

# Product Vision and Planning

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# Product Vision

The product is an extension for an existing system. The customer [1] is a company that makes virtual reality systems for Mental Health Problems such as Social Phobia or Psychosis [2]. The VR systems are based on Virtual Reality Exposure Therapy (VRET) [3] which helps patients to interact with a virtual world as realistic as possible and overcome their fears.

This product addresses the needs of the company to make the environment they work with more realistic, user-friendly and expand it with additional functionality. The simulated environment that the patient will work with needs to feel stable and realistic. The patient should feel comfortable and should be able to act as in the real world to experience the same feelings and help overcome them.

It is crucial for the patient to feel comfortable in the virtual environment and to be able to act naturally in it [4]. This will help the patient have a good indication of how it is like in the real world. This is very important in order to help the patient overcome his fears. So the patient should be able to walk around in the simulated supermarket, pick up items and interact with other 'people' and objects .

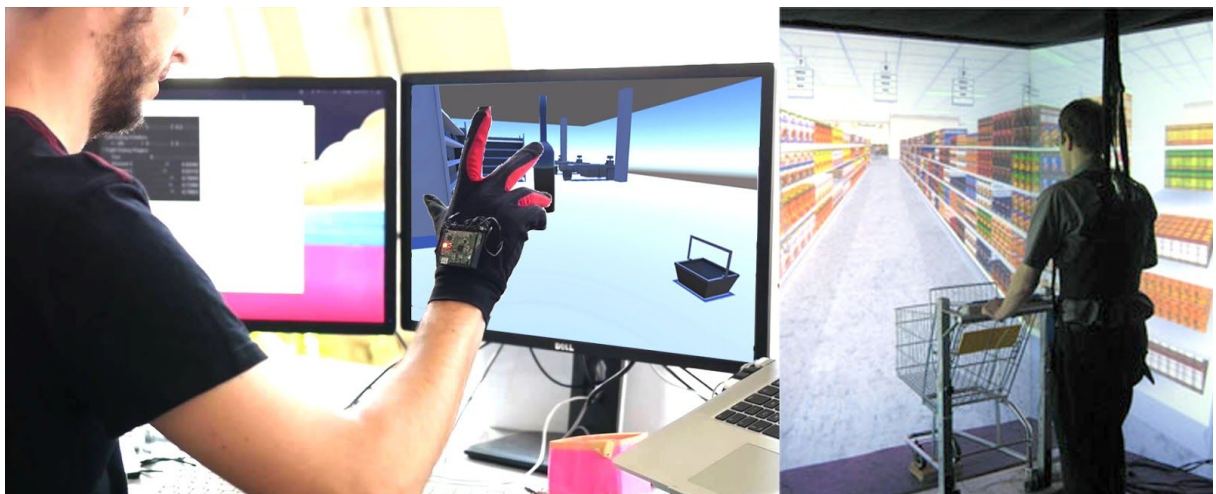
The uniqueness of this product lies in the user's experience in the virtual environment. This makes the therapy more effective, because of the Virtual Reality glasses. The users get a more realistic feeling. And another important thing that makes this therapy more effective is that the user can actually act in that virtual environment which makes the experience even more real. So the user will be able to pick up items, walk around the supermarket, search for items that he needs to buy and finally buy those items.

The time we have to develop and launch this project is approximately 10 weeks of which we will use the first three weeks for setting up the project and all related issues and documentation . We will try to keep the budget as low as possible without affecting the quality of the product.

When it comes to treating patients with psychosis problems, there are some researchers developing virtual worlds for better understanding the mind-set of these patients [5]. However, these only help into understanding their problems, these programs are not designed for helping them. For some areas other than psychosis, there are some developments into VRET. For example, at the University of Southern California Institute for Creative Technologies they are trying to help former soldier who suffer from PTSD (post-traumatic stress disorder)[6]. Yet, there is no direct competition for CleVR [1], meaning there are no companies who try to help psychosis patients.

## Visuals

We have created several visuals to show how we view our simulation.



# Product Planning

## 1. Introduction

The Health Informatics project 2016 has the goal to make a system that makes the experience better for the users of the Psychosis Virtual Reality Exposure Therapy. This system should allow the user to interact with the virtual environment in a natural way in order to experience the same feelings they have in real life and try to overcome their fears [7].

