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WHO AM I?:
FULL-BODY INTERACTION

Hochschule Augsburg
University of Applied Sciences

CONTENT

ABSTRACT

„**Who Am I?: A full-body interaction**" is a concept-study for a tool which purpose is to collect statistical information about visitors of an exhibition area. The collection of the information is achieved through different levels of interaction.

The tool triggers the presence of the people as soon as they enter the exhibition area and projects a shadow on the screen representing the visitor (avatar). Subsequently the visitor is guided through a survey aiming at collecting the statistical information.

⟶ **But more important beside providing a new and innovative way to collect statistical information about visitors of an exhibition, the aim of the project is to study the reaction of a non-experienced user to new interactive mean.**

RELATED WORK / MOTIVATION

„Who am I?" – Science Museum London

A set of Installations at the Science Museum in London titled „Who Am I?" invites you to explore the science of who you are through intriguing objects, provocative artworks and hands-on exhibits.
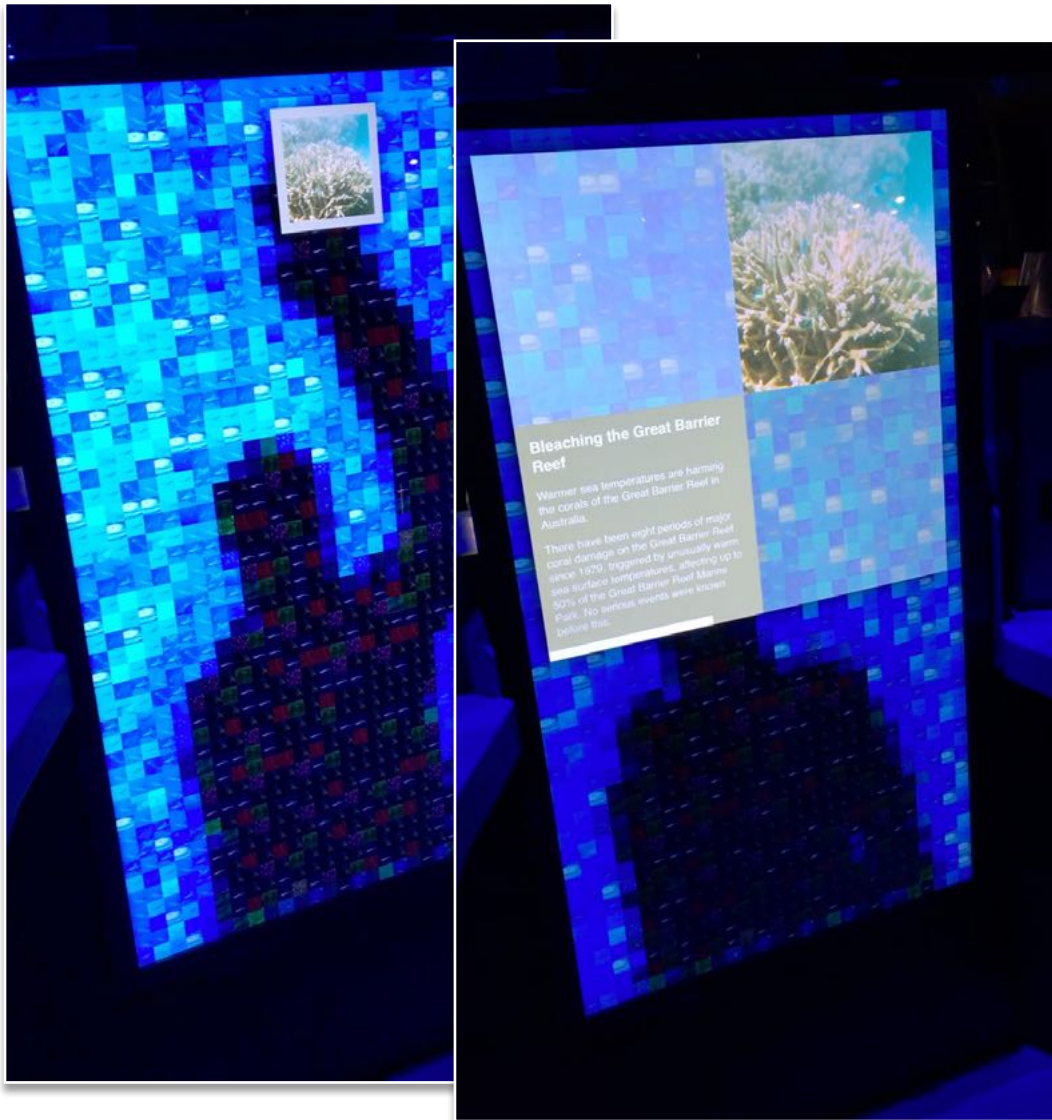
The interest concept from this exhibiton is a full wall on which information collected through different exhibits are graphically displayed to give a representation of the audience.

