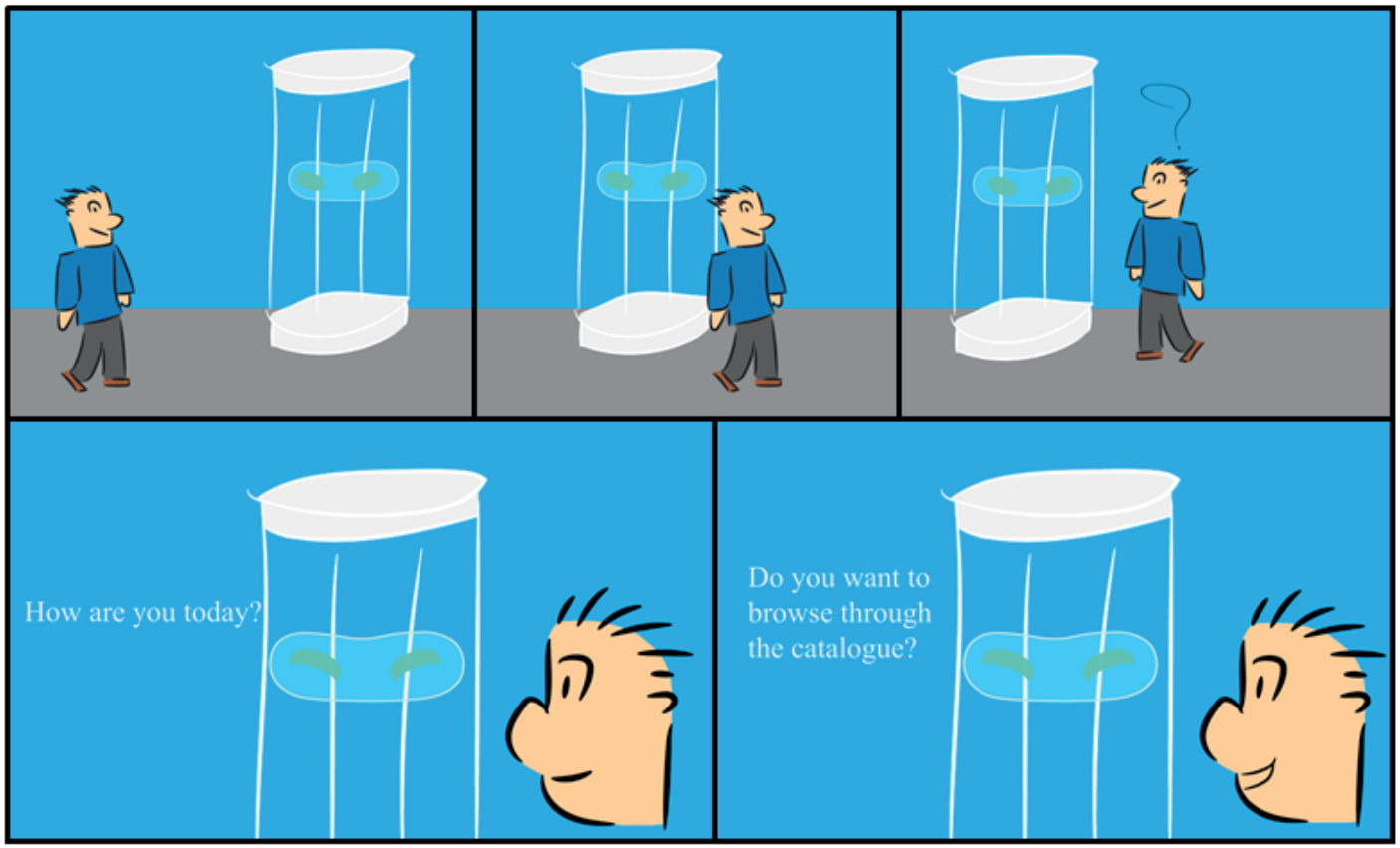
Implement EVA?

Despite having the HYPERVSN visualizations and the ORBBEC technology for advanced interaction, we fancied enhancing the customer's experience even more. By adding EVA, our personal interactive AI, we made the display stand more personal and added a different way of providing information. We also gave EVA emotions, to really get that emotional connection between the stand and the customer.

