HYBRID 3D FASHION DESIGN

documentation sprint 2

CONTENTS

briefing

briefing

PARTNER'S AIM

Figure 1: Prima Donna bra, testing elements before manufacturing

VAN DE VELDE

As a company they are looking for added values in 3D fashion design and use the result to improve their current design process.

briefing

PARTNER'S AIM

Figure 2: Studio Jacob kok, Evolution

STUDIO JACOB KOK

Jacob who is known for his virtual presentation of his designs, experiment with the newest technologies and see what they can do for fashion presentations.

BRIEFING Van de Velde

1. How can we use virtual simulation to make fashion design processes more sustainable?

Sustainable fashion, also called eco fashion, is a part of the growing design philosophy and trend of sustainability, the goal of which is to create a system which can be supported indefinitely in terms of environmentalism and social responsibility. Sustainable fashion appears not to be a short-term trend but one which could last multiple seasons. ["Earth to Fashion." Vogue (May 2007). 128-132.]

Slowly but surely the fashion industry is catching on to corporate social responsibility and sustainability. First came the anti-fur campaigns of the 1980s and 1990s. Many brands and retailers have since eliminated the use of fur in their products. ["Sustainable Fashion Design: Oxymoron No More?" BSR report October 2012]

But sustainable fashion is not only using green material in producing garments, the ways how they design and produce is also considered by sustainability. Less time and energy usage, better connection between designers, suppliers, producers and consumers, less samples making and etc., all can be the aims of sustainability.

Virtual simulation of body, garments and movements involves a combination of a large range of techniques, mechanical simulation, tests, scan, collision detection, and user interface techniques for creating garments that in each step of fashion process.

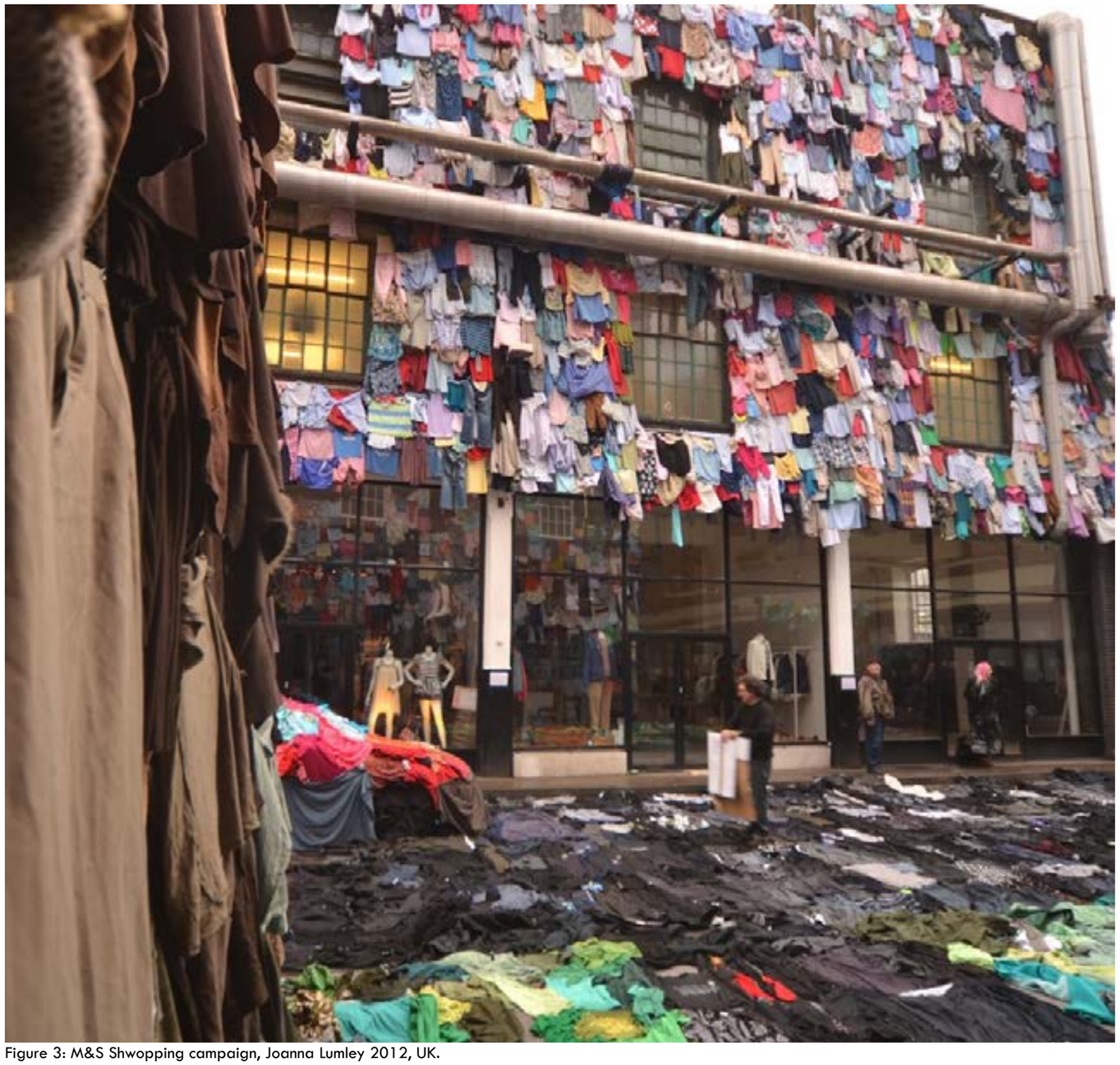


Figure 3: M&S Shwopping campaign, Joanna Lumley 2012, UK.

The challenges of virtual garment simulation are numerous, and have attracted research efforts for more than a decade. (like realistic simulation, physical characteristics, fitting and etc.). First dedicated to the realistic simulation of the mechanical behavior of cloth, then soon evolved towards simulation of virtual garments on synthetic characters. While computer graphics gets the most obvious benefits from garment simulation on animated virtual characters, virtual prototyping of garment models become another major application field for the garment industry.

But the mechanical representation should be accurate enough to deal with the non-linearities and large deformations occurring at any place in the cloth, such as folds and wrinkles. Moreover, the garment cloth interacts strongly with the body that wears it, as well as with the other garments of the apparel. ["Garment simulation in 3d virtual dressing room" the 7th International scientific conference eLearning and Software for Education, Bucharest April 2011]

Body simulation, on the other hands, has challenges more than realistic simulation and mechanical behavior. The human body shapes changes one by one, between different generation and during movements. Nowadays some coloured scanner can produce quiet accurate 3D body shapes whereas motion capture and tracking technology can produce realistic movement that use a lot in animation film making.

