Interactive light sphere which encourages social communication between strangers in the urban area

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ABSTRACT

The life in the urban area gets more and more isolated. Technologies are usually designed to be used by a single person, rather than to create an interaction between many. This paper will present an approach on how to use technology in order to motivate people to find a way out of the social isolation in the urban area, since we see it as a place of social interaction, communication and culture.

Regarding this we created an interactive light sphere which is an example of an artefact, utilizing technology to bring people together. The light sphere lives of the exchange between strangers with the purpose of creating a motivation to socially interact with other people.

Topic of this paper will not only be the creation of a concept but also the technical and constructional manufacturing of the sphere and how to reach more people with the right marketing. Furthermore we analyze how light can be used as a motivator and how to choose the shape of the artefact in order to signalize the right affordances. A special effort in this process was to find a technique and algorithm which allow us to differentiate between people, getting the assurance that the artefact will always be passed to strangers.

Author Keywords

Social interaction, urban space, interactive sphere, light communication

ACM Classification Keywords

H.5.3 Group and Organization Interfaces

INTRODUCTION

The use of media technologies in the public space increases drastically. Although all places and devices are connected, people are not communicating with each other anymore [1, 4]. Many technologies are used for digital advertising and consumption. They seem to be rather passive and developed for the individual [2]. Mobile devices are used by anyone and anywhere, but they promote also a personal and private intention. Many of these technologies are intended to be used by an individual and miss the social aspect. The fact that they are not invented for the public space reduces the chance of people communicating directly with each other [1, 2, 4].

Similarly to other authors [1, 3], we see the public space as a place that has a social, personal and cultural meaning. A number of initiatives have already tried to use technology in order to regain these aspects in the public space [1, 2, 6].

We are following this approach and want to demonstrate how the implication of technologies in the public domain can be used to promote an interpersonal interaction.

Our goal is the development of an digital artefact that encourages the social exchange between people. We would like to deploy the technology in order to motivate people to get out of the private isolation and be receptive to strangers. The public space should become a place where companionship and culture are present and which creates a network of social connections in the public.

In this paper we presented our concept of an interactive light sphere, which lives through the social exchange between strangers. The conceptual development and the technical conversion of this interactive object will be explained and consequently it will be shown how technology can be used to improve the exchange in the urban area.

ENCOURAGING PEOPLE TO INTERACT WITH STRANGERS

In the everyday life of every human being there is rarely contact with strangers, because in general people are busy with their smartphones and do not pay attention to their surroundings [4]. In addition, they have no real motivation to communicate with people around them, since they can communicate with their friends via a smartphone. Most of technologic objects get people to concentrate on the object itself instead of communicating with others. Through our project people should be motivated to get in contact with the people around them.

The question is, how people could be motivated to recognize their environment and communicate more with others. There are two types of motivation, which get people motivated, the intrinsic and extrinsic motivation [5].

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Intrinsic motivation is driven by an interest or enjoyment in the task itself rather than external prods, pressures, or rewards. In contrast, extrinsic motivated people act out of external reasons, for example rewards or punishment by others [5]. The reward do not need to be materialistic, even a gesture could be enough.

Taking the latter into account we formulated the demand to produce an interactive object, which gets passed from person to person. The object helps to get the motivation and a reason for interacting with strangers and creates social contact between strangers.

The object should invoke an intrinsic motivation in people, because they feel pleasured while passing the sphere to another person and get eventually a smile from the opposite. To create a suitable extrinsic motivation factor, we have considered various parameters. From all of them the impression of light appeared most promising. It triggers both, the intrinsic and the extrinsic motivation of a person. It can be used to pass an object to a stranger and communicate with them.

CREATING FASCINATION WITH LIGHT

Light is not only an instrument to create different emotions, but also enables an abstract way to communicate various things. We analyzed how to use these features of light effectively and utilized them to create the light sphere.

Fascination

Light has a vast impact on people. It enables us to see our surroundings and affects the way how we see it [7]. To see something in a whole new light is a saying which can be taken literally. In addition to the influence that light has to objects, we have different association with it, its color and its behavior. One can use these associations to create different emotions through light. While a smooth, slow and sparkling light might have a relaxing effect, since it can be associated with natural situations like sun falling through leaves, a flickering bright light stresses the body and is more likely to be associated with danger causing discomfort. Therefore it is crucial to choose the right light to create fascination and keep the person interested rather than scaring them off. In regard to this knowledge we collected positive and fascinating light events and created the spheres light behavior.