Chose this specific coloring?

In the first part of the process, we already researched the major impact coloring has on the customer. We needed a bright color palette to get the customer's attention, yet we tried to create a calming and neutral ambiance in a quite chaotic environment. After some experimenting, we came up with our current color palette, which does both, so we decided to stick with that.

3.4 User experience



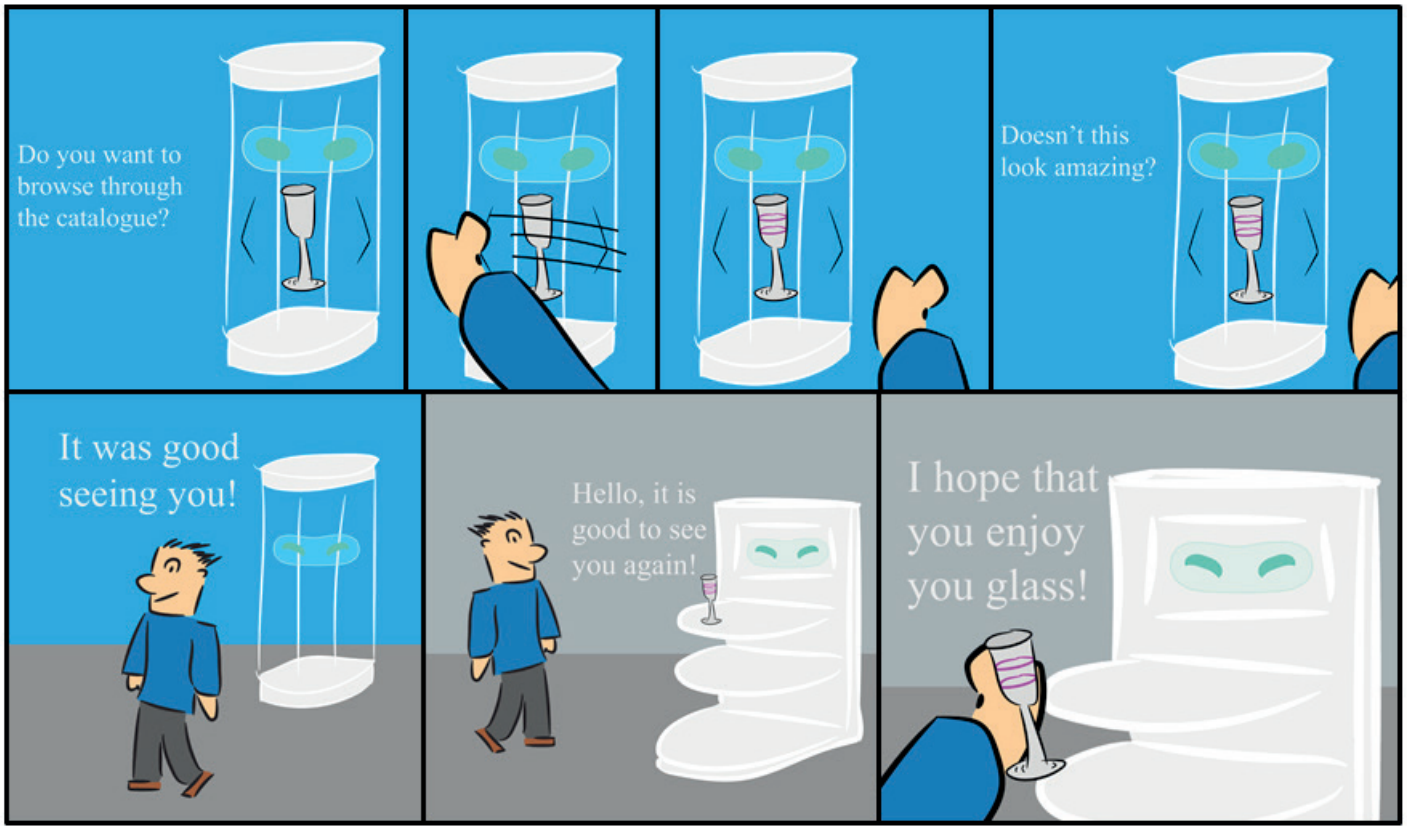
Outside:

