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Invisible Scars

Immersive experience about PTSD

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Abstract

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Contents

INVISIBLE SCARS

Single user immersive experience in a dark room only with audio and visual stimuli, simulating the story of a soldier who came home with PTSD. Students, friends and family of the person who has the disorder and looking to understand what it's like to have PTSD, will be put as close as possible to the reality of having this trauma, to help them understand the behaviors of someone with this condition, to create awareness and to make people contribute consciously and positively to this problem.

1. Introduction
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(Beatriz)

(General thoughts, Problem and area of development, Motivation/Significance of the Study, Objectives, Report topics)

2. Fundamental Background
--

(All the knowledge needed for the project: software, hardware and technics)

3. Development

3.1. Goals

Our main goal with this project was to create awareness of war related PTSD and encourage people to help in any way they can. Our project is mainly directed for friends and family of those in this situation, and aims to help them help their loved ones. We realise it is hard to help someone when we don't know what they are going through, and specially in this situation, it is not very frequent that we have also been through war and suffered the psychological impacts of it. With this thought in mind, we tried to put the person who wants to help in this situation. We also wanted to show that this problem not only has a psychological impact but also a biological one, therefore we added the heart rate measurer and it's visualization.

3.2. Methodology (Double Diamond Process)

3.2.1. Discover

In the beginning of this stage we discussed, as a lab group, about several topics of which we could extract narratives. Many topics were in discussion and it wasn't easy to choose one. Eventually, everyone started to lean towards War and that was the winner. After choosing the main topic, each group within the lab discussed and came up with one or many subtopics. In the end, each group chose a subtopic from the ones mentioned. Our group chose Inside War.

3.2.2. Define

Having the topic chosen, we moved on to defining our idea and story. We discussed both between each other and with the teachers and researched many references online. Having decided to approach the theme of PTSD and using the story of the daily life of a soldier, we moved on to concretely defining how we would present the project. Quickly, we decided to create an immersive experience and after this, we researched again about how we could connect the user to the story, ending up with a first person video and a heart rate measurer and it's visual representation.

3.2.3. Develop

In the developing fase we split tasks according to each group member's abilities and background knowledge. After splitting tasks and defining deadlines to have each part of the project ready, we spent our time building and creating what we were assigned to build or create. Finally, we fused all the parts of the project and tested them, made the necessary adjustments and ended up with the final prototype.

3.2.4. Deliver

After having the prototype ready, we went to take care of the logistical parts (the room, the projector, any needed hardware, etc.). We also tested the full experience and made any necessary adjustments. Finally, we discussed our presentation and

how it would work. We also gathered all the other requirements of the project and published them online (website, report, marketing contents, etc.).

3.3. Spectrum of User Experience

3.3.1. The Product

The user experience starts with the user, after finding out about our project, entering the dark room. In this dark room the user will be instructed to place his/her finger on the heart rate measurer and the video will start playing.

As the video progresses the user will get more uncomfortable and stressed and his/her heart rate will rise. This will cause the led light to change its color to *red. The red color will disturb even more the user, it's an exponential growth of stress.

When the video is over the user will be informed about the project and it's remaining parts (social media, website, etc.).

3.3.2. The Interfaces

Our project has two main interface components: the heart rate measurer and the audiovisual component.

To interact with the heart rate measurer the user places it's finger on the sensor which will activate the led light, depending on the user's heart rate, the light will have different colors. If it's low, it will be *green and as it rises the color turns *red. We choose these specific colors due to the social convention created around them, *green is usually associated with correct, calm and non disturbing, however *red is associated with blood, bad and distress.

Our audiovisual component is projected on the wall in front of the user and it shows a first person video. This type of video allows the user to feel like he/she is the character, which was precisely the feeling we were looking to achieve. The sound in the room is loud and surrounds the user, this has the purpose of emerging the user in the experience.

