DURCH DEN WIND: Using hidden air flow to influence the attention of the user

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TEI '17, March 18 – 21, Stockholm, Sweden

Abstract

Several studies of the past decades have focused on the manipulation of human beings. Many of them monitored the impact on the users attention and sensibility as the` key subect. Since air and its movement is elusive, most` of the studies use other media to achieve the manipulation.

"Durch den Wind" addresses oneself to this insufficiently studied medium and makes the first move to use air for further studies. The here presented prototype and depicted usability test clarifying, in which etent hidden` air flow can be used, to impact the attention of the user.

The Prototype is made of two boes which simulate the` look of normal loudspeakers, but have hidden motors and fans inside. Further a Microsoft kinect tracks the user and hence the fans adust themselves towards the` user.

Author Keywords

desktop; installation; kinect; flow of air; manipulation; air; apparent perception; haptic feedback; interference

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): H.5.2. User Interfaces; H.5.m. Miscellaneous; J.4 Social and behavioral sciences: Psychology

Introduction

“Durch den Wind” is an ambient desktop installation that works with air movement, which is presented by a prototype. Hereto the research question “Is it possible to sway the attention of the user by eposing him to` hidden flow of air?” should be evaluated in an usability test. As the user should not be aware of the flow of air, the fans are hidden in DIY looking, wooden loudspeaker boes. These are placed normally aside` the computer screen. Through a tracking software the fans adust themselves to face towards the user.`

The project's focus is on the medium air, its ability to function as a medium and how it can be perceived in a desktop installation. Moreover the usability test provides the basis for further research in the field of influencing human beings through flow of air.

Setting

Due to the fact that “Durch den Wind” is a desktop installation, it can take place alongside any computer screen (See Figure 1). It is important that the setting is adusted to the user and placed like any other normal` loudspeaker boes. Each loudspeaker have to be` placed on one side of the screen and the kinect camera in the front, to track the head of the user. To look like normal loudspeakers and not to attract attention by the user is the main goal.

The main intend is to clarify the uestion given above.` Therefore the kinect does not have to be covered, like the ventilators or motors in the boes, since it can be` used for multiple purposes and is not imperative coherent with them. hen the user gets inducted into` the euipment it is suggested to present the kinect as` part of the eye tracking software, to disallow the user any other unwanted associations.

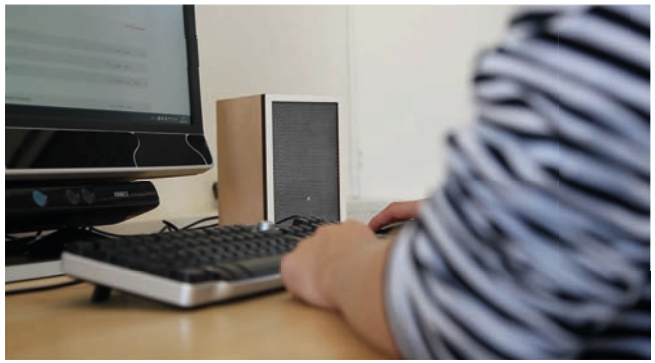

Figure . : "Durch den Wind" Box beside the screen and Kinect camera in front of the user

Mechanics & Tracking

“Durch den Wind” can be easily set up on any given desktop with a normal computer. All used cables are regular USB and electric cable, which have to be plugged into the computer and socket.

Correctly constructed, the boxes don’t seem any different to normal loudspeakers. As outlined above, the kinect have to be placed in front of the screen and with the angle, in which it can track the users head.` For optimal tracking the kinect have to be about an arm’s length ahead of the user.

(Mechanics)

As soon as the kinect starts tracking the users head` position, it will send these data via the arduino to the motors and fans. These will adust themselves, so that` the flow of air will lead towards the users face.` Additional to the X- and Y-axis, the Z-axis, on which the user moves his head, is also considered. Therewith “Durch den Wind” is able to follow the user, no matter how much he changes his position in front of the screen, of course ust as long as he stays in the field`

of view of the kinect.

(Tracking)

Before the Motors are able the adust the flow of air` towards the users face, they need the data, where to` focus on. This is achieved by one Microsoft kinect camera, equipped with an infrared projector, an infrared camera and an RGB camera. The perfect position for that, have to be eamined in a test` procedure, before the actually usability test.

Figure 2: Two motors rotating the fan on the X- and Y axis.

Usability Test

Is it possible to sway the attention of the user by` exposing him to hidden flow of air?" Building on this uestion a usability test, as referred to in the following` two sections, which eamines if it is generally possible,` that air movement have any impact on a human behavior, should be conducted.

(First calibration)

In the first instance a smaller evaluation takes place, in which the probands value when they feel the flow of air or its shift. By the obtained values the used fans can be subtler calibrated and adusted variously for` different purposes.

The prototype will be placed on a detached desk, whereby the orientation of the boes have to match the` ustification of the fans. In addition it shall be no air` circulation in the room.

(First calibration - Process)

The proband receives an invite for the usability test on the prototypes evaluation. He gets briefed in his tasks during the test and existing questions on his part are answered. His main task is to mind the flow of air and its changes. All probands are divided in two groups, whereby both groups are starting at the same initial situation.