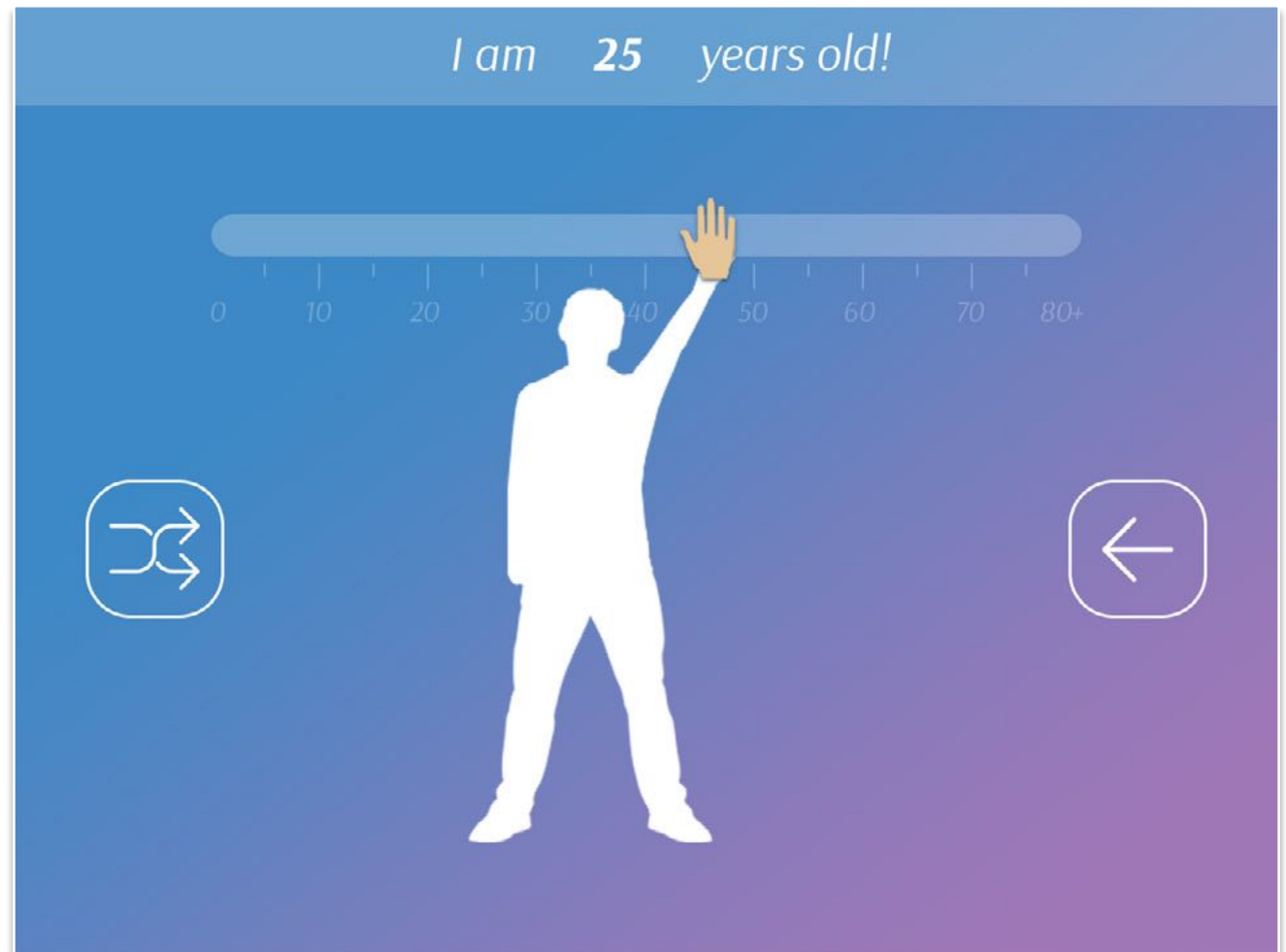Who am I?