As the availability of motion capture data has increased, there has been more and more interest in using it as a basis for creating computer animations when life-like motion is desired. However, there are still a number of difficulties to overcome concering its use. As a result, most high quality animations are still created by keyframing by skilled animators. ["Motion Capture Assisted Animation: Texturing and Synthesis" Stanford University 2010]

BRIEFING Studio Jacob kok

2. How can virtual simulation help to extend the way of fashion presentation?

The wide-range applications of the internet, computre graphics, man-machine interface and the expressiveness of multimedia offer more and more opportunities for developing virtual presentaion in fashion and other industries.
The virtual experience was defined as physical and emotional states that consumers undergo while interacting with products in a 3D environment. Interactivity makes it possible that human feel virtual experience just like the actual direct experience to objects or environments.
In virtual fashion presentation, realistic simulation of fabric and body movement that still is in progress give audiences better perception of virtual reality of products and spaces. However it make a smaller gap between designers and consumers.
A variation type of Virtual Environment (VE) or Virtual Reality (VR) is Augmented Reality (AR) but VE technologies completely immerse a user inside a synthetic environment. [http://en.wikipedia.org/wiki/Virtual_reality - http://en.wikipedia.org/wiki/Augmented_reality]. While immersed, the user cannot see the real world around him. In contrast, AR allows the user to see the real world, with virtual objects superimposed upon or composited with the real world.
Therefore, AR supplements reality, rather than completely replacing it.

Figure 4: Screenshot from Future Motion Control Gaming, Brandon Laatsch & Freddie Wong 2011

workflow

GENERAL WORKFLOW

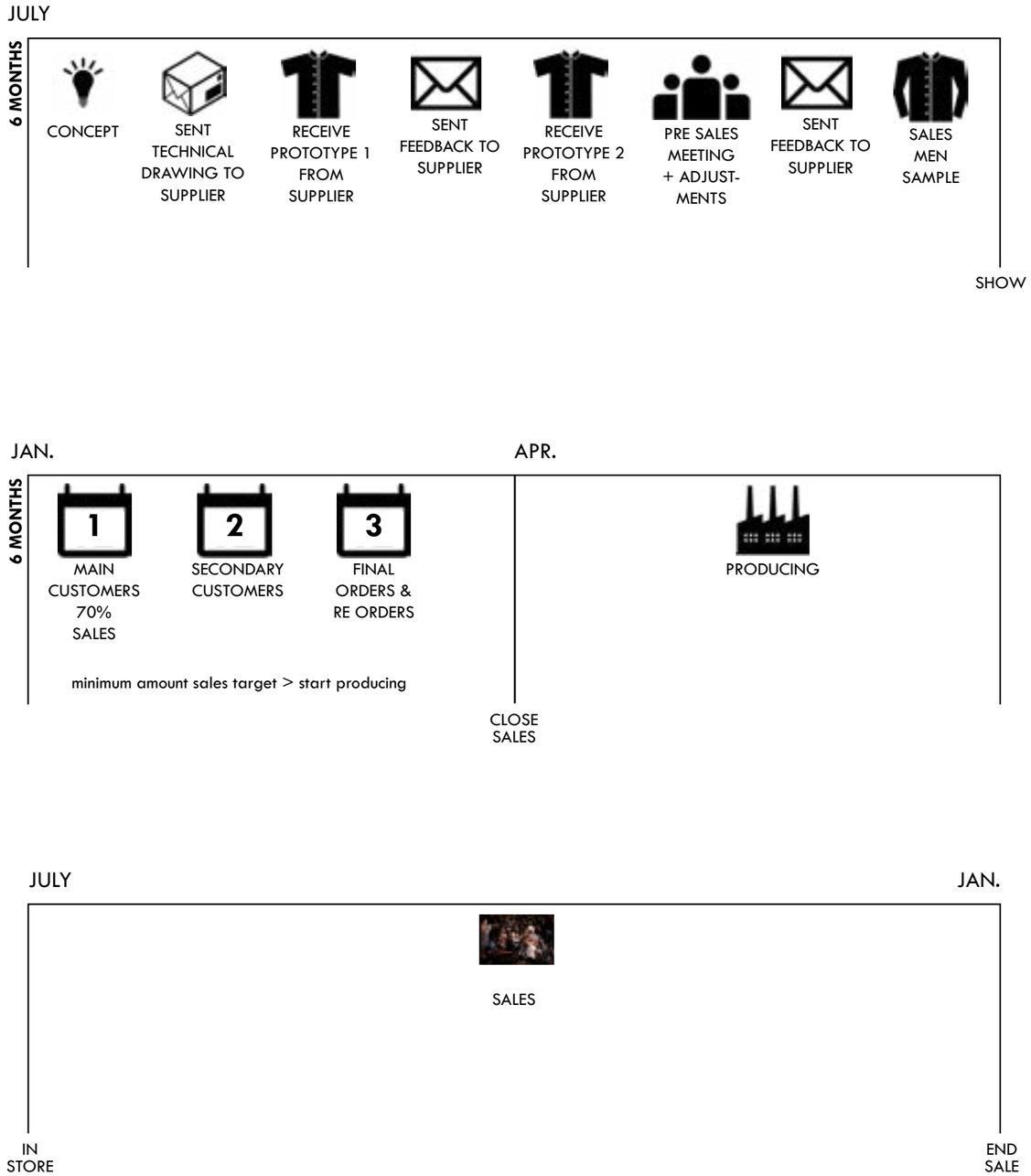


Figure 5: General Fashion Industry Workflow, In consulting with Jose C. Olcina

WORKFLOW

To see what virtual fashion design can do for the fashion production process we researched about the current general workflow. We spoke to José C. Olcina (teacher in Fashion & Management at Amsterdam Fashion Institute). This is the result of how a general workflow is, we have to investigate how virtual fashion design can be an added value, so we can make changes in the workflow of the future.

GENERAL WORKFLOW IN THE FASHION INDUSTRY

EXAMPLE A / W 2015

PROCESS
In the first six months of the process the collection will be designed by making a concept, prototypes and finally finish the sales samples.

From January to March the collection is sold to buyers. In the first month 70 percent of orders are made by the most important buyers. The second month the smaller clients are buying and the third month even smaller individual shops are buying the collection and re-orders are being made.

The next three months are reserved to produce the garments in China. The orders up first are produced first.

PRODUCTION
The production times are for many companies in the same period. Therefore companies want to produce their garments as late as possible in the season. In November to December and May to June the factories are the busiest.