Before the actually test is able to start, the proband have to be perceived by the kinect. For this purpose he needs to stand in front of the desk, with his arms not touching his legs, for a short duration. Once the kinect starts tracking the probands head position, he may sit down and start the test. Both groups come by the instructions to inform the eaminer if they feel any` changes in the flow of air, which whiffs towards the probands face. The proband receives headphones, which he has to put on, to suppress potential motor noises. Additionally group B is due to watch videos or do something they are really entertained by, as a distraction from the original task. After the test the proband gets the opportunity to share his feelings during the test.

(First calibration - Goal)

The Goal of the test is, to ascertain when the proband perceives the airflow or its changes.Hence it is very important to note, at which point the flow of air is perceived peripherally, to be able to adust the fans` more precisely later on. Group A can thoroughly

Figure 3: Setting without a computer screen

concentrate on their perception, whereas group B is slightly distracted. This shall evaluate in which etent` the fans changes are perceived, when the users main attention is focused on something different.

With the help of the gathered data, "Durch den Wind" can be controlled more precisely and used for different purposes.

(Test scenario)

After the first test to the calibration of Durch den` Wind", the second one inquires whether the probands attention could be affected by the hidden airflow. Besides a survey shall provide a glimpse of the feelings or its changes during the test. Based on the results further research shall eamine, if human beings can be` manipulated through hidden airflow. The users perception, direction of view or even the behavior may be affected by this.

(Test scenario - Process)

The proband applies for an usability test at the subect` "attention" and receives an invite. He will be introduced into the computer and eye tracking equipment. An employee explains the test process, adusts the eyetracking software and makes the` proband aware of possible recordings and protocols. The eaminer keeps accompanying the proband` through the test and observes him, but do not engages in the test. The proband is constrained to think aloud and particularly to confide how he feels during the test.

The probands are divided into two groups. Group A participates without any distractions from the fans and sets the standard for the average paid attention, at the test scenario. By group B the hidden airflow is deployed.

hen the test has been completed, the proband is` asked in a survey about his attention, feeling and its changes during the test. After this survey the probands from group B are informed about the real purpose of the test, the manipulation with hidden airflow, and their reactions to the situation get documented. Later on these reactions have to be analyzed.

(Test scenario - Goal)

The scenario, as described above, will show if peoples` attention and feeling is influenced by the hidden airflow. Since the user shall only perceive the airflow unconsciously, the intensity of it may be assimilated based on the received data. Hence if the proband senses the flow of air during the test and informs the eaminer about it, he have to note it and asks how the` proband feels about it.

hen the proband gets informed about the hidden` airflow, it is important to analye the reaction, whether` he was unaware of it or just haven't told.

Further research

As mentioned below, there are various fields of applications for "Durch den Wind". Not only in the behaviourism, but also at the perception research, ust` to mention the research areas. It would be interesting to know, if the work with hidden airflow is capable of impacting the direction of view or even the behaviour of the proband. Furthermore it can be a great tool to investigate more of the classical conditioning, with air as a medium, or to research in the field if translucent perception.

Conclusion

"Durch den Wind" is an ambient system which uses the everyday loudspeakers and turn them in to something completely different. While the exterior is matching the classic loudspeaker, the difference is rather hard to tell by not inaugurated people.

Ambient systems often depend on the subliminal of their work, just as "Durch den Wind". It is not bothersome, but is able to, if needed. Moreover it has a slow notification rate, which also aids to be undetected.

The prototype has a big potential to fuel the research with air and behaviourism forward. But before these studies can take place, the initial usability test should be conducted.

Range of application

(Virtual reality)

While VR and the associated video game experience are progressing, the demand for products that support a gaming experience, further than just the visual aspect, will increase. For example, there are already Bodysuits and gloves that generate feedback, by vibration or slight electronic impulses, to the user. To create an even more realistic atmosphere, the final prototype will be able to support the ambient perception of the user via airstreams. An possible scenery would be for example any game with speed differentials like walking, jogging or sprinting. The prototype would adapt the speed by increasing the airstream, simulating a faster pace of speed. Also various weather conditions could be recreated, from a low summer breeze standing on a beach to the harsh winds on a mountain. None of these concepts are VR dependent but should be used in combination to reach the full experience.

(Time controlling)

Modern society suffers from a fatal problem due to increasing numbers of people spending hours in front of their pcs, up until the point where it affects their health dramatically. The final Prototype could offer here a controlling instance: a software installed on the PC tracks the time the participant spends on several websites or on playing video games. Crossing the timestamp, set by user, will activate the fans, which will target the user automatically. The ongoing airstream targeting the face will dry out the participants eyes, exhausting them even faster. The user is reminded to take a break and rest his eyes for several minutes, through this ambient system.

(Pschology)

The presented prototype will find great usage in psychological studies about conditioning and apparent perception.

Due to fact, that the fans are hidden inside an everyday object, the participant is not aware that he is targeted by an airstream. This could be used to test the perception of the participant. Possible therapeutic purposes are imaginable, like deep concentration sessions with an extreme low powered airstream to be more aware of your own body. On warm days, where an empowered airstream produce a welcomed cooling is a great opportunity to reduce stress and surface temperature of the participant.

Conditioning is another possible sub area where the prototype could make an appearance. Creating sceneries where the proband plays a game, in which he has to perceives when the airflow changes. If he's correct, he gets a reward. If not a negative feedback occurs.

A collaboration with a psychological study about

apparent perception would be advisable and interesting.

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