Who am I?
Displayed information on full wall

Engineer your future

In another exhibtion, aimed at teens, titled „Engineer your future" the visitors are invited to think about their future through challenges, games and films which help them to understand what engineers do — and to find out whether this could be a suitable job for them.

The part of interest of this exhbition is a interactive tool which recognize the movement of the visitor, project a shadow of the visitor on the screen and build the interaction starting from these two elements.

With my idea i want to create an effective combination between the profiling feature of the first installation and the technical means used in the second installation.

Screen
„Who Am I?: Full-body interaction"

INTERACTION TECHNIQUES

First of all it is important to determine and limit the input mechanisms.
the following moves / gestures are used to operate the final prototype.

1st

Using the position of your hand as you would use your computer mouse.

2nd

Using the distance between your hands.

3rd

Using the joints angles of your upper body.

The user can interact with the prototype by using the control techniques shown in the previous slide.

The prototype consists of three different scenes:

age

The user can set his age either using the position of his hands or the distance between them

country

The user can set his country by using the position of your hand (in an alternative way than in the „set age").

gender

The user can set his gender by using the joints angle of your arm.
(Beware: the choice of the arm has a meaning)

navigate

In common to these three parts there is the navigation between the scenes.

The navigation is done with the hand position.

STORYBOARD

Intropage

If no user is detected the visor are prompt with a welcome screen which invites them to step in front of the installation. A minimal form of animation was added to try to catch the attention of the visitor.
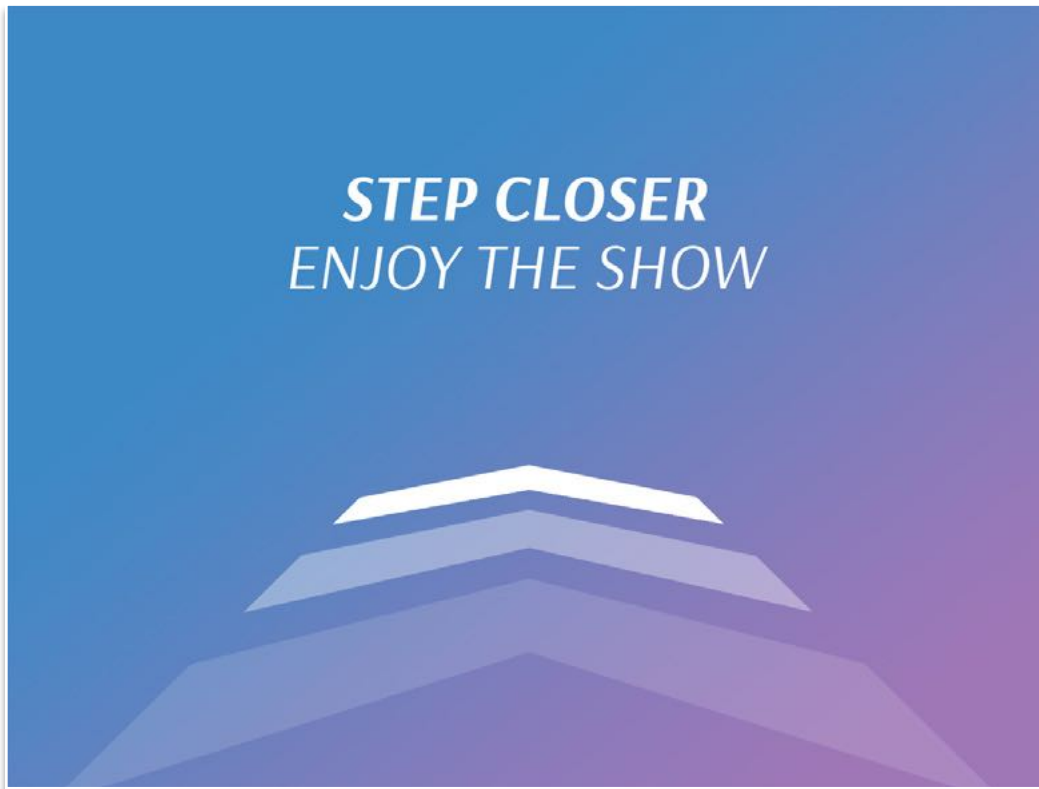
Intro
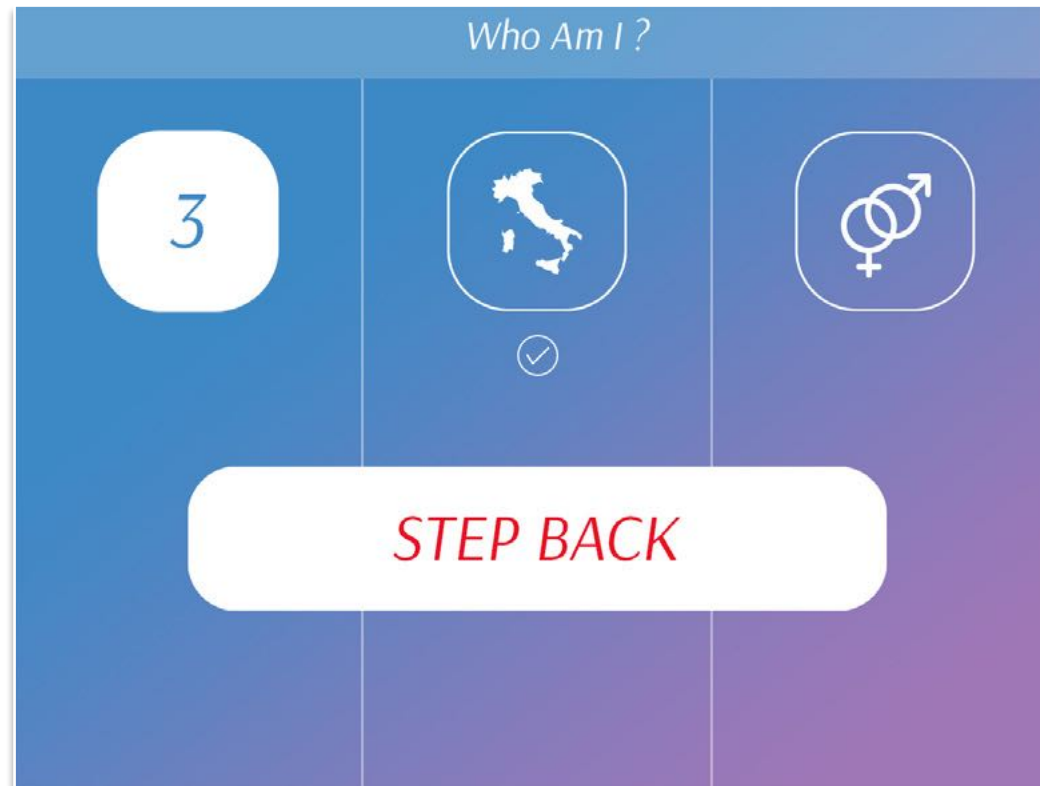„Who Am I?: Full-body interaction"

Mainpage

The main page is used as the connection between the individual scenes.

With the position of your hand all the three scenes can be selected. To provide better control a timer of three seconds was introduced to confirm any selection.