The video was shot by us, with a Go Pro Camera, except the flashbacks, which we found online. It was edited in Adobe Premiere Pro in a way that would simulate the character's thoughts and visions.
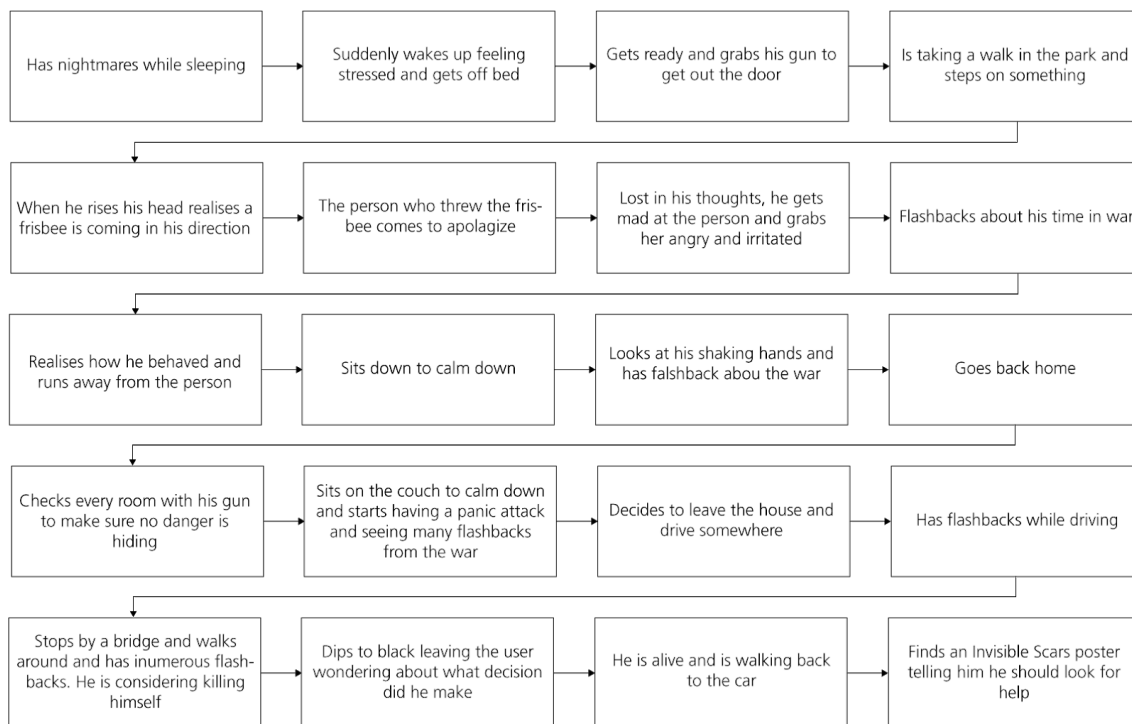
| Has nightmares while sleeping | → | Suddenly wakes up feeling stressed and gets off bed | → | Gets ready and grabs his gun to get out the door | → | Is taking a walk in the park and steps on something |

| When he rises his head realises a frisbee is coming in his direction | → | The person who threw the frisbee comes to apologize | → | Lost in his thoughts, he gets mad at the person and grabs her angry and irritated | → | Flashbacks about his time in war |

| Realises how he behaved and runs away from the person | → | Sits down to calm down | → | Looks at his shaking hands and has falshback abou the war | → | Goes back home |

| Checks every room with his gun to make sure no danger is hiding | → | Sits on the couch to calm down and starts having a panic attack and seeing many flashbacks from the war | → | Decides to leave the house and drive somewhere | → | Has flashbacks while driving |

| Stops by a bridge and walks around and has inumerous flashbacks. He is considering killing himself | → | Dips to black leaving the user wondering about what decision did he make | → | He is alive and is walking back to the car | → | Finds an Invisible Scars poster telling him he should look for help |

Fig. 1 - Graphical Representation of the audiovisual component's flow/story

3.3.3. The Communication

In terms of communication, we created: website, teaser, social media, physical publicity and merchandising.

The website is the main communication platform, it includes all the information about the project and all the other communication components.

The teaser is a component that would be shared in all created media to supply the user with a preview of the experience. Since our project is an on site project, the teaser is fundamental because not everyone can be on that site whenever they want. It also aims to increase interest in the project.

