The Friendly Flame: A device to improve friendships

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Abstract
In this essay we introducte the Friendly Flame, a tangible accessoire with the main goal to maintain relationships with other people. Relationships are important for maintening a healthy life, but many tend to neglect them and end up lonely. With our device we want to encourage people to be more outgoing by showing them their general level ouf socialness with colors on a tangible flame scultpure. The user should feel the need to care for his flame in order to let burn brightly by meeting with friends and family. Also the current status of a meeting should be visible on the sculpture to give a visual feedback of the users current rsvp status.

Author Keywords
ambient; relationships; tangible; social; communication

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous. See:

Introduction
Socialization and meeting friends is a very important activity during people's life. Concerning [1], family and friends are the most important peer groups, when it is

about advises or helping each other to solve problems. To maintain these groups is a very important matter; nevertheless it is in some situations hard to do. Managing time for get-togethers with friends is not very easy if we consider work-, student- or private-duties of a person. Like described in [2] people tend to forget dates or events and are catching negatively attention from their friends and family. If this continues all over again, it sends an un-respectful message to their counterparts which can lead to the fact that the other person doesn't want to meet each other any more.

Another issue is, that there are two types of people, namely the introverted and extroverted ones. According to [3], introverted people have problems with traditional social interaction and meeting people face-to-face. Mostly they gain the "real-me" (means who am I actually) through the Internet, compared to extroverted people, which gain real-me through traditional interaction. The Internet is also a very good way for introverted people to find like-minded friends and as a result forming traditional social contacts. That's why we conducted our project and the related prototype, as to support this kind of people, as to strengthen and manage friendships. Like in [4] people are anxious or lonely at the beginning, looking for friends in the Internet, which has the same value like non-internet friends and so they are using social networks. Normally they chat, telephone and have a face-to-face meeting with the person into real life social network and we want to attach to the last step, the bridge between communication in social networks and meeting each other in real-life. That's why we were using Facebook as a marketplace platform.

Concerning [5] people are using Facebook for ad-hoc social life management, for encouraging peripheral friendships, closer friendships and school relationships or to relate online and offline social practices. Facebook also supports communication with people who are not so close, because you don't need a phone number or email to exchange. Phone calls cannot be ignored, compared to wall posts or messages on Facebook. There are also four different types of social gatherings:

- Schedule social gathering is for get-togethers for practical purpose like planning an event and inviting other relevant members.

- Semi-scheduled social gathering is for regular dates, like pick-ups and lunch dates.

- Ad-hoc social gathering is used for short-time planning of meet ups, when people ran into each other. This can also be achieved by updating Facebook status messages.

- Special events are based on invitations like birthday-, barbecue- and other parties.

Concerning these facts, we based our mobile app on Facebook in combination with our tangible object, which should encourage people meeting each other more often and caring more about their social life.

Related Works

In Zurich a group of scientists was working on the problem of improving interaction between neighbors. Most of the problems were time related and because new neighbors are too cautious, they won't meet each other. The scientists found out that it is a good way to break the ice between communication with foreigners with gift-giving and in result it improves relationships and enables communication. So they designed "SharryBot", a non-functional prototype that distribute gifts among the neighborhood, connecting people in an effective way and improving the later on face-to-face communication between neighbors. The aim was, that indirect asynchronous communication of the prototype leads to direct to face-to-face communication, which we also want to achieve with our Friendly Flame Prototype. The tests with end-users showed that such a system would help creating new relations and improve existing ones within a neighborhood. [6]

An other project which forces get-togethers and further more measures personality is "Evil Twin", described in [7]. It's based on social software, but doesn't store any personal information. Firstly the user has to answer a web-based questionnaire formulated from personality typology tests to determine extroversion, friendliness, orderliness, emotional and open-mindedness. Further there is a separated set of hardware to determine evilness. A radio frequent device is transmitting to other evils and receiving signals from other players. When a person comes in 20 feet distance to a receptive device, the persons device will vibrate. That means, the "Evil Twin" is nearby and giving you three solutions. You can ignore it; fake to ignore it or make it obvious that device is vibrating. This interaction without words should on the first thought be funny, on the second thought it should animate people to talk with each other and have benefits to social life, while playing the game.

In [8] an imaginary friend is developed. The user has a pico-projector on his shoulder attached, goes around the city and leaves emotion cookies. Imaginary friend collects and treasures them, accompanies user and keeps their company. A sensor is measuring variations in electro dermal activity and transmitting to a mobile phone over Bluetooth. If there are any changes, the imaginary friend asks the person how she is feeling. The person answers by tapping on the appropriate feeling on mobile phones display. The phone is attached to a pico-projector and projects the picture on the floor. Imaginary friend takes also mimics like when person is walking or standing still, due to acceleration of mobile phone. Due to the imaginary friend, 82% of the test-users had a emotional connection with him. That's what we also want to achieve with our Friendly Flame, that the users feel a connection also like a good buddy, connecting through him with the users real friends.

