



# Surrounding conscious

Absorb the world around you

Research document

# **SURROUNDING CONSCIOUS**

Absorb the world around you

January 17, 2016  
Rotterdam

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**RESEARCH QUESTION**

How do I create a tool that makes people aware of their current behavior and let's them appreciate a city from a different point of view.

<b>What is my tool</b>	<b>What is it's meaning?</b>	<b>What is the problem?</b>
A brace for your neck	It forces the wearer to focus at different views in a city which they would never look at without it.	Appreciating a city is already hard, looking at the bigger picture is difficult for everyone plus with the rise of mobile phones, the city has only become smaller.
<b>Why does this exists?</b>	<b>What is the value?</b>	<b>Why is it personal?</b>
Naturally, people focus on things that are right in front of them and exploring new therefor becomes hard. We are comfortable living with the things we all ready know.	In a world where most of the people live in their own small world. Exploring a city could potentially change their insights.	I realize all to well, that although I focus on how a city works and how people behave, a lot of people are not aware.

## PROJECT APPROACH

Although I wanted to start the assignment with a clear concept in mind. I actually started with some interactions that I was interested in. The concept that I eventually ended up with, is therefore a result out of many prototypes I have created during this process.

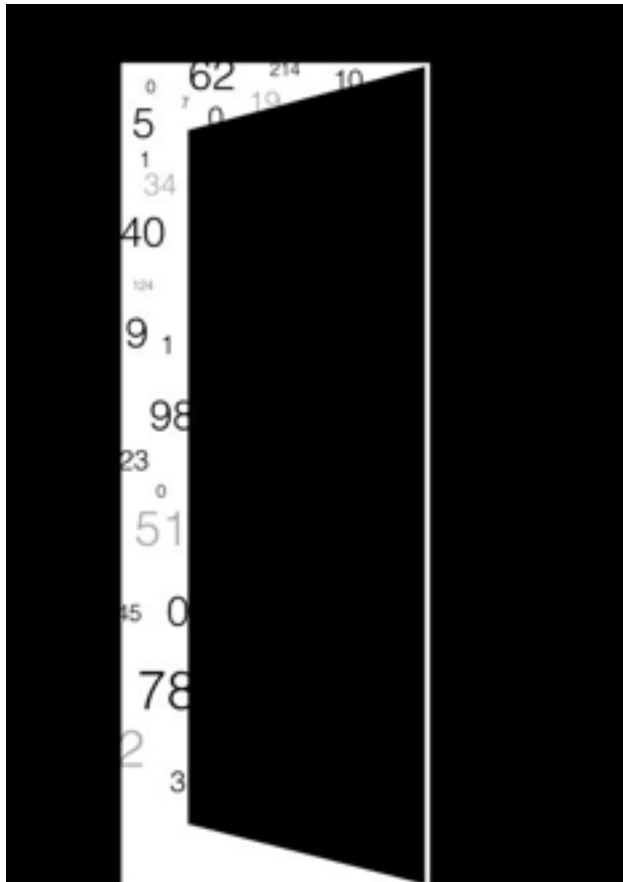
At Spatial Design (my personal course) we are always being pushed to create by doing. The result of these prototypes therefore defined my overall process towards a final concept. The prototypes that I made vary from interactive models in combination with sensors towards objects that let's you experience different perspectives related to the environment around us. The following pages explain why I made these prototypes and what the results were after using them.

## KICK OFF

As a spatial designer I like to think about how people interact with objects and spaces. I like how people experience the place they are in or how they interact with their environment. But it also bothers me because although a lot of our things become interactive and therefore become more interesting and useful, still a lot of buildings or objects around us are static. You know what they are and you know how they behave. In comparison to nature, which is all around us and full of life. It breathes and grows and most of all, it adapts. It is almost a fight between nature and humans.



