Pflichtenheft

Virtual Reality für Sensordatenanalyse

Projekt:	Virtual Reality für Sensordatenanalyse 0.1
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1 Purpose

The software project module in 2017 at the university of Constance focuses on the development of app for mobile devices.
Especially, this Pflichtenheft intends to describe the structure of an implementation of a virtual reality representation of BLE sensor feedback.

1.1 Mandatory Criteria

M1 The app shall use the Bluetooth adapter of the smartphone to connect to a TI SimpleLink SensorTag device.

M2 The app shall track the position of a TI SimpleLink SensorTag device with up to 30m tolerance.

M3 The app shall visualize the sensors' data and its position using 3D/stereoscopy, more concrete the WebVR framework.

M4 The visualization mentioned in M3 shall be explorable by tilting the joystick of a bluetooth controller

1.2 Desired Criteria

A1 The app shall visualize the sensors' data and its position using augmented reality

A2 The VR-World represents a whole corridor with more then two rooms.

2 Product Environment

2.1 Software

- Android 5.0 Lollipop or higher

2.2 Hardware

- Bluetooth-enabled Smartphone
- TI SimpleLink SensorTag device
- Victorstar VRBox 2.0
- VR-Park Bluetooth Controller

3 Product Functions

3.1 Settings

The User can set the following Options:

/F0100/ *Sensor:* The User can set, which data shall be displayed in the VR-World (Temperature, etc.)

3.2 VR-World

The VR-Mode is 3D view of the world on entering VR-Mode the user will see a fullscreen 3D world and by pressing the button in the lower right corner he can enter the stereoscopic view of the World. The VR-World is a 3D representation of a real series of rooms.

/F0300/ *Look around:* The User can look around in the Vr-World by touching and draging on the Screen or by moving his head around to pan the camera.

/F0310/ *Move inside VR-World:* The User can move inside the VR-World by tilting the joystick of his controller forward. Turning will be done by looking around with the VR-headset or by clicking and dragging on the screen.

/F0320/ *Switch Data representation:* The User can switch between two different respresentations of the bluetooth data from the sensor by pressing the A-Button on his controller.

/F0330/ *Exit VR-Mode:* The User can exit the VR-Mode by pressing the x in the top right corner of the screen or by looking for 5 seconds directly on the x under his feet.

/F0340/ *Enter stereoscopic VR-Mode:* The User can switch from fullscreen VR-Mode to stereoscopic by pressing the button in the lower right corner or by pressing the A-Button on his controller.

/F0350/ *Exit stereoscopic VR-Mode:* The User can leave stereoscopic Vr-Mode by pressing the back button on his device or by touching the back button in the top left corner.

/F0360/ *Enter Settings:* The User shall be able to enter the Settings menu while in normal 3D-Mode.

/F0370/ *Switch rooms:* The User can easily switch rooms by pressing the B-Button on his controller or by looking up at the door sign for at least 5 seconds.

The VR-World shall model at least two different rooms and a connect hallway.

The VR-World shall be viewed inside a web browser and from the App.

The VR-World shall have a stereoscopic 3D-Mode of the World.

While viewing the VR-World the user shall be able to look around using the gyro senor of his phone to pan the camera around.

While the App is not in stereoscopic 3D mode the User shall be able to click and drag to pan the camera around.

The User shall be able to move the camera inside the Vr-World by using his controller.

The Data fechted from the Sensor shall be displayed inside the VR-World.

There shall be at least two different representations the data from the Sensor.

The VR-World shall represent at least two different real world rooms.

The User shall be able to easily switch between stereoscopic 3D and normal 3D mode.

The App shall be in fullscreen mode, while in VR-Mode.

While in stereoscopic 3D-Mode the user shall be able to exit it by looking for 5 seconds at the cross under his feet.

4 Product Data

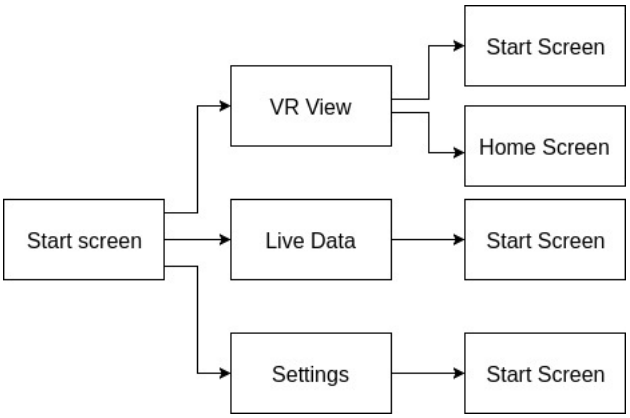
TODO: MockUp/Interface einer Projekt 4 Gruppe
TODO: Was muss für 3D Modell gespeichert werden? Wie sehen die Datenstrukturen aus?