The social media platforms are, likely, the platforms that would reach the biggest amount of people to experiment with our immersive experience. We didn't create the actual accounts, just to avoid any complication, however, we created mockups of the social media we would have, a facebook page and as instagram account. The purpose of having these media would be to, of course, share that our project exists and show all it's components (other media, merch, publicity), it's goals, it's eventual partners, the locations were it would be possible to experiment the project and helpful information to any PTSD patient and/or it's family members and friends.

The physical publicity and merchandising would be spread in the locations that the project occurred and in any partner associations. It also plays a key role in the audiovisual component of the immersive experience.

3.4. Experience Mapping

3.4.1. Intended

3.4.2. Real

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3.5. Project description

3.5.1. Contents

We created an immersive and personalized audiovisual experience about post traumatic stress disorder. The user is confronted with video and sound that tell the story of the daily struggles of an ex-soldier with PTSD in first person, making it possible for the user to feel like he/she is the main character of the story. As he/she watches the video, his/her hand is connected to a heart rate measurer that controls the color of the entire room, making it personalized and tailored to how the user is being impacted by the video. The idea is to show the user how stressful it can be to be in the soldier's position, and therefore, be more aware of the help they need.

3.5.2. Visual Designs

We created a visual identity with specific rules that we used throughout the entire project whenever we had a visual component. Mainly it was used in the communication components and in the vídeo.

Fig. ? - Visual Identity rules

Our idea was to make something simple that, when someone looked at it, it would immediately remind them of war. Therefore, we used natural colors, like in military uniforms and contrasted them with black key assets that refer to the war (soldier, helmet, tags, etc.). The logo simply says the name of the project, however, the word SCARS has a scar, a visual component that literally translates what the title says.

In the video we simply use the typeface chosen in the visual identity and in the remaining video we kept it's visual aspect pretty raw and simple.

3.5.3. Technological Developments

As mentioned previously, our main technological development was the heart rate sensor. Its objective was to read the user's heart rate and display it through a LED strip, meaning the intensity of the lights would increase according to the pulse and the color of the strip would change based on the following rates in beats per minute (BPM):

- Green: < 75 BPM
- Yellow: 75 BPM - 95 BPM
- Red: > 95 BPM

Due to the limitations of the materials available, the circuit was placed inside a box and powered both the LED strip around it and the sensor, as shown in the figure below.

Fig. ? - Heart beat sensor and light system

For the development of the circuit, the following components were required:

● Arduino UNO;
● 9v battery;
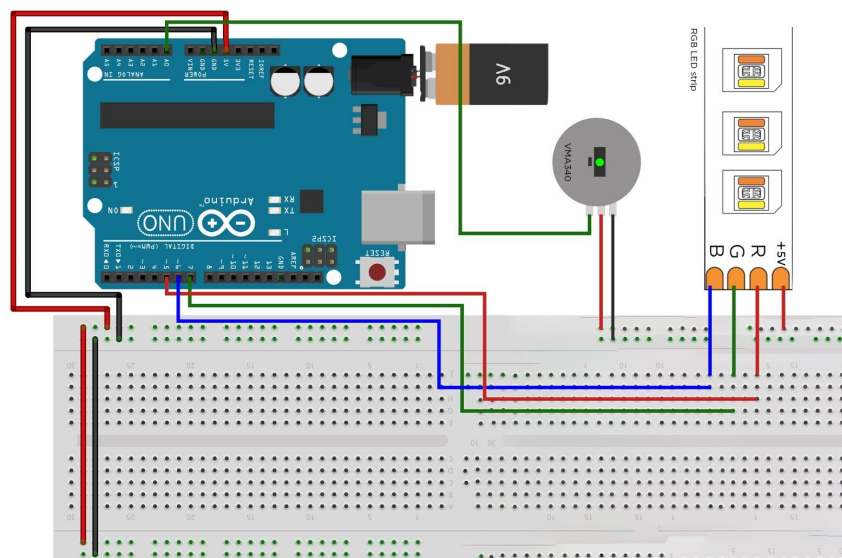● 5v RGB LED strip;
● VMA340 sensor.

Fig. ? - Heart rate sensor circuit

The program to get the BPMs and control the lights was coded in Arduino IDE and was based on the existing library *PulseSensorPlayground* [1]. The code can be seen in the Appendices.