To tackle this problem, I wanted to use open data, that is derived from nature and use that into our own structures. Therefore we could design and create structures that adapt as well. This open data could be derived from many different sources, using different techniques and sensors. Sensors I thought about using were heat sensors, humidity sensor, light sensors and pressure sensors.



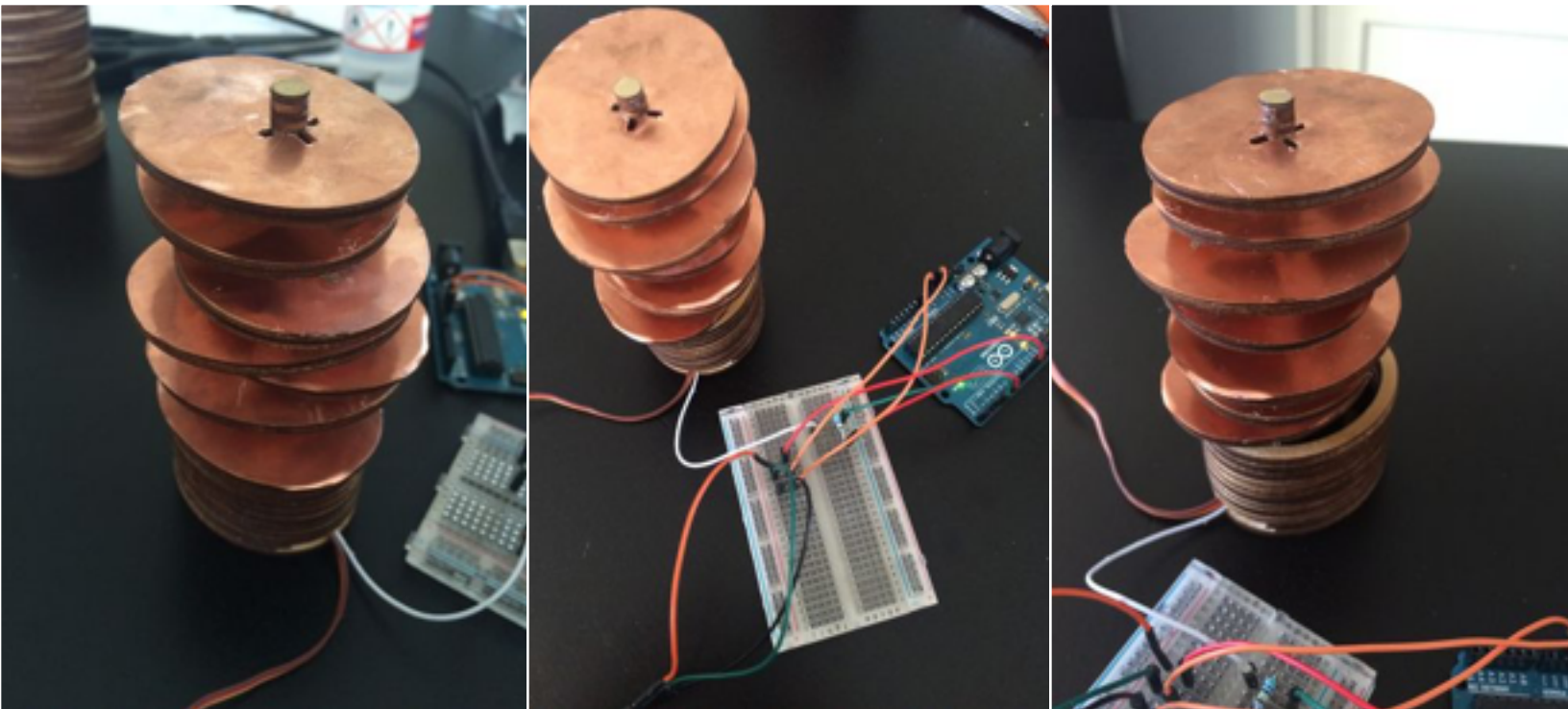
The interesting thought here is that we as humans are so used to know tools and constructions behave, that by combining open data for interactivity and common tools, we could create new and exciting tools which would force us to rethink its purpose.