Figure 1. A person is fascinated by the sparkling illuminated sphere.

Communication

When left alone, the sphere tries to attract the users attention. This is done through slow and faint pulsing light. The intention is to evoke associations with weak breathing or low pulse. All of which commonly drive humans to look after somebody and wanting to comfort him or her, in this case the sphere. After picking up the sphere, it greets its user with a bright flash of light. This increase of energy is analogous to the joy you feel when meeting someone you like after a long time. Reacting with this intensity gives the user the feeling the sphere is excited to meet him. To keep interest high, the sphere starts to randomly twinkle its light when hold. Initially just planned as a means to be interesting to look at, several test subjects quickly drew a connection to wind lanterns. This was reinforced by the fact, that the light intensity slowly decreases when hold by the same person for a long time. The spheres “life energy” is weakening similar to a lantern running low on petrol.

We generally avoided the use of red or green. These colors are commonly associated with errors respectively confirmation. By excluding those colors, we avoided the chance of perceiving the light signals as simple error messages or acknowledgment of presence.

FINDING THE RIGHT FORM

The next step in the process was to find a form for the object. An important point in the choice of form was the feeling of the surface. The object will be given from one person to another person, therefore it has to lie comfortably in the hand. An ergonomic object with many curves suits the hand position. The shape of a sphere fulfills all these criteria and it is easy to carry.

Another important task was to determine a fitting size for the object. On one hand is has to be small enough to carry and therefore it should not exceed a size of 25 cm. On the other hand a size less than 15 cm may give people involved an uncomfortable feeling while they pass the object to another person as their hands may touch each other. When the sphere

is too small, it would be possible to throw it rather than hand it over directly. Therefore, we have chosen a size of 20 cm.

Another main part of the object are the sensors which are required to differentiate between persons. When the sphere is handed over, it has to be assured that the sensors are always touched. One solution to this problem could be dividing the sphere into two halves. The touch sensors would be attached to the lower half while the upper half would contain the light.

The upper half has an opaque surface, through which you can see the light inside. People are afraid to put their hands on the top half of the sphere at the handover, since they would obscure the light. By using this effect it could be ensured that people always touch the lower half of the sphere which is contains the sensors. Technically it was not possible to distribute more than 8 sensors on the sphere, hence the use of a teensy microcontroller for the prototype of the sphere. The sensors are arranged in a circle around the lower part of the sphere. The shape of the sensors should fit into the overall appearance. Therefore circle elements and rounded crescents were used, since they can be deduced from the round shape of the sphere. The material of the sensors is copper, because it is sufficiently conductive. Furthermore the thin copper plates were easy to cut and bend in an individual shape.

The bottom half of the sphere had to have an individual form. It needed eight holes for the cable connections to the sensors and a screw thread for closing. As well as a flattened form at the bottom, so that the Sphere can stand on the ground while it is charging. The form was planned with a CAD program, printed out with a 3D printer, then sanded and painted.

The counterpart of the screw thread has been attached to the upper half of the sphere. The surface of the upper half is very smooth and opaque. The inside contains a round mirror and a reflecting ball. By using reflective surfaces the light will be broken repeatedly and will not be casted evenly on the hemisphere.

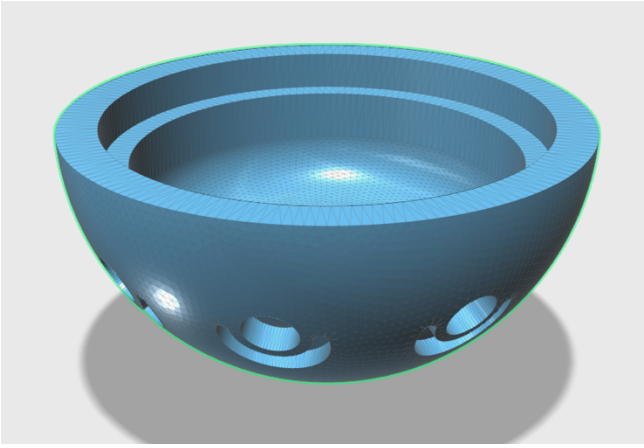

Figure 2. A CAD sketch of the bottom half

With all the material and the technology included, the sphere weights 1kg. This weight is neither too heavy to carry the sphere with you nor to light to throw the sphere up.