Because we are recording outgoing habbits in our Friendly Flame project, the project described in [9] is also interesting. It is called SenseCam and is used for better recall of daily lives by recording textual information from daily lives. It simply visualizes interaction over time with a user in a cartoon strip (to communicate sentiments effectively) and is helping the users to recall their memories.

SenseCam consists of an android app, which is accessing the Facebook profile of the user, learning her

Creation process of friendly flame

Preparation: First interviewing four users concerning their outgoing habits, creating paper prototypes and evaluating them.

Materials: The friendly flame consists of wire, paste, parchment and a RGB LED connecting with an android phone over Andruino Mega Board with Tinkerkit and allowing the user manipulating the flame over an android app.

Process: Creating the friendly flame, developing of the android application and writing Arduino source code to interact with the tangible device.

Result:

preferences and social graph. Hyperlinks are provided to different events in the lifelog to enable faster recall and better sharing of memories.

Also we have to consider according to [10], that the structure of a HCI application is not only the architecture, but also the social norms and values that emerge through extended use and diverse populations. That means, we have to consider, how people identify relationships over social networks and that the creative play in social interaction is important.

The Petimo project [11] is a small robotic toy for children. It should change social networks fundamentally while a person is interacting by squeezing, touching and sending gifts or emoticons to their friends, family and parents. This brought us

the idea, to base communication just on event statuses to achieve a higher boundary with friends and family and so meeting each other more often after initiating a get-together using the friendly flame.

The Friendly Flame Prototype

Concept

To achieve our goal, namely to create a device and improving friendships, we developed an android app on one side and the tangible prototype on the other. We are using the tangible prototype to visualize social activities of the user. It ought to be an accessory to be put at home on your desk or in the living room showing your outgoingness to people visiting your place. The Friendly Flame is visualizing this value by glowing in a certain color. The user can also accept and deny events and show all their event statuses. We were using the Facebook API for our app, because Facebook is supporting event planning. Another reason was, due to the already existing social connections between the user and her friends and it offers a very easy way to contact new people (like friends of friends).

Firstly the user is logging into our app using her Facebook username and password. If the user is not registered on Facebook, she can do this by clicking on "register" button. The first screen, which the logged in user sees, is the "all events"-screen. Showing all events of the user on the android display invokes the tangible flame to glow in the outgoingness-level of the user. It means, the more events the user is attending, the brighter yellow the flame is shining. We mapped the outgoingness in the hsv color spectrum form black (= not outgoing) to brown, orange and yellow (= very outgoing). Before logging in, the flame is not shining at all.

Our app has three tabs, namely: all events, friends' events and my events. Clicking on friends' events, all the events are shown, which the logged in user got invited for a friends event. My events are events which the user created herself and invited people to it.

Clicking on a particular event, the flame is turning in a certain color, concerning the event status:

- Violet means the user is unsure if she is attending the event.
- Green means the user is attending the event.
- Red means the user declined the event and

- Blue means the user has not answered yet.

Technical implementation

We designed the tangible object friendly flame by using wire, paste and parchments paper. In this way it was easier to form the shape to look like a burning fire. Furthermore we were using the Arduino Mega ADK and Tinkerkit as components of the tangible object in connection with BlinkM MaxM LED for visualizing the different colors. We applied Android and Facebook SDK for developing the app.

A challenge was to find out how to calculate the outgoingness of a person. Due to the fact, that there are many events that the person is not interested in but is receiving invitations, we created this formula

$$((anE - abE - (nbE / 2) / E) + 0.5$$

with that attributes:

- anE = accepted events
- abE = denied events
- nbE = not answered events
- E = all events

The friendly flame is visualizing this value by glowing in a certain color, which represents the outgoingness. When clicking on each event, the app is reading the rsvp-status from the Facebook FQL source and visualizing the status on the phone display and coloring the flame. The rsvp-status of events is describing if the user is attending or declining the event and can take the values attending, unsure, not answered or declined. Unfortunately Facebook isn’t granting the rights to change the rsvp-status of a certain event for the user, so we have to call the real event screen from the external Facebook app just to change the status.

Design process

The initial idea that came from our context analysis was to develop a system that helps people to meet up by showing if their friends are available to hang out or busy. From the replies of our test persons we found out, that most of them lead a rather active social life, but some don't engage so much in social activities, tend to stay at home and get lonely. We wanted to support those people by motivating them to meet and socialize with other people and therefore improve their overall wellbeing.

We were given the choice to build our final project by using the Kinect camera, Arduino software or an Android smartphone and as we wanted to build a physical object that the user can manipulate, we decided to use Arduino and Android for our prototype.