Therefore I tried to create prototypes that could behave differently than we were used to. To see if we could find meaning and exciting possibilities through these models.

## UNPREDICTED MOVEMENTS

The first prototype I created was a combination of a servo motor and an capacitive sensor. The capacitive sensor worked through small plates of copper. And I created the Arduino-sketch to get the capacitive sensor working together with the servo motor.

The meaning of the prototype was to create an interaction trough a common material (copper) and when you would approach it, it would behave in an unusual way. In this case, when you would move your hand over the copper plates, the whole object would move including the copper plates. The interesting part is that the input is part of the output as well.

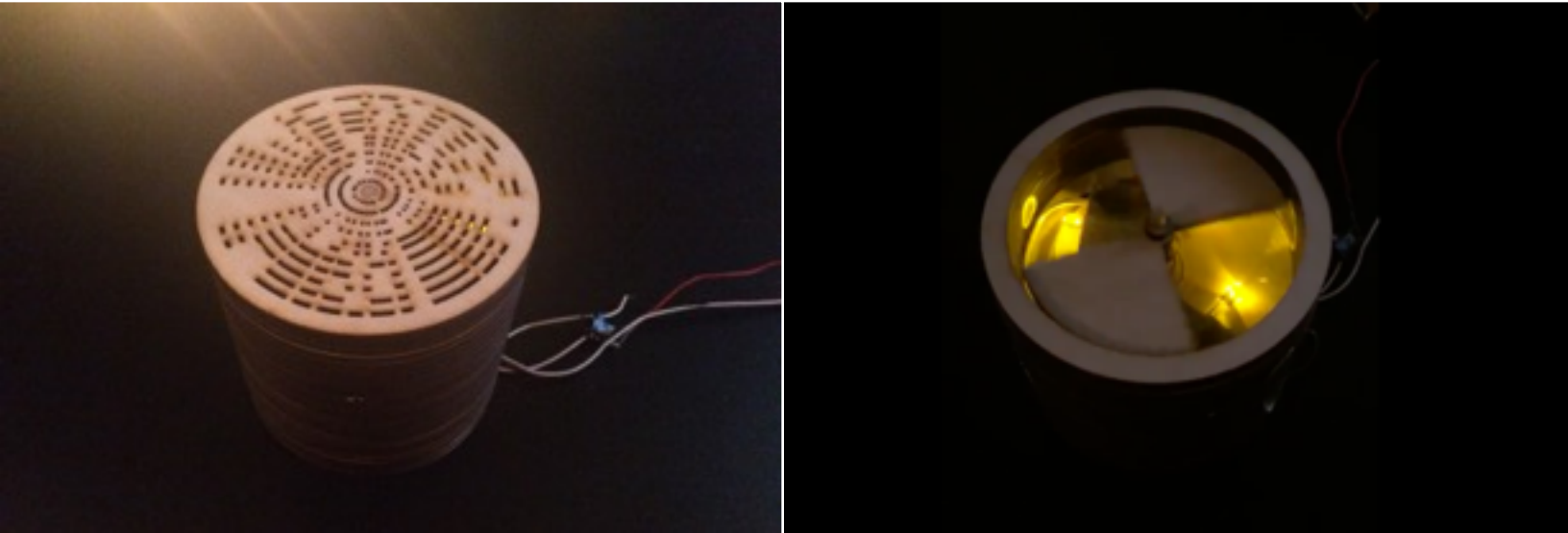


### Prototype 1

Materials: Triplex (cut by lasercutter), copper  
Electronics: Arduino, wires, breadboard, servo motor 180° rotation

In my second prototype I made a connection between open data through the internet and a servo motor that causes a 360 degree rotation. The prototype was used as a lamp in which the light would get dimmed due to a variable input.