RECOGNITION AND DIFFERENTIATION OF USERS THROUGH VARIOUS METRICS

In order to encourage people to pass the sphere around and not just keep it for themselves the spheres “life energy” is slowly depleted and can only be recharged by giving it to another person.

Figure 3. When the algorithm detects a handover the sphere shines in a new bright color.

This posed the challenge of recognizing past users to prevent them from just passing the sphere inside a closed circle of people or just putting it down and picking it back up again.

To accomplish this task we utilized a few different sensors, algorithms and behaviors.

The first stage is to detect if the sphere is picked up or passed along, regardless of a specific user.

This is achieved through several copper pads, evenly spaced around the sphere. By constantly reading the capacitance of these, we can detect if they are touched, thus having an increased capacitance by means of the users body. The information of all sensors is fed to an algorithm which can differentiate between different touch patterns and tell us what is currently happening with the sphere.

When the first stage concludes that the sphere was picked up or given to another user, the next step is to figure out who is holding the object. For this we reuse the aforementioned copper pads and perform a body impedance analysis. A small and harmless electrical current is sent through the user’s upper body at different frequencies. With this technique, commonly found in consumer body scales, we can detect the user’s body composition and get values for water content, muscle mass or even body fat percentage. This provides us with several reference points we can compare to previous readings and users.

Unfortunately, this method is getting more and more error-prone the more the sphere is passed around and the more the database is growing. To counteract this, we employ 2 techniques to narrow down the dataset.

The first one is simply based on time. After a set period of time, old datasets get invalidated. Chances are the sphere is already moved on by that time. Furthermore, a person’s body

composition is changing over time, thus rendering previous readings invalid anyway.

The second technique is based on the current location. In addition to the body composition the GPS coordinates of the reading are saved in the database. When comparing readings, only results within a certain proximity are considered valid. The Idea behind this is that the sphere is constantly traveling, people are not. It is unlikely that the object is touched by the same person a second time hundreds of kilometers away from the first encounter.

SPREADING THE MESSAGE

The sphere can only be at one location at once, that is why there had to be some other kind of marketing to reach more people in the urban area and therefore get more people to interact with each other. There are many ways to get people's attention, we defined some of them and utilized them for our message.

Viral & Marketing

To begin with, spreading the Message depends greatly on people talking or rather communicating with each other, which is great, since it is a part of the message. Holding the object in the hands or seeing it traveling through a crowd is something special. If you get asked "How was your day" there is a chance, that you will not shrug it off with the typical "good", but telling them about your new experience and start a real conversation. Besides that, the appearance of the sphere and its light invite you to take pictures while holding it. This might lead to gain attention via social media.

The viral marketing might be one of the main sources for attention, but in addition some print media, i. e. poster, flyer, postcards, were created to be placed in the urban area. Their main purpose is informing people about the project in order to overcome their inhibitions. The people are generating the desire to hold the sphere in their own hands while making conversation and new connections with people around them.

Website

In order to reach people who were not in range to hold the digital artefact, yet, we have created a website which explains the project and gives an impression of its effect. This website also contains a map showing the journey of the object which it has already accomplished. To accomplish this we used a GPS-module which sends the current location of the sphere to a server, whenever it is passed to a new person. On one side this allows people who already held the sphere to keep track of it and see how they influenced its journey. This may connect some individuals longer to the project than just a few days. On the other side the map is helpful for people who want to be a part of the project. They can easily look up where the object was last passed to a new person and can try to follow it until they get the chance to hold it.

CONCLUSION

In this paper we demonstrate a possibility to deploy technology in order to create new ways of interpersonal communication in the urban area. Media technologies are not only thought to be used by an individual. They can be used to promote the social exchange and have a positive influence on the social life and the general behavior in the public space.

With the help of this paper we show an opportunity to use a digital artefact to encourage the social communication between people. Through an intelligent usage of biometrics and an algorithms, which can recognizes a person, we create the possibility to identify a person and differentiate between people. In combination with light we created an interactive sphere which registrants his owner and has an individual behavior. The light spheres behavior is thought to promote the exchange between people by inviting them to pass it to a stranger.

We hope that the presentation of our concept contributes to get some attention for designing more interesting solutions in regard to supporting social interaction with technology in the urban spaces.

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