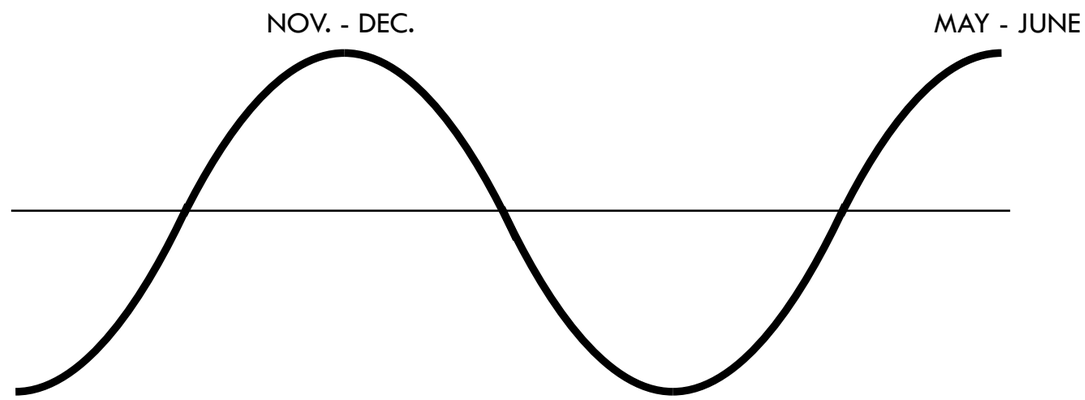
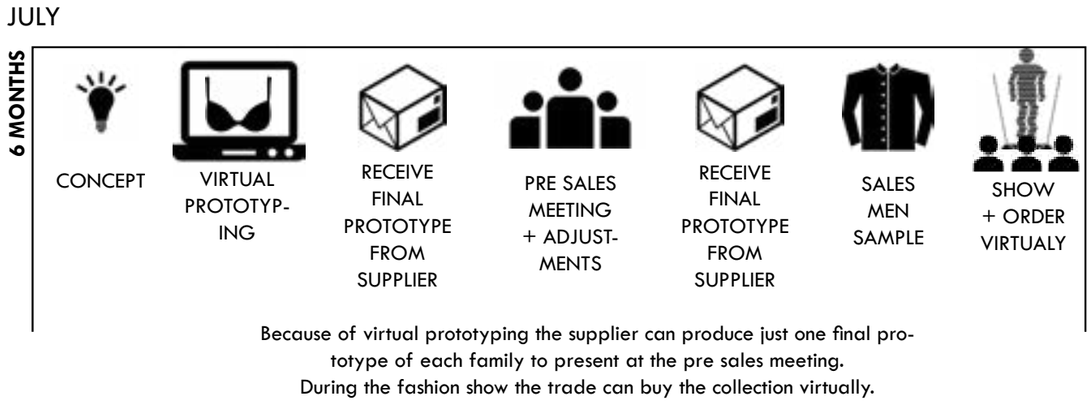


Figure 6: Fashion Industry Production Timeline, In consulting with Jose C. Olcina



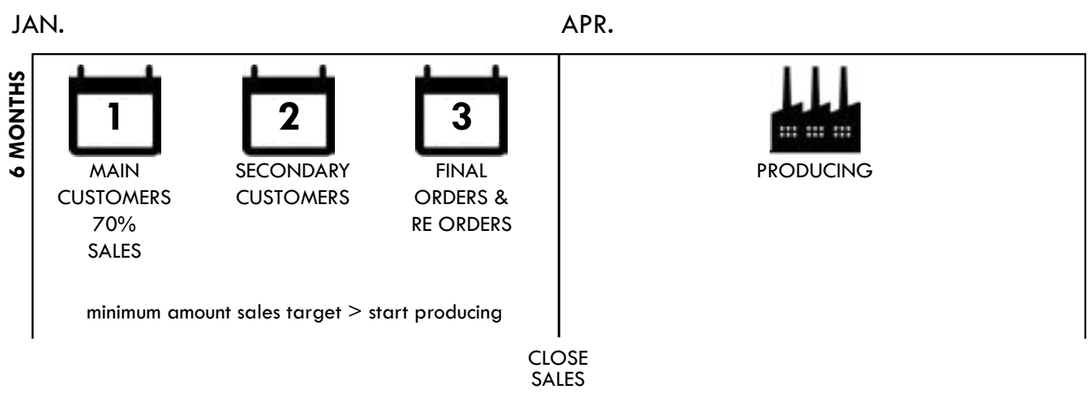
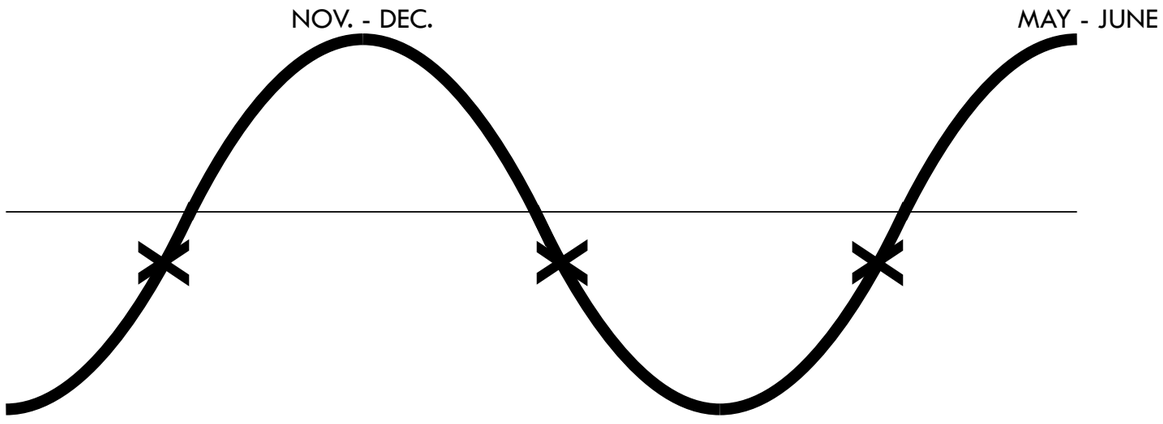


Figure 7: General Fashion Industry Workflow Improved by using Software and Virtual Media and new technologies, In consulting with Jose C. Olcina



Design Process can be shorter by virtual fashion design. So the company could produce in an earlier stage. The most fashion retailers are producing as late as possible before sales start. The moment the most retailers are producing is during November to December and from May to June. Because of the bussiness this is the most expencive time to produce.
If you produce in a earlier stage this will save the company money.