+ **selected scene (timer)**

+ **visited scene (check + attribute)**

+ **unvisited scene**



main page
(incl. scene status, warning signal)

In order to avoid inaccuracy of the user detection a warning message is displayed when the user step to close or too far from the Kinect.
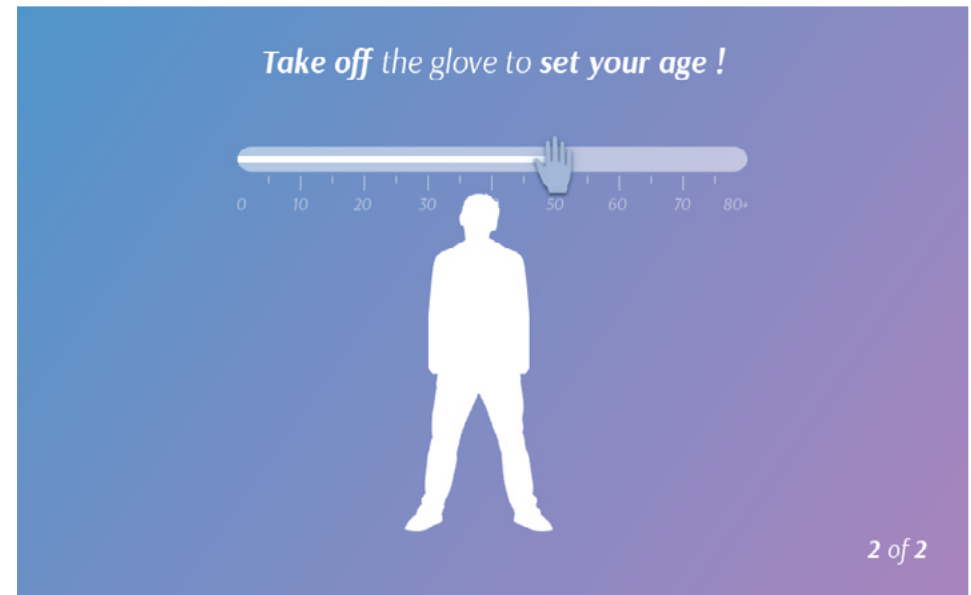
Age selection (mutation 1)

In the age scene two different interaction techniques were implemented.

Both of them have the concept of a „agebar" in common, On which a "cursor" give a feedback on the selected age.

The first one is based on the position of the hand:
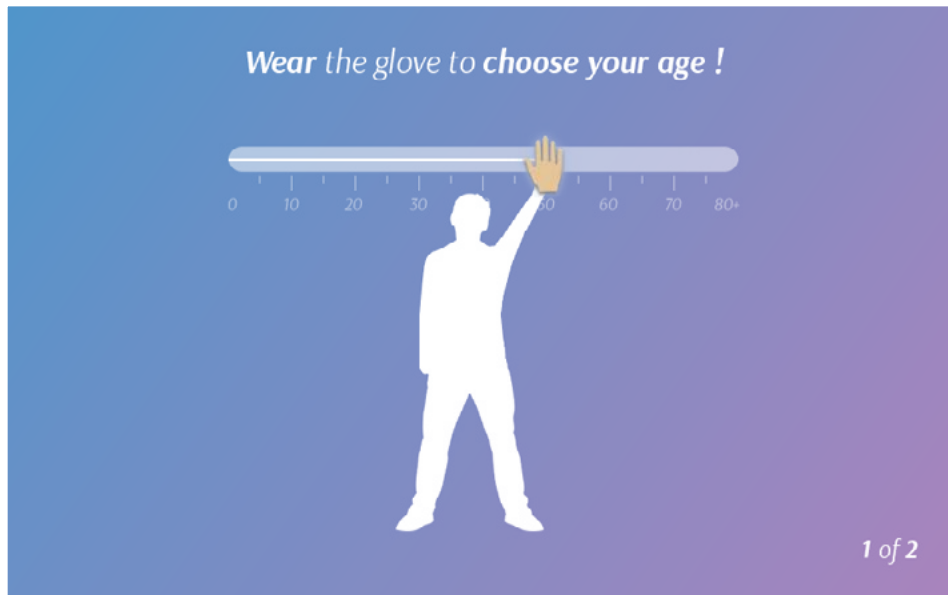
The cursor can be used like a glove. When the user is wearing the glove he is selecting the age by moving the glove along the „agebar".
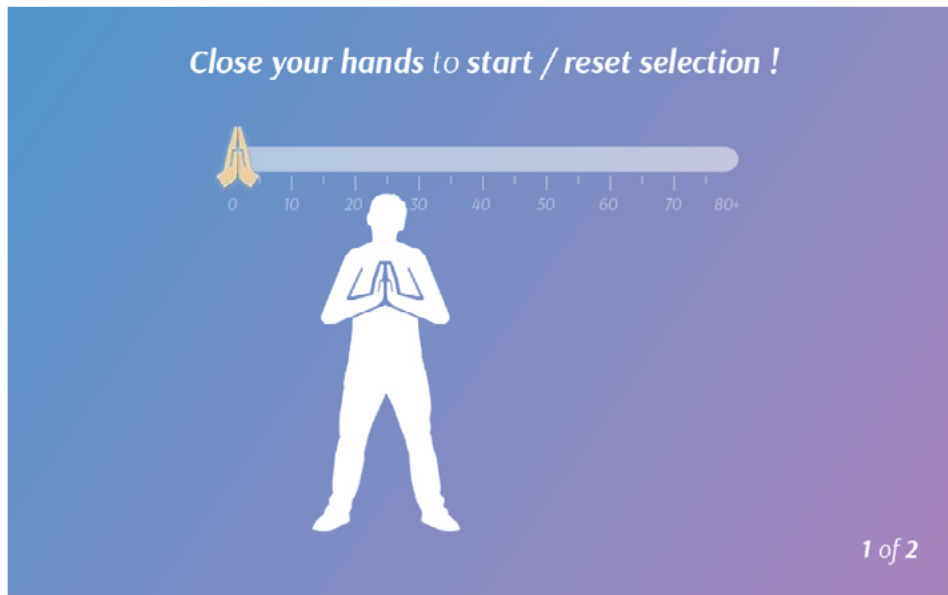