1. A possible customer walks by the store.
2. The possible customer sees Eva on the outside stand.
3. The possible customer gets curious and walks towards Eva.
4. Eva sees a customer walking towards her.
5. When the customer is near Eva, the customer gets greeted by Eva: “How are you today?”
6. Eva gets extra happy because she gets interaction.
7. Eva then says: “Do you want to browse through the catalogue?” and shows the customer the catalogue.

8. The customer starts swiping through the whole catalogue.
9. Eva gets amazed and says: “Doesn’t this look amazing?”
10. Eva gives the customer basic information about the selected product.
11. The customer is happy with the product and walks into the store.
12. While the customer is walking away, Eva says: “It was nice seeing you!”

Inside:

13. The customer walks in the store and sees the inside stand and walks towards it.
14. Eva sees the customer approaching and greets him: “Hello, it is good to see you again!”
15. The customer pick the product up to get a better view of it.
16. Eva provides more detailed information about the product.
17. The customer picks his product from the stand and proceeds to the cash register.
18. Eva says: “I hope that you enjoy your glass!”

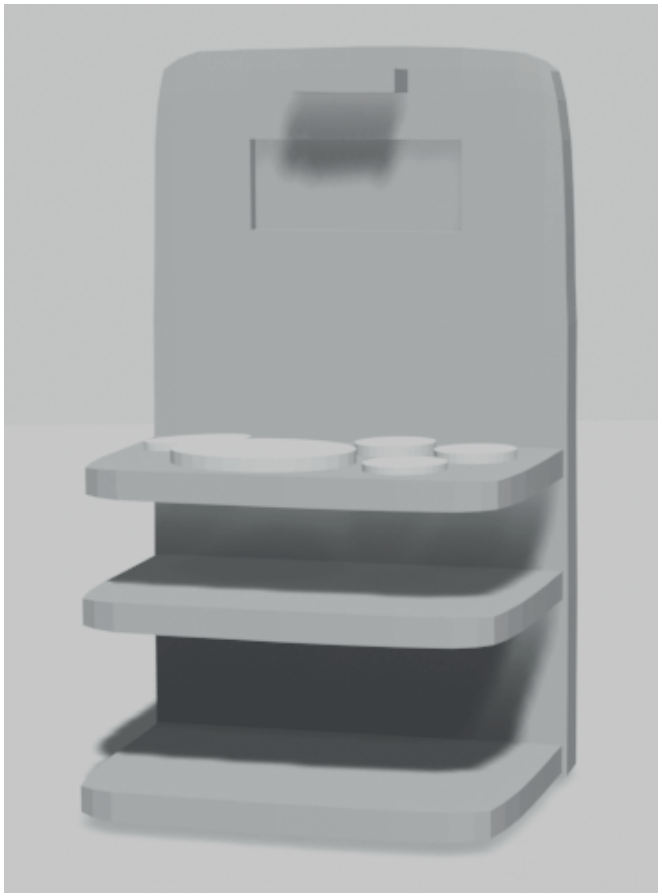


3.5 Concept

Inside stand

Made out of bamboo wood, we created an inside stand that is not only light weight, it's also easy to disassemble and reassemble. We had to create an easy inside stand to compromise with the huge outside stand. So after some sketching and prototyping we came up with a fairly neutral inside stand. We didn't focus to much on this stand being a real bound breaking experience, but rather easy to use and self-explanatory. We had to implement EVA in this stand, as this is the connection between the inside stand and the outside stand.

The inside stand is based on information sharing and storage space for the loyalty programs items. EVA can tell you anything about the loyalty program, from how much points you still need to get for your next discount/item, to additional information about the products currently in the loyalty program. EVA will help you with your experience and will make your day at the store a lot easier. EVA will be displayed on the inside stand through a small display at eye height. It will recognize you from the previous stand and adjust accordingly, we explain this further in the AI interaction further on in this report (pageNUM).