Figure 8: Produce Earlier in Fashion Industry Production, In consulting with Jose C. Olcina

CURRENT WORKFLOW VAN DE VELDE

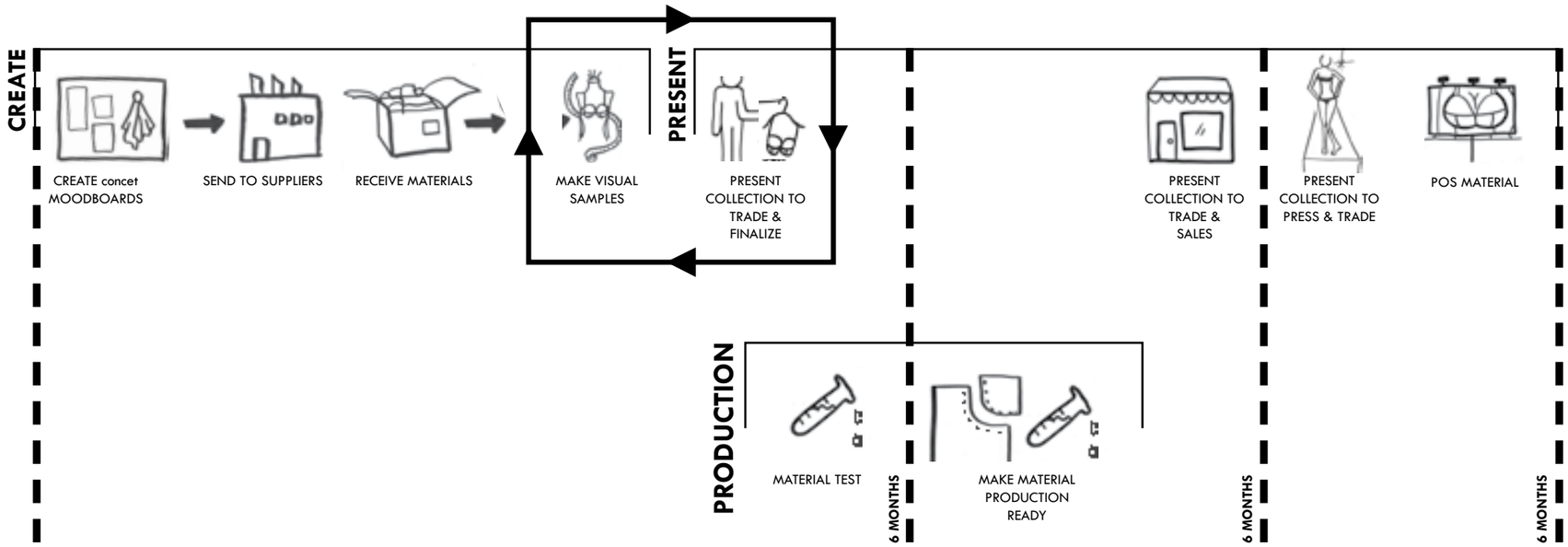


Figure 9: Current Van de Velde Workflow, In consulting with Christel Aarts and Tamara Van Camp

VIRTUAL IMPROVED WORKFLOW

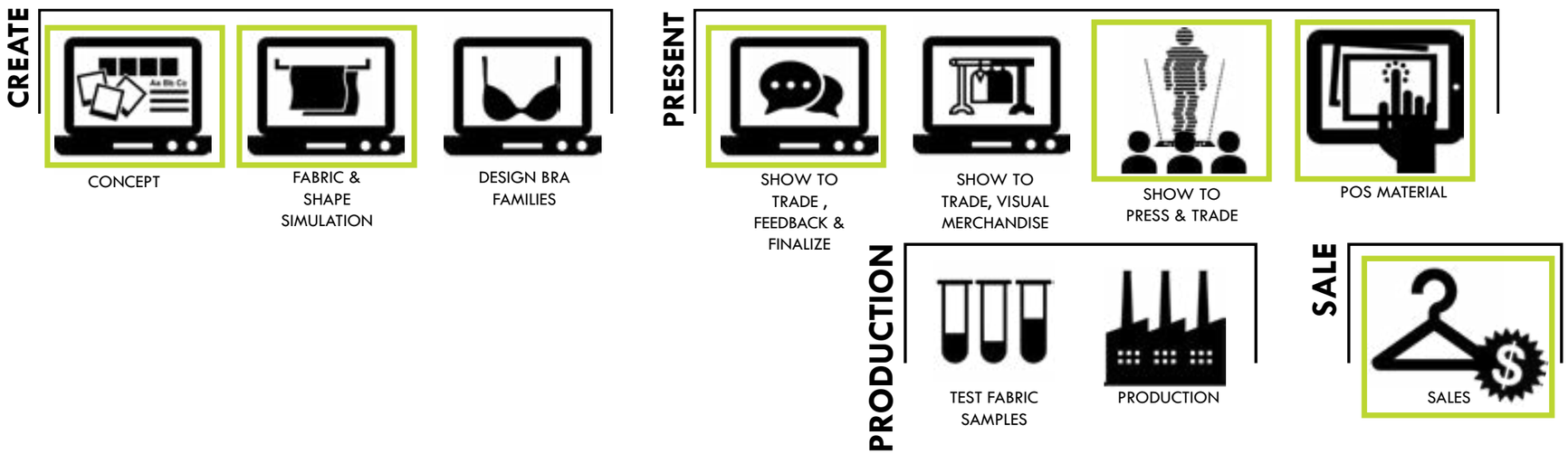


Figure 10: Virtual improved Workflow, suggested by 3D Fashion Group 2014

VAN DE VELDE WORKFLOW

Van de Velde's aim is to improve their production workflow. The company requierments and needs have been devided to three parts; Visual approval, fit approval and Collection approval. They wants to make design decisions in an earlier stage, design to cost, reduce lead-time, reduce sample making, create more transparency and improve communication.

CURRENT PRODUCTION WORKFLOW

Creating a collection from idea to shop takes approximately 8 months for Van de Velde.

THE FIRST SIX MONTHS: CREATE

The design team creates moodboards and send the inspiration to the suppliers. Then suppliers make material samples and send them back to Van De Velde. The design team creates visual samples out of the samples and hand draw other styles of family. After that they present the samples and drawn collection families to selected trade and internal task force. The design team processes the feedback of the selected trade on the collection and finalizes the families. They know what materials will be used now so they can start the material tests.

SECOND 6 MONTHS: PRODUCE AND PRESENT

To prepare the production they need to make the patterns, make fitting samples and make the materials production ready. They also make salesmen samples so they can present the collection to trade and sales while producing the collection.

THIRD 6 MONTHS PRESENTING

The last period is all about communicating the collection to the world.

