Tackling aquaphobia using Virtual Reality

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ABSTRACT

Aqua phobia is a disease caused due to many cases such as rabies, inheritance or previous false experiences with respect to water. In some cases, the cause of this disease is eradicated, but the disease itself is a phobia therefore, it remains in the mind. Such cases are taken to a psychologist or a psychiatrist, which causes individuals a lot amount of charges. Therefore, a cost-effective solution is needed for this critical issue. Virtual Reality creates an environment for any individual which is totally different from the current reality. This might prove to be a solution to the issue of Aqua phobia. Virtual Reality has the ability to render environments where an Aqua phobic individual can experience the fearsome situations visually. The proposed plan focuses on simulating different environments (levels) wherein fearsome environments of different intensity would be provided to the Aqua phobic people. While experiencing these environments visually, the individual would be in coordination with a pulse-rate sensor. This sensor, integrating with the application would provide a percentage on the removal of Aqua phobia for that respective level. If the percentage amount crosses a certain percentage, then the individual would be able to move on to the next level. This project aims at reducing the effect of Aqua phobia, as the related diseases are removed but the phobias which are caused due to the diseases retain. In future, the project aims to tackle Claustrophobia and Arachnophobia as well.

Keywords— *Aquaphobia, Virtual reality, Pulse-rate sensor, Simulations, Claustrophobia, Arachnophobia*

1. INTRODUCTION

Aqua Phobia or any phobia, for instance, is a neglected or rather secondary phenomenon once the causing disease is cured. These phobias are caused due to unpleasant experiences or due to diseases that have the phobia as an aftereffect. But, once the disease is cured or reduced to its maximum limit, the phobias are mostly given secondary importance or neglected. But, in the period ahead, these phobias can cause harm to a person's mental health. As a concern to this issue, currently, only psychiatric treatment is the way to reduce the impact of phobias. Especially in the case of Aqua Phobia, the treatments are carried out by traditional methods, using therapist or psychologist views about the scenario. Psychologists tend to put the patient in real life, Aqua phobic situations and record the reactions. This process involves a lot of time as well as a lot of money.

The product which is being developed by the team mainly focuses on reducing the impact of Aqua Phobia on the patients using Virtual Reality as a domain.

Virtual Reality is a computer-generated simulated experience which provides a user with real-life experiences. The virtual world which is created using Virtual Reality is similar to the real world and provides similar Visual and Auditory feedback, sometimes haptic and sensory too.

Aqua Phobia is basically the fear of "Sight of Water" and not the fear of water itself. Therefore, Virtual Reality as a domain would be helpful to reduce the impact of phobia on the patients. The product aims at creating various simulations in which aqua phobic conditions would be depicted to be viewed by the patient. These simulations would be escalating in intensity and would try and reduce the impact of sight of water from the patients. All the simulations are created under the guidance of a psychologist which would make it more helpful for the patients and also would be visually effective at the same time.

As aforementioned, the escalation of levels would play a major role in reducing the impact of Aqua Phobia. The escalation of levels would be happening on the basis of reduction percentage calculated for the previous level. For calculating this percentage, usage of pulse sensors is done. Using pulse sensors while viewing the Simulations the jumping of the pulse (in BPM) would be taken as an input and an inverse percentage would be calculated upon that (i.e. lower the number of jumps, higher the percentage of reduction). Once the count crosses a certain percentage, the further level would be available to the users. Until the percentage count is acquired, the levels would be locked as a security perspective.

The overall work of product development is performed under the guidance of a psychologist and all the security aspects regarding the users' health are taken into consideration. Initially starting with Blender as an object creation module, it creates necessary entities, which are used in a simulation.

2. RELATED WORK

The traditional methods of phobia treatment include observing the patient reactions while in real-time environment. Also, the treatment is a bit hectic and time-consuming. It even costs a lot of money for the fees of psychologists as well as transportation and related stuff.
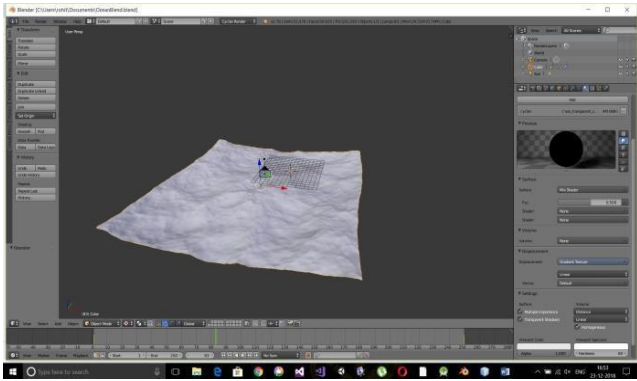