After the right age is set, the cursor has to be left, like you would take off a glove.

Now the age is set and the scene can be left to lock the data.

Age selection (mutation 2)

The alternative is based on the distance of the hands:

To start this scene, you have to close your hands.
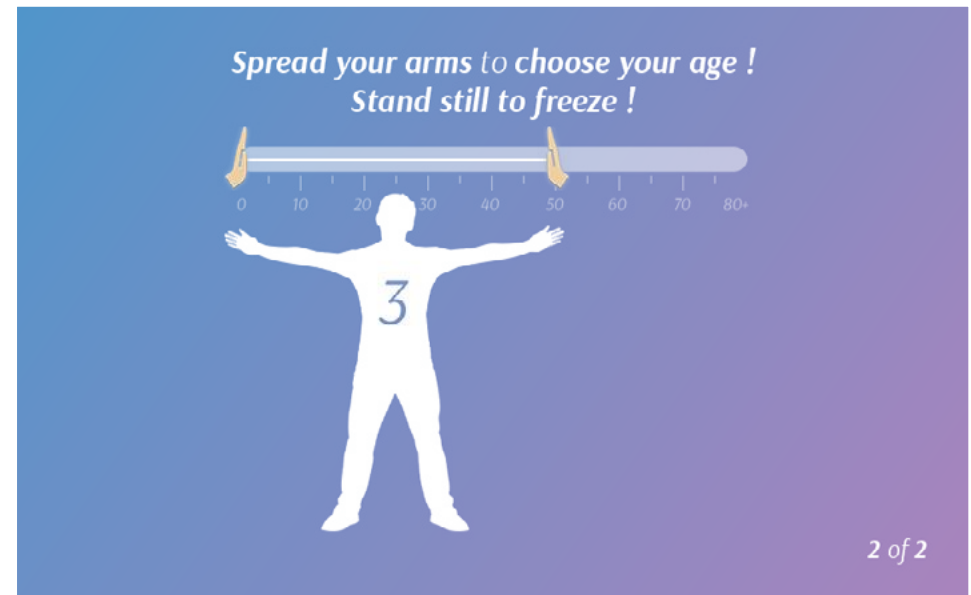
After this move the visitor can then spread his arms to set his age. Therefore is the left cursor fix at the origin of the „agebar". The right cursor is moving propotional to the distance of the hands of the visitor.