First they present the collection to trade and press at a fashion show. After that they create the campaign for shopping windows, advertising and website. While the campaign is public the collection is available in the shops.

fashion presentation

fashion presentation audience

Figure 11: Diesel zomer,

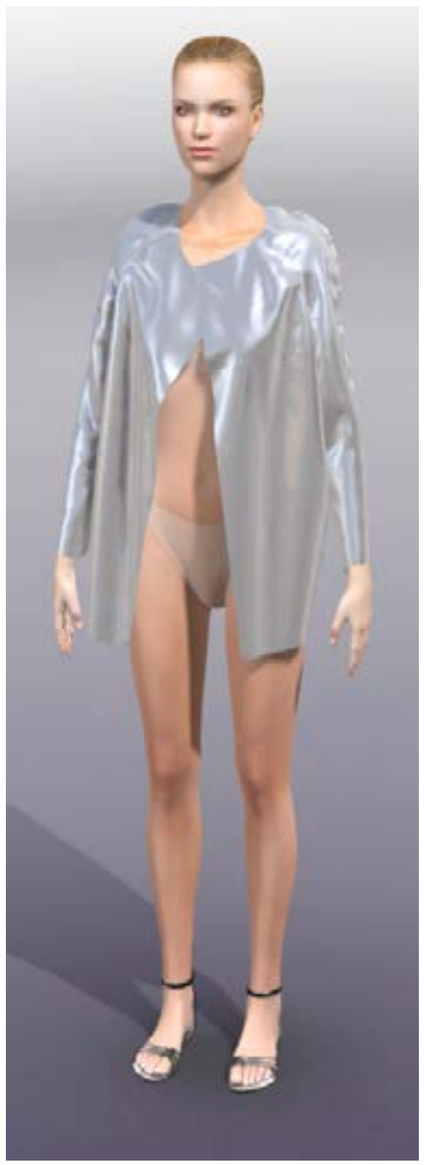
technical research

CAMPARISON ANALYSIS

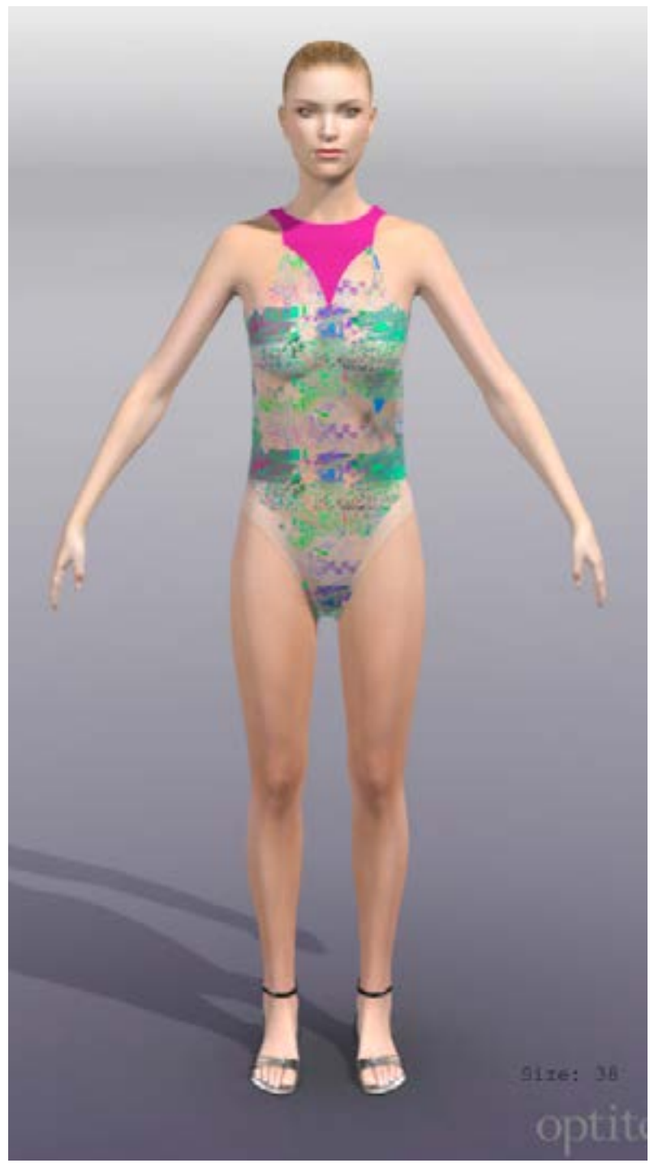
Optitex
[http://www.optitex.com/en]

Optitex needs some time to understand, but once you know how it works there are some handy tools that the other programs don't possess. The program has an option to render in low quality and in high quality. The high quality render option also displays textures from actual textiles (with depth) that none of the other programs have. The software is actually meant to make patterns with, which makes the pattern drawing functions very broad. The 3D module is something you can buy optionally to the 2D software. They encourage people to work with the 3D module as if it is a design tool, and not just to check the patterns at the end. The animation options are not very broad. They have two catwalk models (male and female) and the animation has to be pre-rendered. It is not meant for animation, it is more directed towards the industry, this is not a negative thing but it is another mindset.

Figure 12: Creation made in Optitex by Amber Slooten



- Jacket render with metal shader in Optitex.



- Model render with pints and transparency in Optitex.

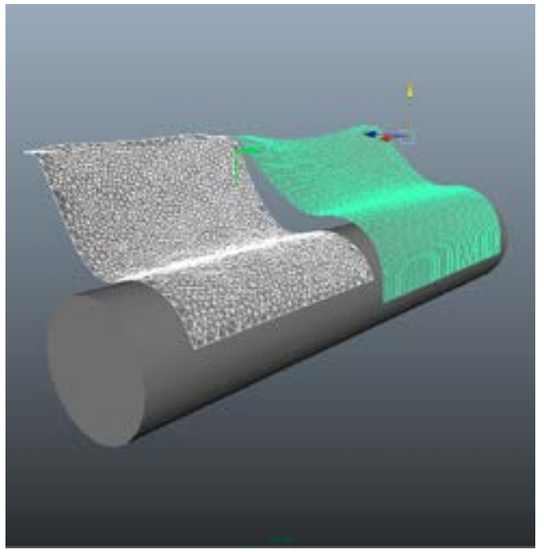
Figure 13: Creation made in Optitex by Amber Slooten