The variable input in this case, is the wind in Rotterdam. When the wind flows from an other angle, the movement will be immediately reflected onto the model which causes a different rotation. What essentially is being created is an uncontrolled movement due to the unpredicted wind. The user is not in control anymore, but essentially an object is created and the controls are being given away.



#### Prototype 2

Materials: Triplex (cut by lasercutter),

Electronics: Arduino, wires, breadboard, three lights + switch, servo motor 360° rotation



## RESEARCH / REFERENCES

These braces are all meant for different types of injuries. They vary from severe brain injury in which your head needs to be very stable to a brace where the noise can not move. All of the braces rely on other parts of the body to keep them steady and in position.

Mainly made of of hard unbreakable materials such as plastics, these braces can be tunes to everybody's needs. In general all the braces fit everybody, but because of the soft material on the inside of the brace, it can adjust perfectly to the users specific facial features. This also helps to make the brace more comfortable to wear and it helps against sweat.

When I went to the Erasmus hospital to ask if I could borrow a brace and or inspect one, they lucky had one in the back which I could try on for a short time. When I did put it on it almost felt like it couldn't breath. It is hard to get used to such an steady object around your neck. Especially moving around became problematic because when I wanted to turn my head, I was forced to turn my whole body.

This makes actually perfect sense. When somebody wears a brace, his neck is getting fixed in a forward looking position. It almost like your neck join gone and the next joint you can used in order to turn is your vertebrae.

Being able to use a brace for a short amount of time, let's you quickly realize that moving your neck is a vital way of walking around and interacting with your environment.



## PERSPECTIVE OBJECTS

The perspective objects as I call them, are all small prototypes of different sizes that limits your vision in certain ways. They vary from viewers with a 90° cut. One where the sides are being narrowed towards a single point and one which is made out of 2 cuts/forms. The interesting part about the viewer with the 90° cut is that you find yourself searching for lines and corners. This makes sense because you are trying to search for recognition points.

The viewer in which the side are narrow let's you focus more on context further away. What happens is that your brain tries to make sense of the things your seeing. So by seeing things up-close through a narrow angle gives you almost no context, therefor context which is further away works better.

The wide viewer, which has two viewing holes was ment to separate your eyes, but the effect was not there. Your eyes are searching for a spot to meet, to make sense of what your seeing. Therefor two different holes do not work. You will still glare into one hole at a time.

Two other prototypes were meant as object close to the eyes. One where your viewing angle was being forced to view more horizontal and another one in which the the lenses could be adjustable. These adjustable lenses are interesting because you can change the effect while you watching through them. It wasn't the effect that I had hoped for in the end. Because your eyes are very close upon the lenses, you can view through the effect without any trouble.

Prototype 3 & 4  
Materials: Cardboard, vilt



## BRACES, LIMITATIONS AND COMMUNICATION

This prototype was meant to communicate what it means to wear a brace. The idea that other people realize that your head is stuck in a single position means that people will likely tread you differently. They are more careful around you.

Although the brace didn't work properly at all, people understood that wearing a brace would mean that you have a disability to move and you are not always aware of your surrounding.



Prototype 5  
Materials: Tripex, steel

## HYPOTHESIS

Imagine the following situation; It is Monday morning and your alarm goes off at 07:00 PM. The sun doesn't shine yet. You get up and take a shower in order to get ready for work. You eat your breakfast, while watching the morning news. At 07:45 PM, you are ready to go to work. You walk downstairs and close the front door. Once you're out, you put on your earplugs and start your regular music. You walk towards the metro to get to the center of Rotterdam. You walk towards the exit of the metro and use your NFC-enabled chip-card to check out, from there on you take your bicycle and ride in 5 minutes to work. All of a sudden you're thinking "what did I actually see traveling here" You realized that you haven't been paying attention to your surroundings at all. From the moment that your alarm went off, until the moment you thought back upon it, your mind switched on to automatic pilot. It is hard to actually remember what you saw during your morning trip.

The above situation probably sounds familiar to a lot of people. Our brains tend to use our automatic pilot function to start slowly in the morning. Our brains need time to get fully active.