A freeze of 3 seconds is setting the age. As soon as the scene is left, the age is locked.

Country selection

For the selection of the country you have to use the positon of your hand again.
(In a different way to the age selection).
The concept is to roll a drum with flags and stop it on the right position of your country.

At the beginning of the scene a setup phase is required to determine the maximum span of the movement of the user.

By raising the hand the visitor is able to roll the drum up.
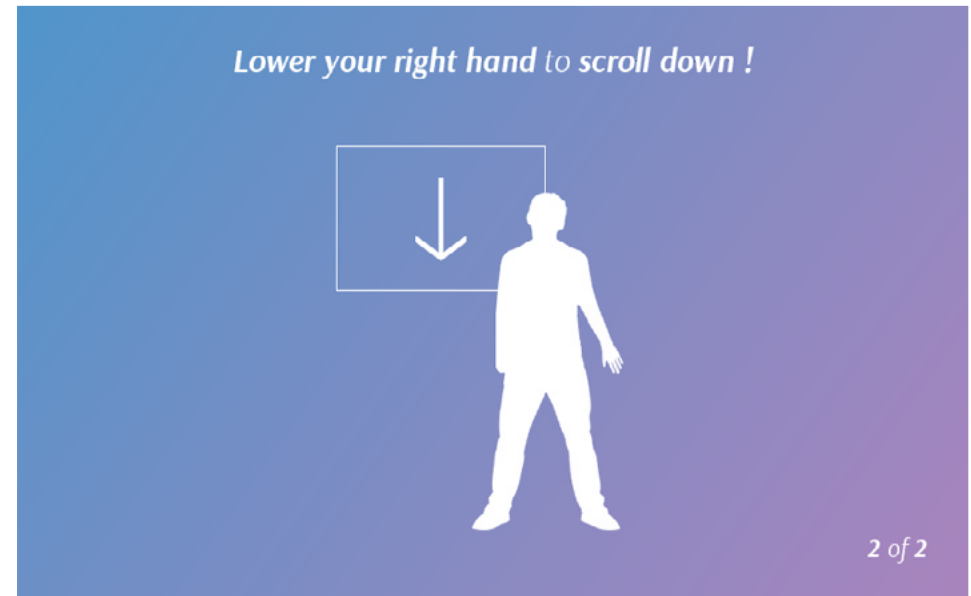
If the drum has to be moved down (again), the visitor has to lower his hand. The faster the hand is moving, the quicker the rolling is performed.

Gender selection

For the selection of the gender you have to use the angle of your joints of your body.

In this case the idea of selection is to imitate typical genderbased-gestures.

A reset mechanism was introduce to fix the issue of "accidental set".

To selected yourself as a man, the visitor has to raise his left arm and form his joints in a 90° angles.

To selected yourself as a woman, the visitor has to place her right arm on the waist (45°).

Both results can be locked by reaching one of the fitting joints angle.

IMPLEMENTATION

sketchbook / language
Processing 2

library
SimpleOpenNI

Who Am I?