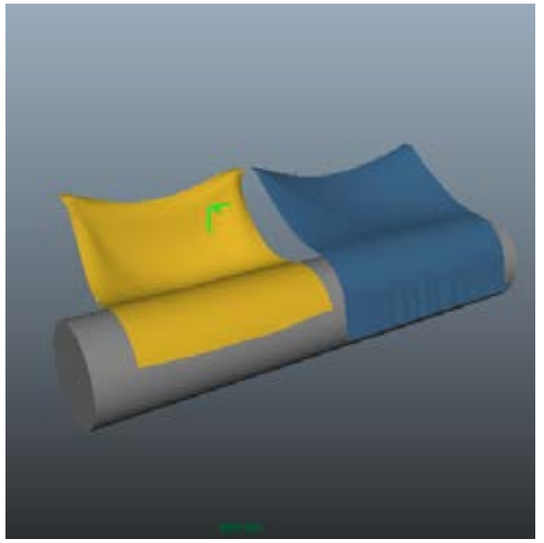
FABRIC SIMULATION

For both the design process and presentation in virtual fashion, simulation of the avatar and the garments is a very essential part. Last sprint we researched on some softwares on 3D garments design, and we saw that it's already possible for some softwares (such as Marvelous Designer) to realise very realistic simulation of clothing. To extend the possibility of it, we made one user story for this sprint to experiment realistic (dynamical) fabrics simulation in Maya. Maya has already been proved to be a very powerful software for 3D modelling and animation, and it also supports dynamical simulation using the its own system or some external plug-ins. Therefore we decided to do some research on plug-ins of Maya to see the possibilities of cloth simulation. The systems that we looked into are "ncloth" and "qualoth". Ncloth is an in-built plug-in of Maya, and it's very powerful in simulating dynamics of the fabrics. Qualoth is an external plug-in developed by FXGear which is famous for simulating cloth on dynamical bodies, as well as building the garment from a traditional panel-making way. We tested both systems by creating a piece of cloth and simulate the effect of draping, collision, and friction. The results showed that ncloth has a better performance in these tests by giving a more realistic simulation of the fabrics. We are going to continue the research with testing more parameters (such as elasticity) and later making these fabrics into garments and simulating them on a moving avatar. [http://vimeo.com/110259018] [https://www.youtube.com/watch?v=SOVxOyVUTV4&feature=youtu.be]

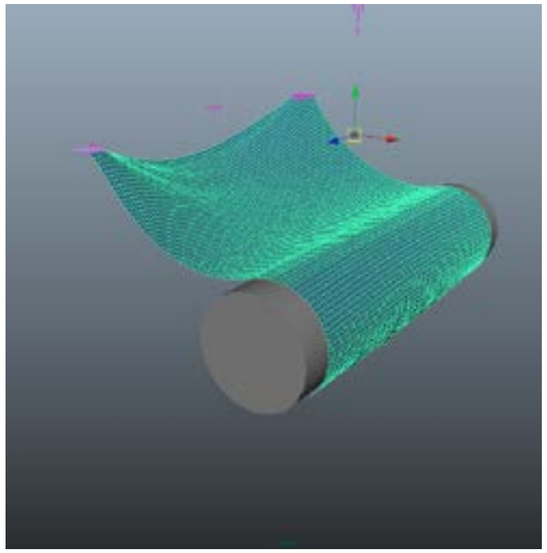
Figure 14: Creation made in Maya

QUALOTH





NCLOTH



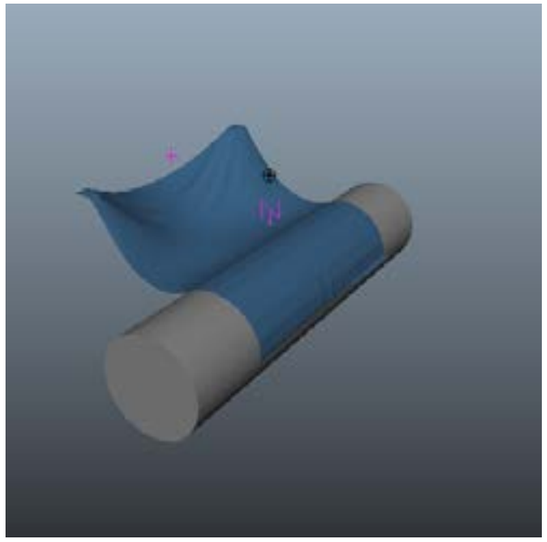


Figure 15: Fabric Simulation in Maya by Yang Chen

BODY'S MOVEMENTS SCANNING

To know more about technical possibilities, we tried to use body scanner to capture the body movements. [Size Stream LLC]
This body scanner is cheaper rather than other devices, which can measure depth and color. It takes six photos per second and exported file is points cloud, the challenges we faced in files reconstructing were the sensors' low-resolution, random scanning noise, and a lot of holes around the subject. [http://www.sizestream.com/]
To overcome this challenges and use the results, first we had to delete noises, fill the holes and than convert the points cloud to mesh files and then to .obj, so we be able to import it to other software like Maya.
Another challenge would be "How to make an animation out of singles scan?", we have just six scans for a second animation and it is absolutely not enough for a movement like jumping.
To have better output and make animation by them, after contacting Size Stream , unfortunately we got it is not possible on short notice to animate the scans and also it is not appropriate way to use the body scanner to make animation, and we need more precise instrument that also capture motion in a shorter time.