The inside stand has different levels of storage space, these floors so to speak can be disassembled and placed on different heights to ensure all products in loyalty programs can be stored in the stand. This is convenient for the store owner and Craze as well, this way they don't have to make new stands for every new loyalty program. This way the stands are reusable.

An Orbec sensor is placed above the EVA display. The Orbec sensor will look at you and scan your body movements. Through facial recognition the Orbec sensor and EVA will recognize you from the outside stand and light up products that you showed interest in. This way your attention is automatically drawn to your personal favorite product.

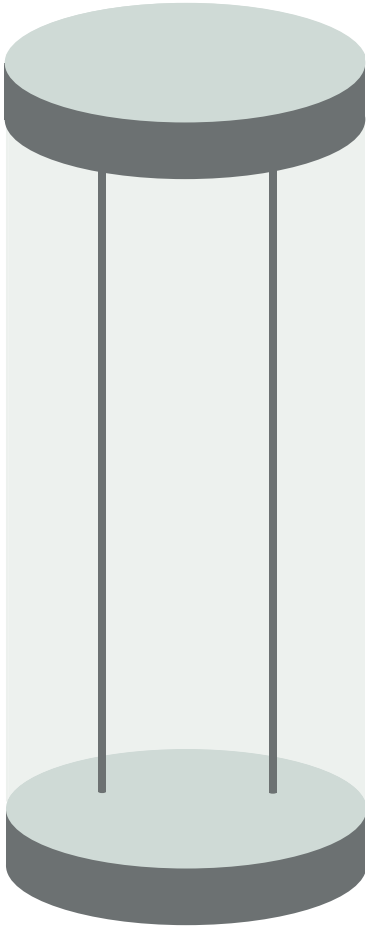
The shape and appearance of the inside stand are based on classical store display stands. We found that this shape is most suitable for our design and is most practical. The round edges gives it a more dynamic feeling. The round edges will also create an illusion of openness and space. The way the stand is designed gives the stand a calming and non-chaotic look. This is what we are searching for in our project. We want the costumers to feel comfortable using and interacting with our stand.

Outside stand

The outside stand is meant to attract as much attention as possible. We want to do this subtle, that's why the stand is not constantly seeking your attention. It's way of getting the customers attention is in the design. The stand will approximately be 2 meters tall and have a diameter of 1 meter. With the rather unknown technology that we used in this stand, namely HyperVSN, we try to attract as many customers as possible. The HyperVSN technology is a real eyecatcher.

We made the outside stand in a cylinder shape to give it an open and free experience. The cylinder shapes makes the 3D model on the HyperVSN fan blades stand out more. This makes it look like there is an actual 3D model of the product inside of the stand.

By using recycled plastic the stand can withstand a wide range of weather forecast, rain, snow, higher temperatures etc. This material is durable, it will last for a while and is not easy to vandalize. Using recycled plastic makes the stand sustainable and eco-friendly. The main part of the stand is made out of glass to protect the fan blades from weather circumstances and other things that could break the technology. The glass also serves as a safety measurement for customers, we don't want small children to get hurt when interacting with the stand.



The stand outside has a pillar like shape, we wanted to keep the futuristic feeling in our stand. We did this to enhance the attention from the customers. We want the customers to look at our stands and be amazed by the technology and its futuristic look. The HyperVSN fan panels give the stand a new type of technology that is still unknown to most people. We want the customers to have a second look at the stand, a second look will lead to actual engagement with the stand and thus with the loyalty program.

The stand uses a catalogue of the products in the loyalty programs. By different hand movements you can browse through all different products. We explain all the hand movements in the User experience topic in this report. You can pick your favorite product and the AI system (EVA). Will remember your face and help you further when you want to pick up the products. EVA will be further explained in a different topic in this report (pageNUM).

We implemented an Orbec sensor in the stand to look at the customers and react to the movements. This sensor will also use facial recognition, it will film and record your face. This footage will only be processed by the AI system EVA and will not be shared. The only valid way to use this footage is when the stand or the store is vandalized, this will help the police to find the criminals. The Orbec sensor has an intelligent camera, it will choose who to look at and who's movements to follow. The EVA AI will interact with the movements accordingly. The Orbec sensors will be further explained in a different topic in this report (pageNUM).