4. Conclusions
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(Project summary, results, future work)

References

[1] Pulse sensor playground

Appendices

A. Software and Hardware used

```
/*  Getting_BPM_to_Monitor prints the BPM to the Serial Monitor, using the least lines of code and
PulseSensor Library.

 *  Tutorial Webpage: https://pulsesensor.com/pages/getting-advanced

 *

--------Use This Sketch To----------------------------------------

1) Displays user's live and changing BPM, Beats Per Minute, in Arduino's native Serial Monitor.

2) Print: "♥  A HeartBeat Happened !" when a beat is detected, live.

2) Learn about using a PulseSensor Library "Object".

4) Blinks LED on PIN 13 with user's Heartbeat.

-----------------------------------------------------------------*/


#define USE_ARDUINO_INTERRUPTS true    // Set-up low-level interrupts for most acurate BPM math.

#include <PulseSensorPlayground.h>     // Includes the PulseSensorPlayground Library.


#include <Adafruit_NeoPixel.h>

#ifdef __AVR__

 #include <avr/power.h> // Required for 16 MHz Adafruit Trinket

#endif


// Which pin on the Arduino is connected to the NeoPixels?

// On a Trinket or Gemma we suggest changing this to 1:



// How many NeoPixels are attached to the Arduino?

#define LED_COUNT 15
```

```
//  Variables

const int PulseWire = 0;       // PulseSensor PURPLE WIRE connected to ANALOG PIN 0

const int LED13 = 13;          // The on-board Arduino LED, close to PIN 13.

int Threshold = 515;           // Determine which Signal to "count as a beat" and which to ignore.

                               // Use the "Gettting Started Project" to fine-tune Threshold Value beyond default
setting.

                               // Otherwise leave the default "550" value.

int Signal;                    // holds the incoming raw data. Signal value can range from 0-1024



PulseSensorPlayground pulseSensor;  // Creates an instance of the PulseSensorPlayground object called
"pulseSensor"



void setup() {



  Serial.begin(9600);          // For Serial Monitor



  // Configure the PulseSensor object, by assigning our variables to it.

  pulseSensor.analogInput(PulseWire);

  pulseSensor.blinkOnPulse(LED13);       //auto-magically blink Arduino's LED with heartbeat.

  pulseSensor.setThreshold(Threshold);



  #if defined(__AVR_ATtiny85__) && (F_CPU == 16000000)

  clock_prescale_set(clock_div_1);

  #endif

  // END of Trinket-specific code.







  // Double-check the "pulseSensor" object was created and "began" seeing a signal.
```

```
  if (pulseSensor.begin()) {

    Serial.println("We created a pulseSensor Object !");  //This prints one time at Arduino power-up,  or on
Arduino reset.

  }



  pinMode(7, OUTPUT);

  pinMode(6, OUTPUT);

  pinMode(5, OUTPUT);

}



void loop() {

 int myBPM = pulseSensor.getBeatsPerMinute();   // Calls function on our pulseSensor object that returns
BPM as an "int".

                              // "myBPM" hold this BPM value now.

  Signal = analogRead(PulseWire);

if (pulseSensor.sawStartOfBeat()) {          // Constantly test to see if "a beat happened".

 Serial.println("♥  A HeartBeat Happened ! "); // If test is "true", print a message "a heartbeat happened".

 Serial.print("BPM: ");                // Print phrase "BPM: "

 Serial.println(myBPM);                  // Print the value inside of myBPM.

}
 if(Signal<Threshold || myBPM==0){

   digitalWrite(7,LOW);

   digitalWrite(6,LOW);

   digitalWrite(5,LOW);



  }

  else if(myBPM > 30 && myBPM <=75 && Signal>Threshold){

   digitalWrite(7,HIGH);

   digitalWrite(6,LOW);

   digitalWrite(5,LOW);
```

```
  }

  else if (myBPM > 75 && myBPM <=95 && Signal>Threshold){

  digitalWrite(7,HIGH);

  digitalWrite(6,LOW);

  digitalWrite(5,HIGH);

  }

  else if (myBPM > 95 && Signal>Threshold){

  digitalWrite(7,LOW);

  digitalWrite(6,LOW);

  digitalWrite(5,HIGH);


  }
 delay(20);              // considered best practice in a simple sketch.
}
```


B. Setup Manual

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