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Systems Neuroscience
& Neurotechnology Unit

Closed Loop Virtual Reality for the Treatment of Phobias

Bachelor Thesis

Systems Neuroscience & Neurotechnology Unit
Saarland University of Applied Sciences
Faculty of Engineering

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Matriculation Number	:	1234567
Course of Study	:	Biomedical Engineering (Bachelor)
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Saarbrücken, January 22, 2018

Abstract

- a brief mentioning of the study and its attempt to treat acrophobia with a virtual environment - theme of this thesis; the design of a VR fit to treat patients

Zusammenfassung

translation of abstract

Declaration

I hereby declare that I have authored this work independently, that I have not used other than the declared sources and resources, and that I have explicitly marked all material which has been quoted either literally or by content from the used sources. This work has neither been submitted to any audit institution nor been published in its current form.

Saarbrücken, January 22, 2018

Dominik Limbach

Contents

1 Introduction

1.1 Motivation

- subject of the study, reduction of acrophobia - the use a virtual environment can have in treating acrophobia. - point out the benefits of VRET over in vivo therapy (safety,one-fits all)

1.2 Acknowledgments

give thanks to - Prof. Dr.Dr. D.J.Strauss - Dr. L. Haab - everyone else who helped

1.3 Theoretical Background

1.3.1 Acrophobia

definition of fear and specific phobias,prevalence, evolutionary purpose(fight or flight), link fear to stress

1.3.2 Stress

definition of stress, ways of stress perception (eustress and distress)

1.3.3 Electrodermal Activity,Galvanic Skin Response

short explanation, influences(autonomic nervous system), role as method to register physiological correlates of mental states like stress

- illustration of a typical gsr signal and explanation of its components (graph, peaks etc)

- how and where is gsr usually measured? why there?

1.3.4 Exposure Therapy

what is exposure therapy? when is it used? how is it done? what is needed for it to be succesful? how effective is it?

2 Problem Analysis and Goals

2.1 State of the Art

should i write about EDA or exposure therapy?

2.2 Recent Advances in Research

3 Materials and Methods

//Materials mention the snnu and the lab where the study takes place

//Setup - description of the therapy setup - graphic 1, shows patient inside the defined treatment area, wearing VR-Headset, the lighthouse system, eeg and gsr sensors, connection to the pc controlled by the physician

//Paradigm - how many subjects did participate? - which tasks did the patients fullfill? (cross the bridge) - duration of the expirement

- description of the virtual environment, the procedure (baseline measurement,VRET by a professional and the eventual tasks the patient performs) - pictures that show the VE in it's starting state as well as it's therapy state (descended floor) - description of how the VR is controlled by the user(which parameters can be influenced)

//Methods - main objective is the measurement of gsr during the therapy and the evaluation of the gsr data concernig the stress of the patient during the therapy - how is the gsr information processed and evaluated?how is it presented to the user? - graphics

4 Results

5 Discussion

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

6 Conclusions and Future Work

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A Tables and Measurement Results

Table A.1: Surgical needle sizes in Gauge[1]

Size [G]	Diameter [mm]	Colour code
10	3.4	brown-olive
11	3.0	yellow-green
12	2.7	lightgray
13	2.4	purple
14	2.1	lightgreen
15	1.8	blue-gray
16	1.6	white
17	1.4	violet
18	1.2	pink
19	1.1	ivory
20	0.9	yellow

[1] see [1]

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Bibliography

[1] Sigma-Aldrich Co. LLC. Syringe Needle Gauge Chart, June 1, 2015. URL http://www.sigmaaldrich.com/chemistry/stockroom-reagents/learning-center/technical-library/needle-gauge-chart.html.