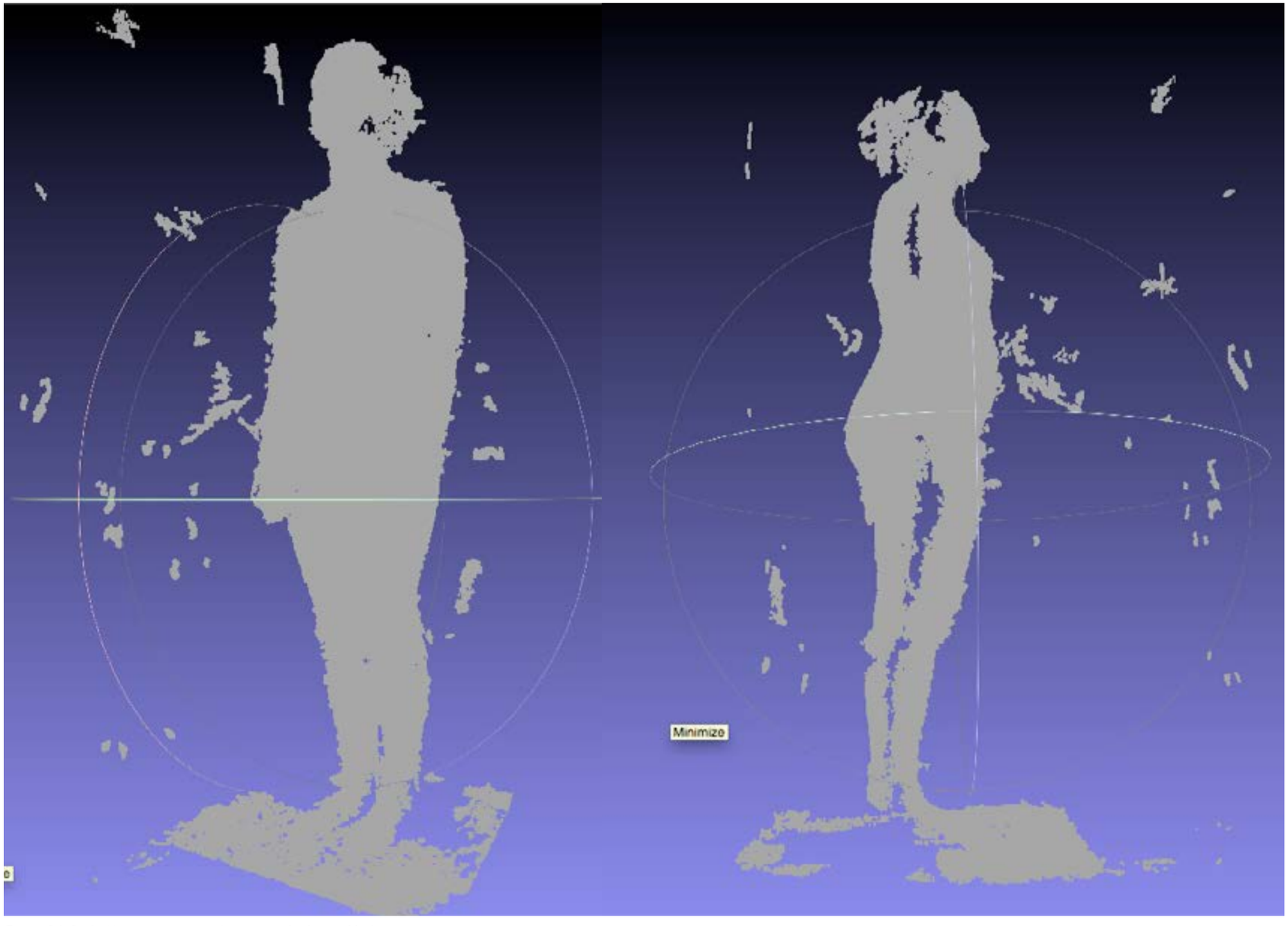


Figure 16: Body Movement capture by scanner by Lisette Vonk

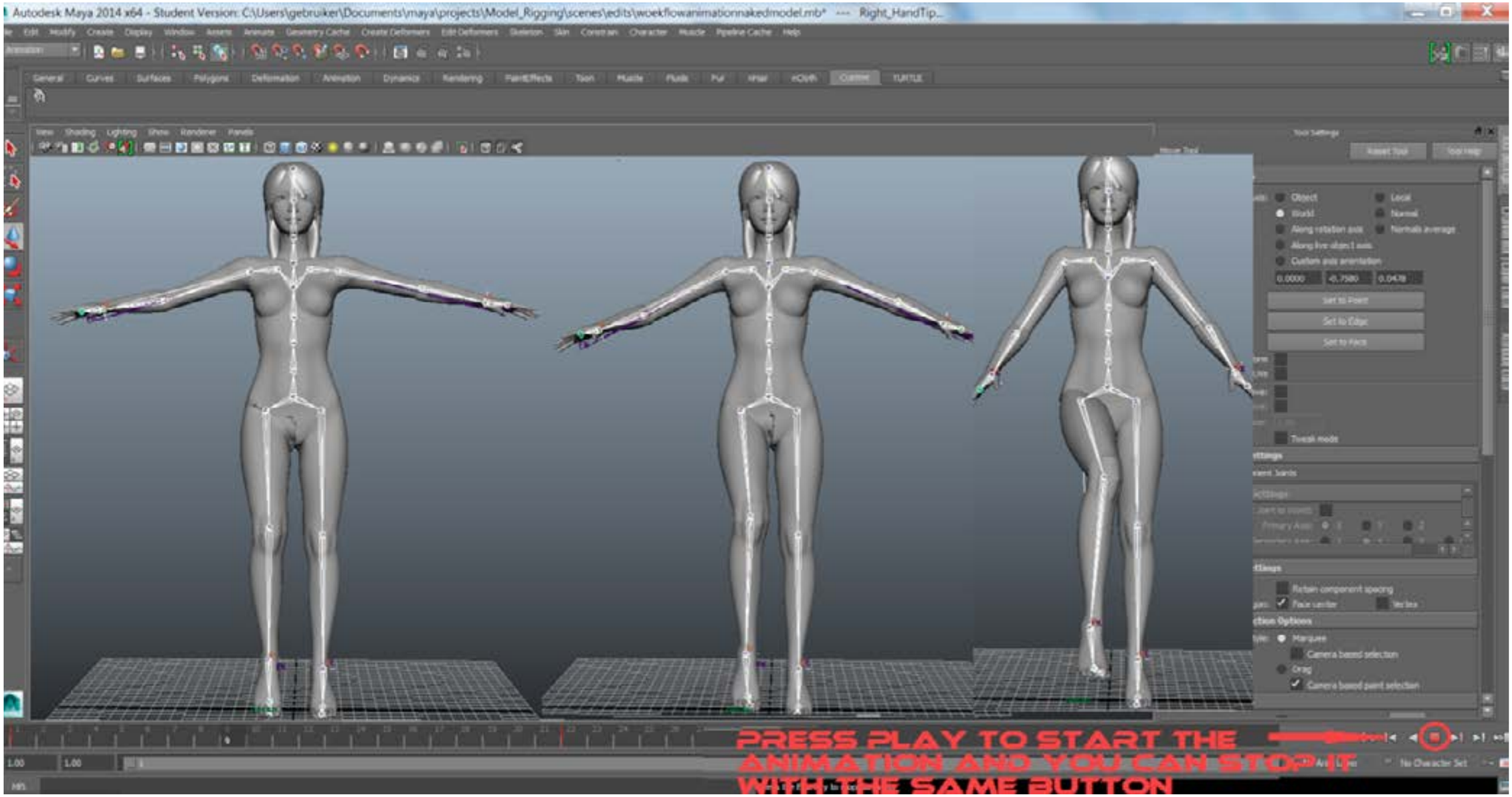


Figure 17: work flow, animat an avatar in Maya made by Michael Lovett and Yang Chen

ANIMATING AN AVATAR IN MAYA

One of our user stories this sprint is to learn how to animate a character. We think this is necessary due to the fact that the animation in a lot of fashion design softwares are quite limited and we want to implement more realistic movements into our project.
Since we choose Maya for the animation making and it's a rather complicated software, we decided to create a workflow, in which we write down step by step how to rig an avatar and set the key frames for the animation, with some explanations and screenshots made in Maya.
By following this workflow we can easily set up a human skeleton, bind it with our avatar, and make some simple animations with it.
While learning how to an avatar we also learn more knowledge about the rigging and animation process. Also it helps us have a better understanding on the movements of a 3D avatar.