Eva

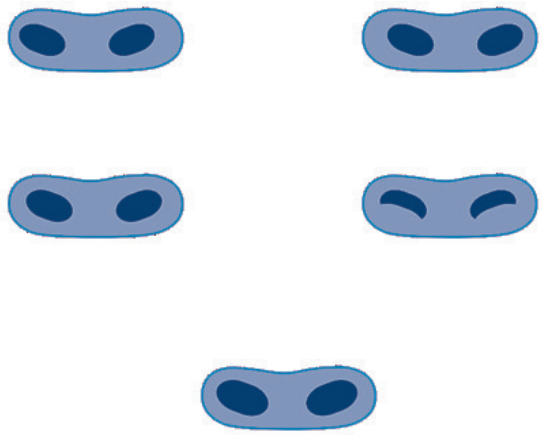
Eva has two modes and three emotions. She has an idle modus and an active modus. When there are no customers interacting with Eva, she will be in idle mode. Her face will appear on the stand and she looks around the store.

When a customer is going to interact with EVA, EVA notices this with the Orbbec sensor and goes into her active mode. In this modus she talks to the customer and helps him or her. In the outside stand, Eva helps the customers by explaining how to browse through the catalogue and giving them basic information about the products.

In the inside stand, Eva will illuminate the a product of the customer. The product that gets illuminated is the product that the customer showed the most interest in on the outside stand. The outside stand will communicate this information to the inside stand.

When the customer reaches for the product, Eva will give more information about it. She can detect this by using the Orbbec sensor.

Eva uses emotions to make the interaction between her and the customer more pleasant. Her three emotions exist out of neutral happy, extra happy and amazed.



She combines these emotions with what she says to the customer and with the way that the customer interacts with her. When a customer starts interacting with Eva, she will get extra happy. She will then return to neutral happy. She also has a change to get amazed when a customer is browsing through the catalogue. And every time that a customer walks away, Eva will get extra happy.

Here below are certain lines combined with the emotion that Eva will use:

“Hello, how are you today?”
- Extra happy

“If you like this product, you probably like this one too.”
- Neutral happy

“This one looks nice, doesn't it?”
-Amazed

“Do you see anything you like?”
-Neutral happy

“It was nice meeting you!”
-Extra happy

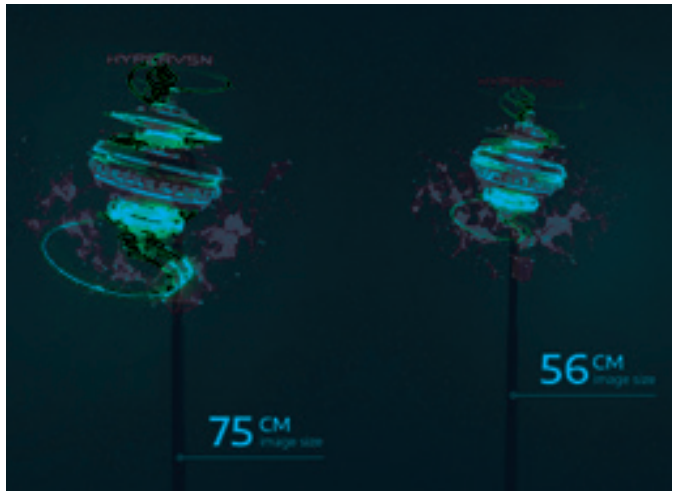
“I am happy to see you (again) today!”
- Extra happy

Hypervsn 3D-display Technology

After the midterm feedback moment, we decided that we had to take things a step back and make our concept a bit more feasible within the next couple of years. Our plan to use nanotechnology was a bit too futuristic and the development needed to get to this technology was not sufficiently substantiated, so we needed something with a similar effect, yet more available in the near future. During the midterm-video presentations, we noticed multiple groups using the holographic pyramid in their design, so we decided almost immediately that we weren't gonna do something like that. We went searching for technology that would at least give a similar visual effect, and after some research, we ran into a company called Hypervsn. Hypervsn focuses on technology that pushes the current boundaries of 3D visuals.