Fig. 1: Traditional treatment of Phobias

The traditional method is flexible to various types of patients, but the necessity of it being flexible is minimal at the cost of cons the treatment carries. Therefore, the product was initially thought of being developed. Aiming at providing a clear visual experience, the Virtual Reality domain was explored before development started, to use the most effective tools for development.
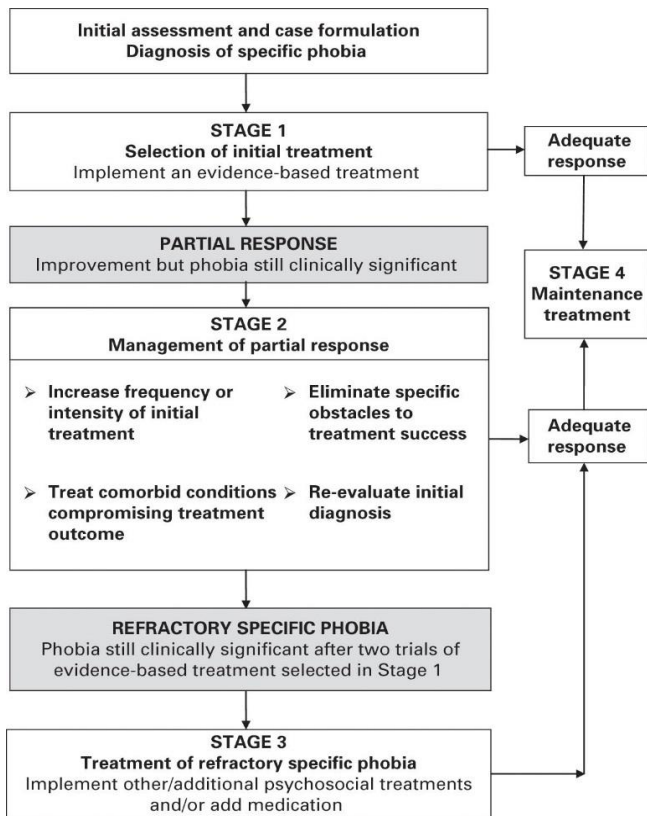

Fig. 2: Oceanic Simulation under development

The development of this object when complete is sent to Unity Engine to perform VR adjustments to it. Also, as the Unity engine has its own Particle system, an object can look more enhanced and realistic.

Fig. 3: Unity Engine used for VR Development

Also, before development, the overall heart rates of human beings were studied. The normal heart rate on an average being in between 60 bpm to 90 bpm.

Fig. 4: Heart Rate in Beat per Minute

The system aims at calculating the percentage inversely upon each bpm jump. The jump actually means that the bpm goes above 90-100. If the bpm goes 110 or 120 for example, it would be taken as a jump.
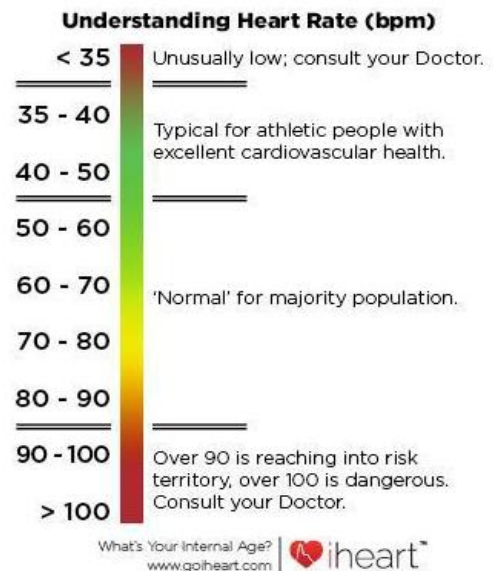

Fig. 5: Heart rate bpm interpretation

As we see in the image, the heart rate over 90-100 is calculated as a risk. Therefore, it would be considered as a jump and the percentage of "Reduction of a phobia" for that very level would reduce.

3. METHODOLOGIES USED

In this section, all the methods and mechanisms used for the development of the product would be discussed. The product basically consists of three main elements, viz. Virtual Reality, Android Application and Pulse Sensor.

3.1 Virtual reality

Virtual Reality is a domain which immerses an individual in a virtual environment which is visually effective as well as sometimes provides auditory, haptic and sensory feedback. The VR simulation creates a different virtual world. Virtual Reality makes the person believe that he/she is present in the scenario which he/she is viewing.

3.2 Android application

Android application here would be playing the role of a mediator between the Simulation and pulse sensor. The application would have the permissions of accessing the

simulations and also calculate the percentage upon acquired heart rate.

3.3 Pulse sensor

Pulse sensor can be of many kinds, for example, the traditional third-party sensor can be used, but it has a time-consuming method of providing with dynamic pulse rate. Fingerprint sensors upon the mobile devices also can be used, but the mobile device itself is going to be playing the Virtual Simulation, therefore, that also goes out of option. Therefore, Fitbit or fit band APIs can be said as the best option to use.

Fig. 6: Fit bit for accessing the pulse rate

Fitbit can acquire a dynamic pulse rate and provide it through available free Web-APIs. These APIs can be used for calculation of the percentage which is necessary for escalation of the levels.

Also, for viewing the simulation, usage of Samsung gear VR is preferred as it provides adequate real simulation feel, and is not as expensive as HTC Vive.

Fig. 7: Samsung Gear VR Headset

4. CONCLUSION

Hence, we can conclude that Virtual Reality domain can prove to be useful in reducing the impact of the phobia over the patients. The domain focuses on putting the individual visually in aqua phobic conditions to reduce the impact. As all the development is done with the consultation of a psychologist, the security aspect is looked after.

In future, the product would also aim in to tackle Claustrophobia and Arachnophobia.

5. REFERENCES

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