MOTION CAPTURING AND TRACKING

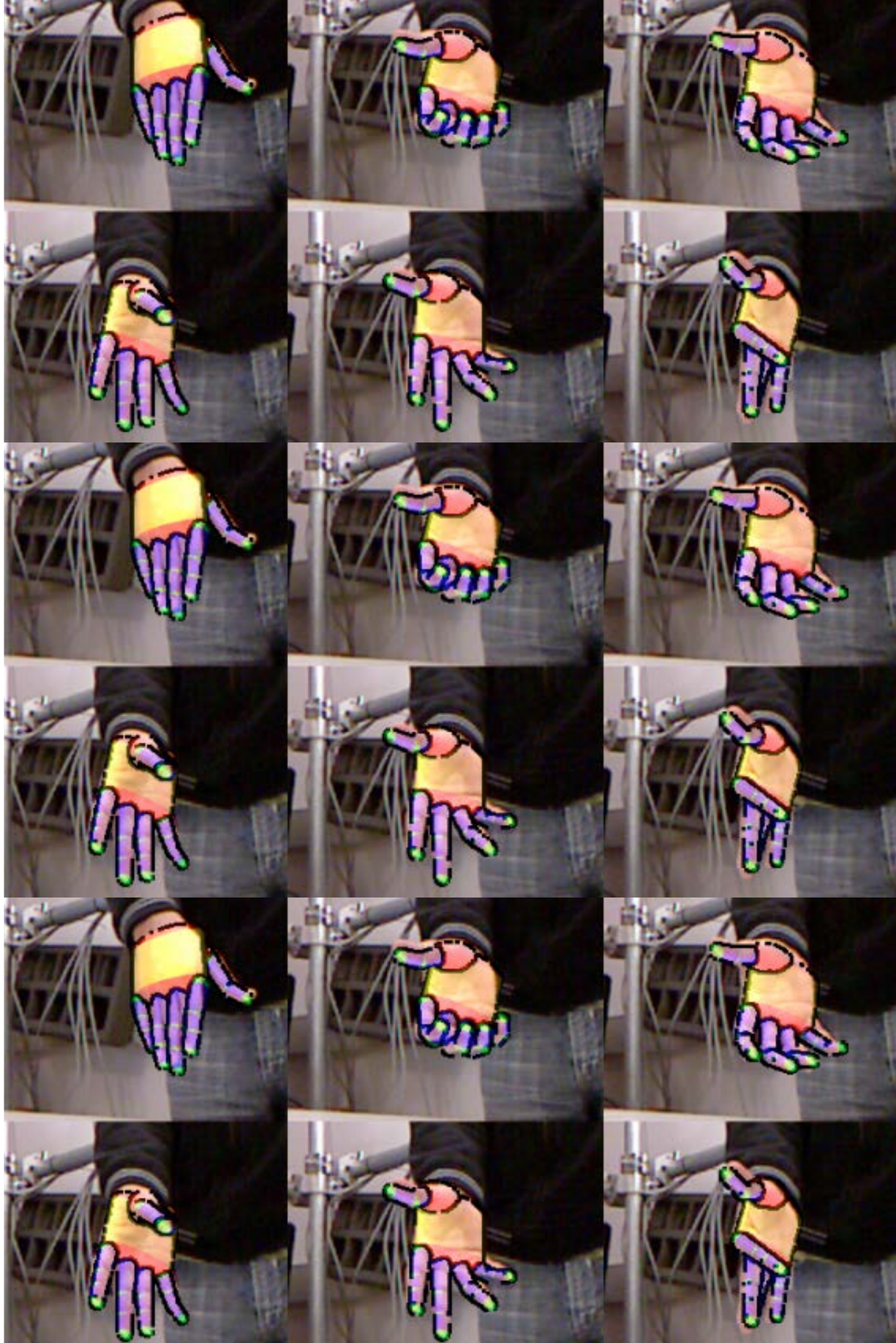


Figure 18: Giving a Hand to Kinect, Pashalis Padeleris and Antonis Argyros, Tsukuba, Japan 2012

Pioneer technologies and researches always help people to make new ideas and statements, and give them opportunity to change the world. To know more about this new possibilities we read some articles, one of them that makes us inspired was *"Motion Capturing Empowered Interaction with a Virtual Agent in an Augmented Reality Environment"* that wrote by I. Damian, R.B. Hling, F. Kistler and M. Billinghurst, 2013.
The article present an Augmented Reality (AR) system where They immerse the user's whole body in the virtual scene by using a motion capturing (MoCap) suit. It also describes an evaluation study of a prototype application, featuring an interactive scenario with a virtual agent. Virtual agents (VA) is non-real personage who have been used to make a bridge between user and computer. To make VA credible like a human, researchers have used various solutions like: Fidelity Graphics, Human-like Behaviors and Natural Interaction. Term Fidelity in computer graphics use to characterize the quality of images and convincing representation of a scene.) ["visual equivalence: a new standard of image fidelity for computer graphics", Ganesh Ramanarayanan, August 2008, Cornell University]
The scenario contains two conditions: in one, the agent has access to the full tracking data of the MoCap suit and therefore is aware of the exact actions of the user, while in the second condition, the agent does not get this information. Than authors tried to elaborate the differences between them base on user's perception in interaction with virtual agent.
The paper argues that one way to make VR much more believable in AR environment is empowering its ability to sense user and thus increasing the realism of the human-agent interaction. To achieve this goal they put the users whole body in AR environment and allow full-body interaction by using inertial MoCap suit and Oculus Rift.

Figure 19: Interaction between real user and virtual agent, Ionut Damian, Ren e Bu hling, 2013.

First, the virtual agent instructs the user to position her/his hands at a certain distance apart. After the user repositioned her/his hands, the system computes the distance between them, by the MoCap system, and then provides feedback accordingly. The virtual agent is capable of executing both verbal and non-verbal behaviors.
16 persons, 13 males and 3 females, with an average age of 28.75 took part in the evaluation of our system. Each person participated in both conditions and the order of the conditions was balanced between users.
At the authors found that the virtual agent's increased awareness of the user's body enabled by the MoCap component does impact the user's sense of spatial presence, in particular, the perception that the agent had access to the real environment.

Figure 20: Control VR, wearable technology that turns hands motion into the ultimate intuitive controller for PCs, VR and beyond, by Control VR Team.

HYBRID 3D FASHION DESIGN

documentation sprint 2