The technology

Hypervsn is introducing a new technology that can show 3D-like mid-air floating holograms. By using four-ray rotors with led-strips, they can visualize any image or video at 30 frames per second. Hypervsn currently offers 2 sizes rotors, size M(56cm) and size L(75cm), with their size M can reach a resolution of 880px, where the size L can even reach up to 1080px. All rotors support 16M+ colors to guarantee perfect visualization. The systems can also be combined with the use of a slight overlap to make it possible to create a complete wall of virtually any size. Hypervsn offers a couple of mounting accessories, as well as transparent domes for protection.



Implementing

To implement this technology in our concept, we had to change our design to be almost fully transparent. We also decided to make this stand completely focussed on the visuals, as a way to attract customers' attention and use the inside stand for the physical product.

By using this technology we didn't only solve the "too futuristic" problem, which kept us from continuing our nano-technology concept, we also managed to find a solution that let us keep our concept of displaying the product with a 3D image. The Hypervsn systems are very compact and lightweight, around 2.8kg apiece, which makes transportation extremely easy. The noise made by the motors stays below European standards for office noise, which makes them extremely quiet. On the other hand, the Hypervsn systems are quite expensive with the Solo system going for about €2000 apiece. When placed anywhere within the customer's reach, the system should also be placed inside some sort of safe-zone to protect the customers from getting hurt.

Orbbec sensors

From the start, we knew we had to design a smart stand, so we had to add interactivity and sensors to our design. For quite some time we didn't really know what or how, until some point after the midterm, when we decided to make the outside stand a catalog. We went looking for Xbox Kinect like sensors, or technology that would allow us to control the catalog by hand movements, and we eventually came up with the ones from Orbbec.

Orbbec

Orbbec focusses on the future of 3d cameras, they are the current global leaders in the development and mass production, while at the same time implementing all kinds of extra features. Their sensors are capable of processing depth information and tracking hand and body motion to allow next-level interactivity. Orbbec also offers the software to completely program the sensor to detect, track and process every input it gets. Their sensors are currently sold for around $150-$250, which makes them good affordable for these purposes, especially given the fact that they're reusable. The software can also choose a specific customer to track, this

solves the problem most other sensors have because most sensors don't know who to track when multiple people are in focus.

Implementing

We implemented the Orbbec sensors on both the inside and outside stand. By programming the sensor to recognize certain hand movements, we offer the customer the option to control the outside stand(the catalog) by swiping, scrolling and tapping mid-air. On the inside stand is the sensor connected to the physical products, for optimal positioning and restocking. The sensor will measure the number of products left, and request a restock when necessary. It will also continuously measure what products are regularly picked at certain timeslots and which not, and the stand can adjust its setup based on this data.

The sensor is also on both stands linked to EVA. EVA will react by showing emotions to customers approaching her, interacting with her and when customers take a product, she will look satisfied. She also has access to the profile data from the customers, meaning she can give personal-based information on products and show exactly how much points the customer needs to get that sweet discount.

The facial recognition will be used to create a profile of the customer, which of course will not be shared with any external instances. When a customer walks up to the outside stand, the sensor will recognize him/her and when that person shows interest in one specific product, the sensor will send a signal to the inside stand. The inside stand will then highlight that same product when its own sensor recognizes that same person.

3.6 Exhibition preperations

To present our stands to Craze and the tutors, we made two prototypes. One prototype of the outside stand and a prototype of the inside stand. Due to the fact that we use new technology in our stand (the HyperVSN fan blades), we could not make a working prototype. Because we have two stands we also made two posters: one for each stand. Because we wanted that most of our attention went to the outside stand, we made this poster bigger (A1). The poster of the inside stand was printed on A2. The video shows the interaction with the stands and show how the HyperVSN fan blades look.

To make sure that both the stands and both the posters were good visible, we choose to put the stands on the far outside of our exhibition. The posters were placed on the inside of the two stand. In the middle of our exhibition stood the laptop that displayed our video.