5 User interface

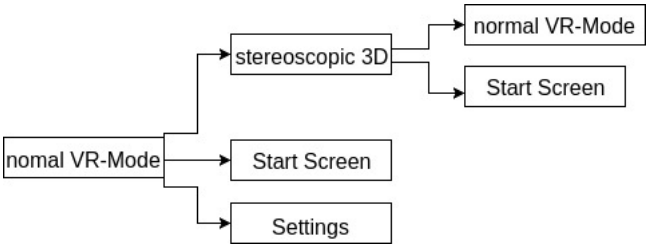
5.1 Structure

A small overview of the menu Structure.

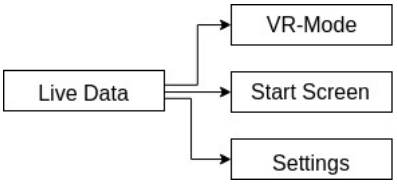
5.1.1 Start screen



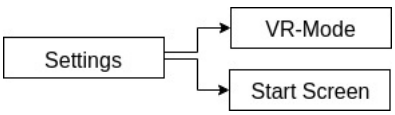
5.1.2 VR-Mode



5.1.3 Live Data



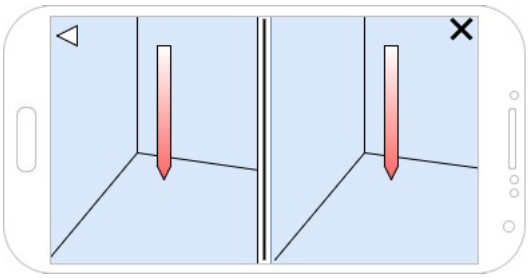
5.1.4 Settings



5.2 Layout

A mockup of the Start up screen.

And a mockup of the stereoscopic Vr-Mode.



6 Quality Requirements

	very important	important	less important	lesser important
Robustness				**X**
Reliability	**X**			
Correctness	**X**			
Usability	**X**			
Efficiency		**X**		
Portability		**X**		
Compatibility			**X**	

7 Test Cases

/T0300/ *Look around:* While in normal 3D mode the tester shall click the screen and drag first up to move the camera up. Then move down to move the camera down, then at last left and then right, all the time the camera must follow the movement of the finger. After this the tester shall tilt the phone up to move the camera up, then tilt it down, left and right. The camera shall follow the tilt direction of the phone all the time with no delay.

This test will be repeated in stereoscopic 3D view, while the clicking and dragging shall not work, the tilting of the phone shall be the only way to pan the camera.

/T0310 *Move inside VR-World:* While in nomral 3D mode the Tester shall tilt the joystick on the conrtoller forward and the camera shall move forward. By tilting the joystick backward the camera shall move back, by tilting left the camera shall move left and by tilting right it shall move right. The camera shall allways follow the view point, so forward is allways in the center of the camera.

This test shall be again repeated in stereoscopic 3D view and all funcitons shall work the same.

8 Development Environment

8.1 Software

OS: Windows 10

IDEs:
- ◇ Android Studio
- ◇ Sensor Controller Studio 1.4.1

VCS: Git & GitHub

UML-Editor: Enterprise Architekt/MS Visio/draw.io

Zeichensatz: LaTeX

8.2 Hardware

Smartphone: Motorola XT1572

Sensor: TI CC2650STK

VR-Headset: Victorstar VRBox 2.0

Bluetooth-Controller: VR-Park (?)

9 Project Time Line

02.05.2017 release Pflichtenheft incl. project plan and subject of the milestones

25.05.2017 Milestone 1

12.06.2017 Milestone 2 & intermediate assesment

17.07.2017 Milestone 3

25.007.2017 Final presentation

Possible starting points:
Simple, bad layout
TI official, complex

10 Sources

Pflichtenheft Template Simon K. Baur Link