This example related to our behavior in the morning. We are programmed to switch on our automatic pilot in situations that are familiar to us. Familiar areas are all around us, with our personal tech. such as our phones we are drawn more and more into a position where our surroundings are being pushed back because we prefer to explore the world from inside our heads instead of looking around.

## FINAL TOOL

At the beginning of the semester I thought about designing and building an object that could light up a discussion. An object in which people could recognize a certain behavior and realize that they are also a victim of that behavior. In order to change people's behavior, you have to confront them. Let them realize that they are part of a certain behavior.

My process through prototyping has therefore let me to design and construct a brace. A brace that could be worn partly over their neck and partly over their head. The brace communicated that the user had a disability, a weakness in their movement. On the other hand, for the user it self, the braces forced the user to move due to the build in accelerometer and speaker.

## DESIGN

The design of the brace began with creating a virtual 3D model. This 3D model was derived from an already existing 3D head. I made sure the measurements were correct so it would fit my head and I made sure they it would be stable enough to be made out of wood. I chose specifically for a brace made out of wood instead of 3D printing it. The texture of wood and the layers in which the material was cut gave a far more beautiful end result than 3D printing could ever have.

Once the model cut out and I glued everything together, I cut the model in two pieces. By creating two pieces that would fit together again, I could be sure that attaching and detaching the brace around the user's head was as easy as it could be. By using magnets on both sides of the cuts I made sure that the two pieces would snap into place.

After the I made the cuts I could cut the voronoi based design into the brace itself. The reason I chose to create a voronoi design, is that it would feel like an extension of the user's skeleton. Meaning that the brace was just as fixed as the user's own skeleton. The practical part of the cutouts was of course that it would make the object dramatically lighter and therefore more comfortable to wear.

Eventually I made sure that in the lower back of the brace the accelerometer had a specific place to be attached. This spot was specifically chosen because it wouldn't get in the way of the user's mobility and it would give the user the appearance that he/she is almost robotic like.

Prototype 5

Materials: Triplex, Paint, Varnish

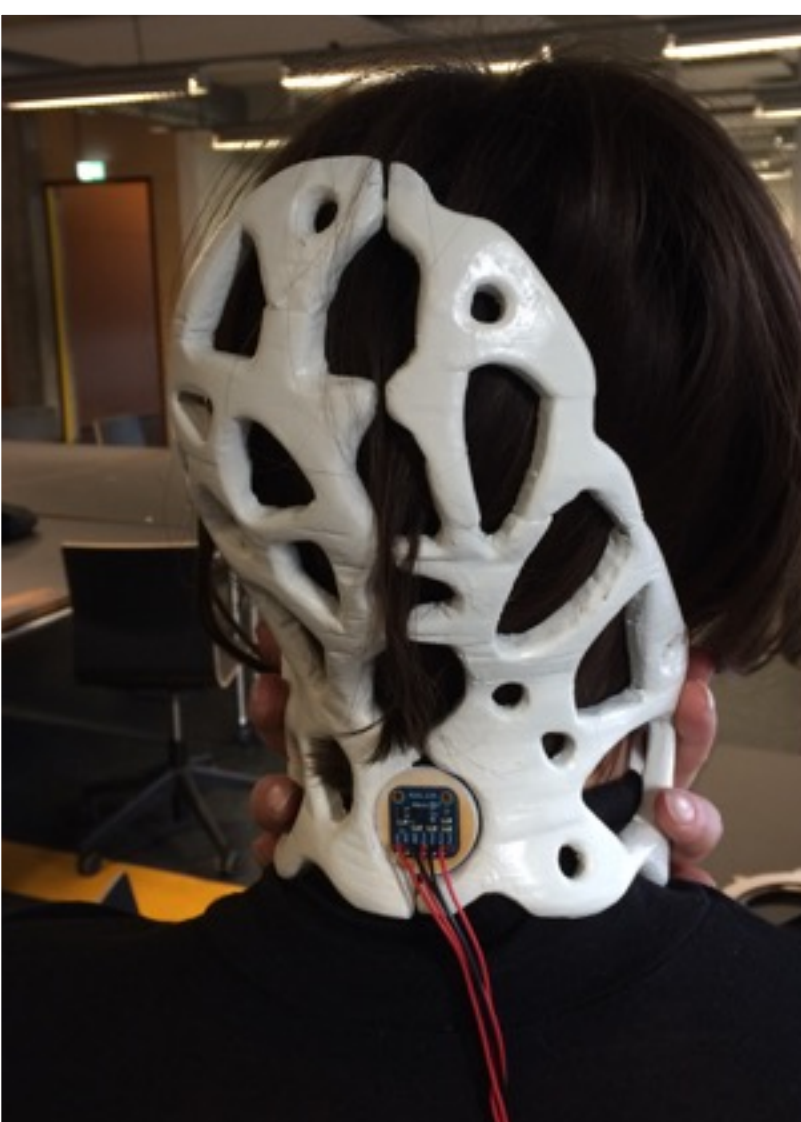
Electronics: Speaker, Accelerometer, wires, 5V battery,