The first presentation was given to the tutor Lianne de Jong. On her advice, we chanced the order in which we presented our stands: we first showed the video and then gave the pitch. In this way, it is easier for a layman to visualize everything that we say in the pitch.

While we gave our presentations to Craze, Bart Hengeveld and some other students, we got the following questions and feedback:

Is there a connection between the inside and outside stand?

Yes, there is a connection between the inside and the outside stand. Customers can view products on the outside stand. Eva will remember at which products the customer looked. When the same customer goes to the inside stand, Eva will recognize this person and illuminates the product that the customer looked the longest at on the outside stand.

The technology that is used is too futuristic to be used now.

In the beginning of the design process we came up with a really futuristic display stand. Since then, we wanted to keep this futuristic feel. This is why we used the HyperVSN fan blades to display 3D images and an AI to enhance the interaction with the customer. With the futuristic feel, we [hope to] attract more customers to our stand. We estimate that, in five years, this technology will become better and cheaper available.

What is the technology behind the storage space?

We have kept the technology behind the storage space quite simple. The OrbbecSensor can see when a customer picks up an item and recognize this item. In this way, Eva will know what it the most popular item that is picked up and how much is in storage.

With a camera like the OrbbecSensor, do the customers have enough privacy?

Eva uses the OrbbecSensor to recognise customers and the gestures they make while they are interacting with her. After the customers stop interacting with Eva, she will only store the faces of the customers and additional data in an enclosed data system. This system is only accessible by the inside and outside stand. Eva does not share this information with the store or with Craze. The additional data that Eva stores is how long a customer looked at a product. Eva uses this information in the inside stand to illuminate that product. (The faces of these persons are connected to their loyalty card.)

How do you prevent that the display products get stolen?

When a customer is near the inside stand, the OrbbecSensor can see him/her. When this customer picks up an display product, the OrbbecSensor registers it. If the customer then walks away with this product, Eva's will see this and sounds a little alarm that informs the staff of the store. They then take action to prevent the theft.

What happens if more people want to use the stand?

The OrbbecSensor has the ability to recognize multiple people at the same time. With a split screen function on the outside stand, two people can browse through the catalog at the same time. The inside stand does not have a split screen function. Here, multiple object can be illuminated when more customers are interacting with the stand.

4.0 Evaluation

Right from the start, we all knew that we fancied designing something completely out-of-the-box, a concept like nobody else had. And that's what we did. Up till the midterm, we went extremely out-of-the-box, we designed a display stand for 30 years into the future instead of 5, so we had to cut back on that during the last few iterations. The first few sessions after the midterm we all lost our focus, resulting in a couple of chaotic last weeks. Thankfully everybody was on the same wavelength, so we managed to get back on track quite quickly. We were all extremely motivated to finish this project with an exceptional design.

Sofie already had some experience with the organization of these projects, which really helped us in moments where we needed a push in the back. She kept us going when we were kind-off done. In the end, we had a decent design, out-of-the-box as we fancied it, yet some aspects like the prototyping could have been better. This is mostly thanks to bad planning, or to be more specific, planning and not following the planning. A couple of times when we agreed to do some work at home before the next meeting, we lost half our meeting doing work that had to be finished already. On the other hand, our communication was really good. We all contentious knew from each other what we were working on. The planning of the meetings went very smooth and most of the time everybody attended them. During the entire project, we always had a similar vision, which really allowed us to get every last drop and made a design we all liked, an out-of-the-box, futuristic smart display stand.