## 2. Product

### 2.1. High-level product backlog

The product needs to simulate the supermarket scenario as close to real life as possible. This realism can be achieved with the following epics:

- As a patient, I want to be able to move in the supermarket simulation in such a way that resembles real life as much as possible so that the simulation feels realistic.
- As a patient, I want to be able to interact with objects in a stable environment so that the simulation feels realistic.
- As a patient, I want to feel a physical presence using Virtual Reality input devices in the simulation so that the simulation feels immersive.
- As a patient, I want to be able to perform a normal shopping routine in the supermarket simulation so that I can overcome my psychosis after prolonged exposure to this simulation.
- As a client, I want the patients to be able to move through the supermarket so that the therapy will be more effective.
- As a client, I want the patients to be able to pick up items so that they will feel like part of the virtual world.
- As a client, I want the patients to be able to buy the items that they have collected so that they will experience more different real life situations and learn how to better react.

### 2.2. Roadmap

#### **Sprint 1**

In this sprint the focus will be on initial designs and planning as well as project setup [8].

- Creation of the product backlog.
- Acquisition of the Unity Engine, IDE and required plugins.
- Creation of the Architecture design.
- Creation of a prototype. The prototype will be a simple simulation of a supermarket. It will be possible to move through the supermarket and shelves,

shopping baskets and other props will be present. The simulation will make use of conventional input devices (mouse, keyboard).

### **Sprint 2**

In this sprint we will focus on implementing the most basic features.

- Creating a basic environment simulating a shelf in a grocery store.
- Creating a virtual hand that will later be controlled by the user.

### **Sprint 3**

We will continue to focus on basic features.

- Implement the ability to use the virtual hand to pick up objects.
- Creating tests and test plans.

### **Sprint 4**

In this sprint we make the link between our simulation and the hardware (Manus-VR or Leap Motion).

- Link between software and hardware.
- Ability to control the virtual hand with the hardware.
- Demo showing the control of the virtual hand..

### **Sprint 5**

In this sprint we continue working on the hardware-software link, making it possible to pick up object.

- Ability to pick up object with the virtual hand through the use of the hardware
- Ability to drop object with the virtual hand (without hardware)

### **Sprint 6**

In this sprint we focus on completing all must-haves

- The user's rough body movements should be tracked and the simulation should show a simulated body that is following these movements.
- The user should be able to pick up an object and put it down on a desired location (shopping basket)
- The user should be able to navigate through the simulation using an input device controlled by the user.

### **Sprint 7**

This sprint will focus on the should have and testing

- Ability to manipulate objects using two virtual hands
- Testing

### **Sprint 8**

In this sprint we focus on completing all should-haves and look at possible could have to implement

- Ability to interact (physically) with other 'people'
- Demo of product

## **Sprint 9**

In this sprint we focus on using multiple input devices

- Implementing multiple input devices
- Comparing improvement in quality vs. added cost of using more hardware

## **Sprint 10**

In this sprint we focus on bug fixing and prepare for product delivery

- Bug fixing
- Demo Final Product

# 3. MoSCoW Requirements

## 3.1. Functional Requirements

### 3.1.1. Must Haves

- The patient must be able to pick up pre-determined objects in the store.
- The predetermined objects must be holdable objects from real life supermarkets.
- The scene (store), apart from the products must be static.
- The patient must be able to hold the objects with one hand.
- The patient must be able to let go of the object
- The patient must be able to see his body moving.
- The patient must be able to walk in the supermarket.
- The patient must be able to put object down.
- The patient won't be able to put his hand through an object.
- The patient must be able to navigate in the simulation on their own.
- The patient must be able to use one of the Virtual Reality input devices such as the Kinect, Manus-VR and Leap Motion.
- The client must be able to provide functionality so that the patient can walk around in the supermarket
- The client must be able to provide the necessary functionality so that the patient will be able to pick up items.

### 3.1.2. Should Haves

- The patient should be able to hold items with both hands at the same time.
- The environment should provide a shopping basket in which items can be stored.
- The patient should be able to put items into the above described basket.
- The patient should be able to retrieve items from the above described basket.

### 3.1.3. Could Haves

- The patient could push other "people" in the environment.
- The patient should be able to buy the selected products by the cash register.
- The patient could push a shopping cart instead of holding a basket.
- Simulated people could be animated to look like they're picking up items.

- The simulation could make use of a combination of Virtual Reality input devices such as the Kinect, Manus-VR and Leap Motion.
- The client should be able to provide the necessary functionality for the patient to actually walk around the supermarket without using a joystick.