## ELECTRONICS

Over the past weeks during my process I made use of different sorts of electronics. In combination with an Arduino, I made use of capacitive sensors, servo motors (180° and 360°), speakers and an accelerometer. Writing the code for the arduino and then connect it to all the sensors and software (grasshopper) to make an interactive communication possible has been a great inspiration for me. Especially by making use of the accelerometer in the brace made me realize that programming has become a very interesting addition to the way I like to work.

By using an accelerometer in an actual design is actually quiet different that just prototyping it. The length of the wires are becoming a part of consideration. The stability is something to think about. The whole integration has made me realize that thinking about the electronics should never be an after thought but really needs to be considered during the design process. Although I was happy with the way it worked on the brace itself. The implementation could have been a little bit better and reliable. In the end I made sure that all the electronics were nice and pushed away in a box to get carried around.



## CONCLUSION

Looking back upon this last quarter, I feel that it tried out a lot of different possibilities. From interactive models that were internet connected to static once, from machine-made models to handcrafted ones. So I am glad that I tried many different prototypes instead of thinking about a concept to long and getting mentally stuck. Because in my previous years at Spatial Design, I always received comments about that particular issue.

Doing research through prototyping let me not only make a lot of models but to try them out as well. Some people thought I was nuts and some people understand what the concept behind the model meant. So in conclusion, some models communicated the idea properly and some of them did not so much.

In the end, this let me to design a brace in which a contrast was important. Communicating that a user is stuck in a single position, not free to look around but on the other hand from a user point of view, that it was actually meant to push the user to look around more. I believe that this contrast made the brace very interesting.

## REFLECTION

At the beginning of this semester I thought that Spatial design and Digital Craft as a minor would fit perfectly. And I have to admit that I really enjoyed it. Working with electronics and trying to shift a little bit more towards Product Design has been good for me. Although the minor didn't go as smooth as I hoped for, I have learned so much in these past couple of months. The reason that I chose Digital Craft is that I thought it would give me the best combination of design through machines and combining this with sensors and electronics. In that case, I think that I chose the right minor.

I have tried to not take the obvious road and use all the tools I already knew, instead I chose to learn through prototyping and trying out. Trying out new electronics, to understand how the arduino works in combination with electronics and sensor and trying to figure out if this is something that I would like to pursue in my future career. A lot of things went really well and surprised me but a lot of things also failed.

However, I did find it hard to combine Digital Craft with Spatial Design. I don't know why that is. Maybe it was because the last two years I have been shifting my attention from architecture towards Product Design bit by bit. You would think that by doing a specialization (minor) you would get clarity towards your end goal, but that is not how it feels to me. To me it feels like the last couple of month have broadened my horizon a lot but it did not made it more clear for me.



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