5.0 Visual overwiew of work devision

Stan Sofie

Thomas Boy

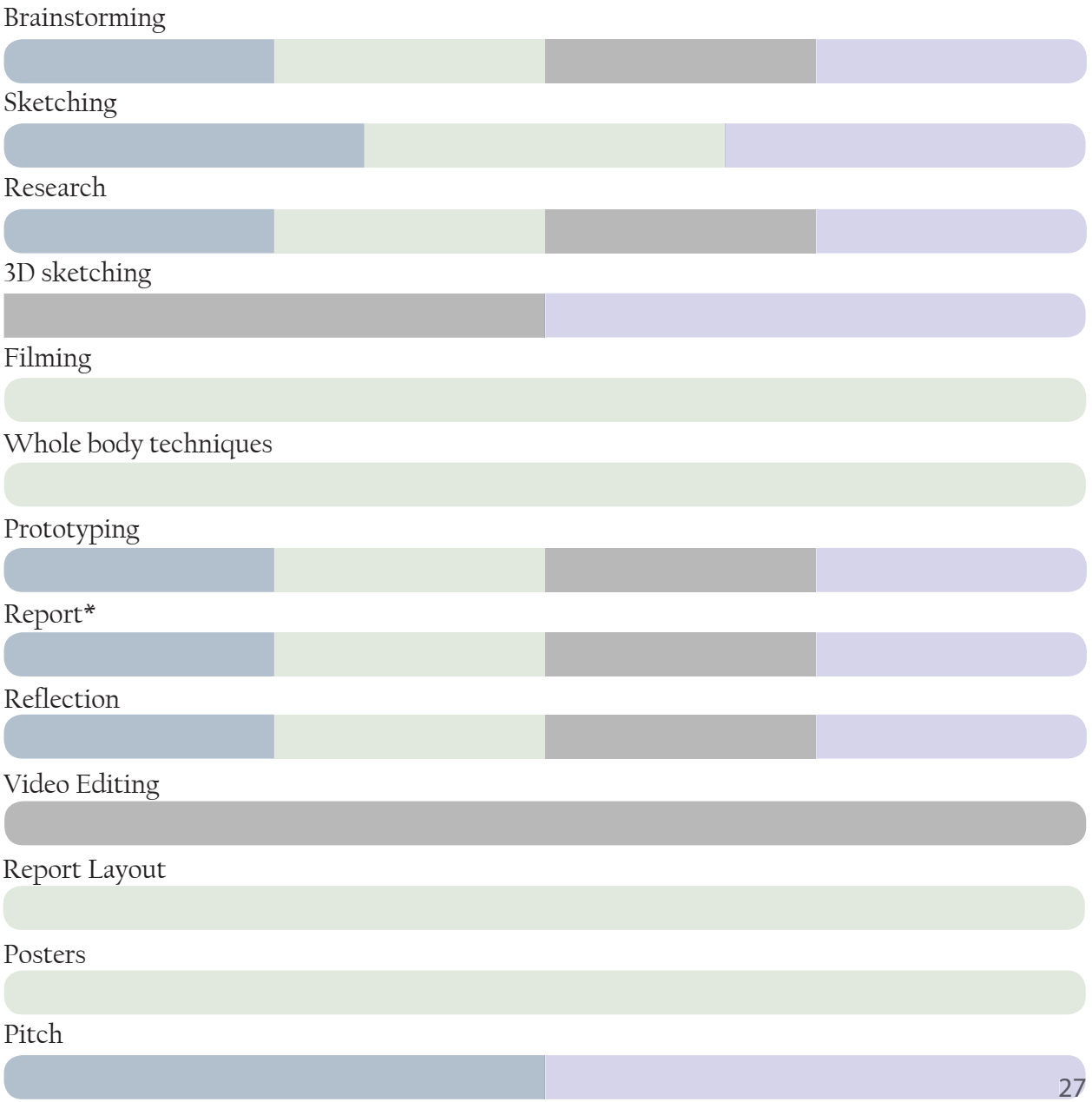
In contrast to the midterm, we now devided the tasks a bit more. This is marely visible in the report and in the making of the prototypes. Thomas now also had a part in these.

*Stan: User experience, the part of EVA in the Concept paragraph and Expo preps.

Sofie: Title page, Table of contents, Ideation paragrapgh and Visual overview of work devision.

Thomas: Recap of midterm, The big WHY's and Evaluation.

Boy: Recap midterm report, Values, and the parts Inside stand, outside stand and logo in the Concept paragrapgh.



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7.0 Appendix

Due to technical issues, the appendix is uploaded separately. Sorry for the inconvience.