#### 3.1.4. Won't Haves

- The environment won't have a reset button.
- There will be no option to design the environment the patient is in.

## 3.2. Non-Functional Requirements

- The product must be developed in C#
- The product must be developed in Visual Studio v2013 with .Net framework v3.5
- The product must be develop with Unity 5.3.4 P1 or newer stable releases.
- The product must be delivered by 20-06-2016 .
- The product should be unit tested.
- Tools that need to be used:
  - StyleCop (Code style enforcer)
  - NUnit Visual Studio Test Adapter (Integration between NUnit and Visual Studio)
  - Visual Studio Spell Checker
  - Productivity Power Tools 2013
  - GhostDoc
  - CodeMaid

## 4. Product Backlog

### 4.1. User stories of features

- As a patient I must be able to pick up pre-determined objects in the store so that the simulation feels realistic.
- As a patient, I must only pick up objects that are holdable objects from real life supermarkets so that the simulation feels realistic.
- As a therapist, I want the simulated store to be mostly static apart from predetermined pick up objects so that the simulation remains in a realistic state when in use.
- As a patient, I must be able to hold predetermined objects with at least one hand so that the simulation resembles real life.
- As a patient, I must be able to put down previously picked up objects so that the simulation resembles real life.
- As a patient, I must be able to see my virtual body so that I feel present in the virtual environment.
- As a patient, I must be able to navigate through the simulated supermarket so that the simulation resembles real life.
- As a patient, I must be able to interact with the simulation using Virtual Reality input devices such as the Kinect, Manus-VR and Leap Motion so that my motions are realistically reflected in the simulation, giving me a feeling of presence.



- As a patient, I should be able to hold items with both hands at the same time so that the simulation closely resembles real life.
- As a patient, I should be able to deposit picked up objects from the supermarket to a shopping basket so that this realistically reflects my shopping experience in real life.
- As a patient, I should be able to retrieve previously deposited items from the shopping basket so that this realistically reflects my shopping experience in real life.

#### 4.2. User stories of defects

- As a therapist, I want the patient to not be able to put their hand through objects in order to prevent unwanted emotional triggers from unrealistic simulation behavior.
- As a therapist, I want the simulation to prevent the patient from interacting with all objects so that the simulated environment stays believable.
- As a client I want the simulation to be very reliable and run smoothly.

#### 4.3. User stories of technical improvements

- As a patient, I want to be able to use a combination of Virtual Reality input devices such as the Kinect, Manus-VR and Leap Motion so that I can realistically interact with the simulated environment.

#### 4.4. Initial release plan

Date	Version
02-05-2016	Prototype Release
09-05-2016	Version 1 Release
16-05-2016	Version 2 Release
23-05-2016	Version 3 Release
30-05-2016	Version 4 Release
06-06-2016	Version 5 Release
13-06-2016	Version 6 Release
20-06-2016	Final Version Release

## 5. Definition Of Done

The definition of done states the exact meaning of what we – the developers – understand by marking our features, sprints and final version as finished [9]. This ensures that there cannot arise any discussion on the delivered products and their completeness.

For a specific feature to gain the status of finished, all of the following conditions need to be met:

- The feature provides the functionality as described in the user stories.
- The feature is tested for the criteria mentioned in the user stories.
- The feature does not add additional functionality not mentioned in the user stories.
- All code concerning the feature is documented by using comments.
- All code including documentation of the feature is written according to coding conventions.

For a sprint to be completed, all of the following conditions need to be met:

- All points described in the Roadmap for the given sprint are finished. Meaning that if a feature is expected the feature satisfies all above conditions for features.

For the final version to acquire the status of done, all “must haves” described in the functional requirements need to be implemented, meaning every feature described is finished.

Additionally, at least half of all “should haves” need to be implemented.

## 6. Glossary

Term	Meaning
Hardware	The devices (Kinect, Manus-VR and/or Leap Motion) we use to interact with the virtual world.
Kinect	Kinect is a camera sensor device that works especially well for rough movement.
Leap Motion	Leap Motion is a camera sensor device that works well for fine movement and is able to determine the translation of body parts, something that is lacking in the other sensor devices used.

Manus-VR	Manus-VR is a sensor glove that tracks the movement of the hand and fingers, it is very effective in tracking fine movement.
Therapist	The therapist uses the product to expose patients to different simulated scenarios.
User	VRET aims to treat psychosis patients, these are the users of our product.
VRET	Virtual Reality Exposure Therapy.

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