motion sensing input devices
Kinect

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Software

Hardware
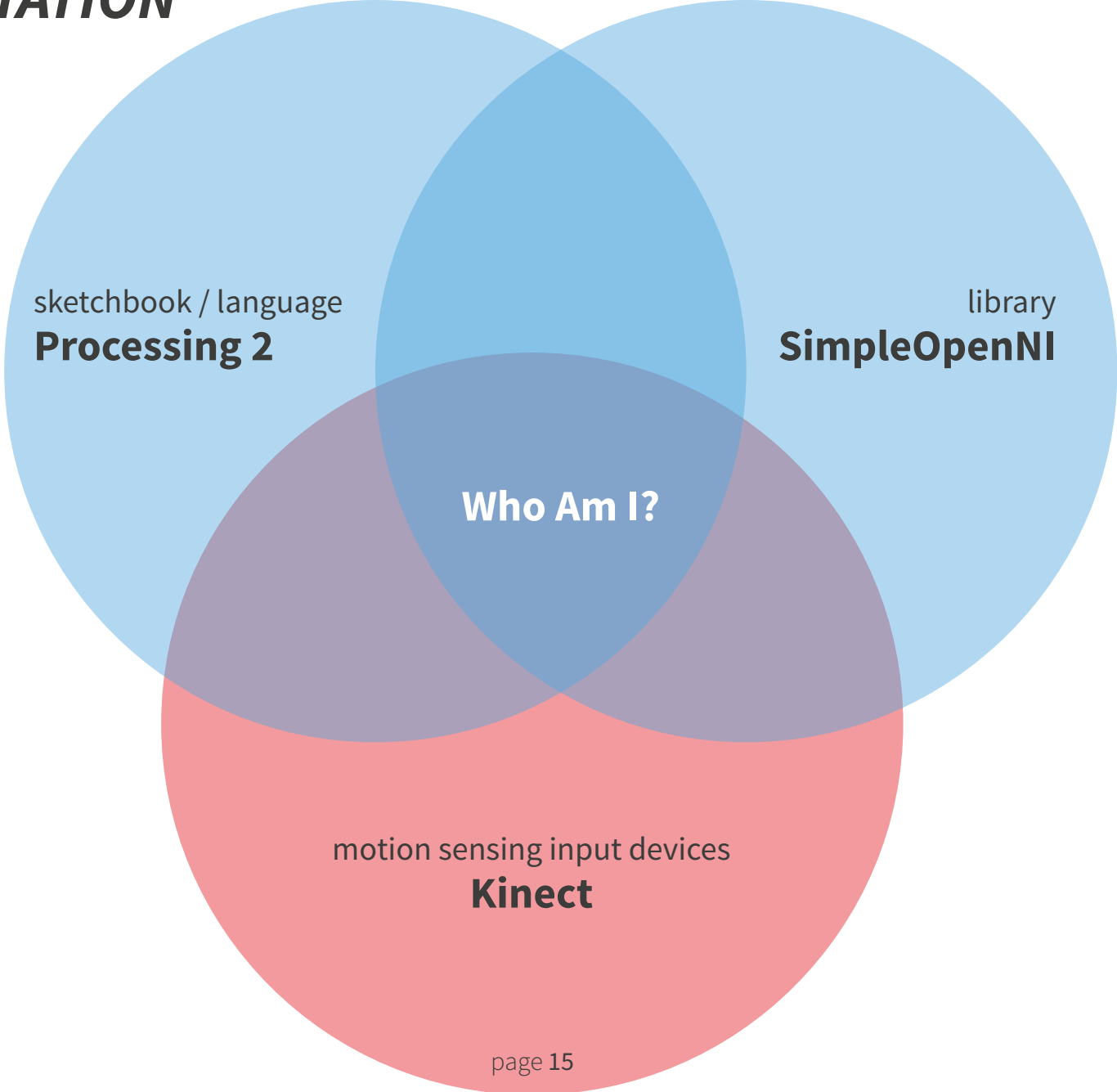
EVALUATION

Leasons learned

During the development phase I was faced with severel problems.

One of the non-technical problems was the need to explain „how-to" use the application. Especially moves to reset or start scenes has to be explained.

⟶ provide demoscreens before every scene

Another problem was in some of my sceneario I had the need to have precise measurment. The system ot the Kinect had some problems to provide reliable data to work with.

⟶ adapt the GUI to satisfy the needs

One last point I want to adress is corncerning the flickering measurments which were provided by the Kinect.

⟶ filter (not implemented) the input of the kinect and using the moving average. (last 10 reads)

CONCLUSION

There were several test run for review the functionality of the application. None of them should be counted as professional user study.

Overall the probands had the most difficulties by using the hand position for rolling the drum to select the country. An increase of the timer to lock the country helped a bit to compensate the insufficient input of the kinect.

Next steps

To fullfill the idea of having two techniques to selected the same value (like at the „set age") it would be meaningful to find mutatinons to „set country" and „set gender".

One possible scenario for the „set country" would be to select the country by tracking the distance from the body to the kinect to roll the drum. If you step fordwards, the drum will roll up, if you step away from the kinect, the drum will roll down.

One possible scenario for the „set gender" would be to select the gender by drawing an outline around an genderbased symbol.