Expert Interview

Introduction

My knowledge of projectors and object detection sensors has increased over the past semesters, but I wanted more information about specific peripherals. Mainly the object detection sensor called **Kinect** and a high-end projector that is capable of true **body projection mapping.**

In this document, you can read how I interviewed multiple people that are experts in those specific fields. I approached a former teacher from my previous semester and asked him about the **Kinect**. Questioning the viability of the sensor, the range of the sensor, and the possibilities of improving my **first prototype**.
Next to that I also gathered my insights from a representative from a lighting and projector company. I mainly asked this person about the different types of projectors that I could possibly use for my prototype.
For even more insight, I approached a coworker at Dutch Rose Media that has worked on a project that involved body detection with a camera.

First prototype:
In my previous semester I already worked on a project that involved **body projection mapping**, I was fortunate enough that I could continue with that same project. I received a great deal of insight

from my former teacher Geert-Jan. The questions that I asked were quite specific, since Geert-Jan already knew what I was talking about.

Interviewing Geert-Jan (Fontys Teacher)

Since Geert-Jan already knew everything there is to know about my project, I asked him very specific questions about the capabilities of the Kinect sensor and what kind of projector might improve the overall stability of the prototype.
The prototype from my previous semester had **latency issues** and the range of the sensor with the projector was also quite limited. Together with the projector from school and a program called **Processing**, I was able to place objects on top of human bodies with projections.

Latency

Why is the latency so long?
The latency is mainly the fault of the Processing program that I am using for the computing. This program only outputs 60 frames per second. For simple video it is fine, but for smoothly following a person, 60 frames a second would not be fast enough.

Are there any other programs than processing I could use, that could potentially reduce the latency?
Processing currently has the largest library of example projects that are specifically created for the Kinect. Therefore, using another programming language that is capable of a higher frame rate would mean that you need to figure everything out by yourself. Which can be a huge undertaking.

Projector

If I were to find a different program and sensor, will a "faster" projector, that is capable of outputting higher frame rates, reduce the latency?
A faster projector, combined with another program and sensor, would most definitely reduce the

latency. It all depends on the output frame rate of the projector and the program that will be used.

Are there any kinds of specific projectors that will reduce the latency?

You could potentially use a laser projector, which has a way higher frame rate. But are costly.

Depth sensing Sensor

Are there any other sensors I could possibly use?

I only know the depth-sensing camera called Kinect, you could use the Azure Kinect. It is way faster and has a wider range, but there is little to no documentation about this specific sensor. Therefore, it wouldn't be viable for this project, especially when looking at the time constraint. Figuring out how to track bodies and map them out would require a lot of time and energy.

Interviewing a Lighting and Projector Company

There is this system called ET SWR10 that is capable of body projection mapping, that Panasonic offers. But the purchasing details were not available online. That is why I approached multiple companies to find out what kind of system it is and if there are any alternatives to achieve real-time body projection mapping.

What kind of projector is capable of body projection mapping?

Yes! There is a system that Panasonic offers, that is capable of this exact thing. The ET SWR10 is a system that is capable of real-time body projecting mapping. It is a system that uses an infrared emitter and an infrared camera to determine the positioning of the desired projection location.
This system is not readily available for anyone to buy, it requires collaboration with Panasonic and an additional monthly fee. This is due to the complexity of the system and this technique of body projection mapping is quite new.
The projector itself goes for about €50.000,- and the additional monthly fee is €2000,- a month.

Are there any alternatives that I could use to get the same results?

Every single projector is capable of body projection mapping, but it is actually the system behind it that is quite complex to pull off. The system that Panasonic offers delivers an extremely high-quality of projection and the projection area itself is quite accurate. There is nothing like this system, there are

currently no other systems that are capable of delivering body projection mapping with this high fidelity.

Interviewing a Co-worker

Next to the projector, I also approached a co-worker at my internship about alternatives to the Kinect. Finding out if I could use a different depth-sensing sensor that could potentially improve the latency, would be quite useful in achieving body projection mapping.

Are there any other alternatives to the Kinect to achieve body projection mapping?
Yes, there is a depth-sensing camera from **Intel** called **Realsense D455.**

What is the range of the sensor?
The ideal range of depth-sensing is about six meters, but it can go up to 10 meters.
Once you go passed the six meters, the results of the body tracking may vary.

What programs can I use with this sensor?
There are a couple of plugins you could use with **Unity.** You could maybe use OPEN CV (body detection software) for body detection. But there are many other programs that could also be used.

Conclusion

Out of all of these small little interviews, I can confirm that there are indeed other alternatives to achieve body projection mapping. The Realsense D455 is a very good alternative to the Kinect, this will then be used for depth-sensing. And for the projector I will need to look for three key features:
Low latency – High frames per second and it would need to be a laser projector, to get the best image quality.
As for the expensive Panasonic system, I will strongly advise this system for the future of hybrid festivals!