Upon paper prototyping we came up with the idea to form the device in the shape of a flame that symbolizes the burning passion of a relationship with a person. We thought that the user needs to feed the flame by accepting social events in order to keep it alive. The flame should burn bright if the user leads an outgoing live and should fade into black if he doesn't spend a lot of time in the company of others. We elaborated on this metaphor and wanted to use items in the shape of of wood to nurture the friendship (accent events) or to

blow out the flame by putting watter on it (decline events).

The user should also be able to see the current status of a social event by looking at the flame, giving her an easy possibility to see at once if she decided to attend, had declined or is not sure about it. Another feature we considered interesting was to also show the current status of an event the user created herself so that the user gets an overall impression of the status of the event like if most of the people are coming, if more people are not sure or if most of them have declined.

User Study

In our qualitative user study four test persons were taking part, two male and two female persons of age 31, 25, 24 and 26 years. Two test persons were study colleagues of us, one person a friend who also workes in IT and the last tester was recruited by asking several students in the university canteen if they would like to participate in testing our prototype.

The test setting consisted of our flame and a smartphone. We built up the setting just in front of the user. Furthermore, every research fellow of us had a certain role. One person was leading the test, speaking about the setup and acted as a contact person for the test user. Another research fellow was taking notes in a shared Google docs file and the third one was filming the whole situation, obtaining audio and video from the test setting. We changed roles after every test person, so each one of us could lead the setup.

We gave our test persons two smartphones, on one the friendly flame app was running and the other one was used for taking pictures if there is something interesting, annoying or cloudy. We gave our participants also a pen and paper, to make notes or if necessary draw something.

The user testing took place in the canteen-room of the Vienna University of Technology and in a flat of a test person. We thought it is a good way to achieve test persons in a canteen of an university. So we asked people in the cantina, whether they would like to participate in our user testing, pieced together two desks and started the observation. Unfortunately the light environment in the canteen-room was not ideally and it was too bright, so our flame couldn't express itself the best way when glowing occurred. On the other hand, the test environment in the participants flat achieved better conditions of illumination and the flame could glow in its expected way. Testing and the interviews took time between 20 and 50min.

Testers	**1**	**2**	**3**	**4**
Sex	male	male	female	female
Age	31	25	24	10.60
Recruited	Friend of researcher	colleague	colleague	Asked in canteen
Location	Flat of tester	TU canteen	TU canteen	TU canteen
Duration	50min.	25min.	18min.	37min.
Method	PEM 2 Video taping	PEM Video taping	PEM 2 Video taping	PEM Video taping

Table 1. Key data of users who tested the prototype

In our study we first wanted to test how the flame appears to the user. Without any explanation, the user can discover the flame and the corresponding app on his own. At this point we want to see how intuitive and easy to use the interface of the app and the flame setting is. Furthermore we wanted to find out, whether the user is using all functions of the app and also understands them. During the testing, the user gets encouraged to make pictures of his discoveries and experiences. After the observation, we were asking the user about his experience on the basis of the pictures she has taken and asking her concrete questions about the app.

Findings

After evaluation of our user study, we found following findings interesting:

User Acceptance and first impression

All of the test users accepted our prototype and liked our idea of supporting and improving a users social life. Although nobody had figured out that our friendly flame is also visualizing the outgoingness level of a user, they had fun using it and watching how the color changed. The shape of the flame was well accepted, but for one test user, it looked like a ghost. Accidently the hardware looked out of the flame, so one test user saw or Tinkerkit and took a picture with the explanation that it's very interesting for her seeing the technology beyond the device (see figure 1).

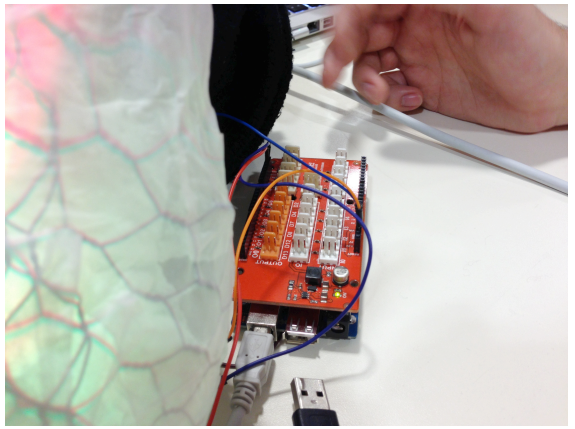

Figure 1. Picture of technology beyond the tangible object, taken by a participant.

Usability

There were not as many usability problems with the tangible object itself, as with the app interface. We found that the event list should be structured more and enable searching events easily. It should contain bigger letters and the event names should pop out. The events detail view had too much information (see figure 2) for one participant. She told us, that she is not interested in past events with the data like maximum number of attended users and so on, bust she would appreciate a more graphical view with an event picture and just her friends pictures who are attending the event. The friendly flame itself was perceived very well and the test users took lot of pictures while checking their event statuses. It was funny and nice seeing the flame shining in different colors as seen in figure 3.

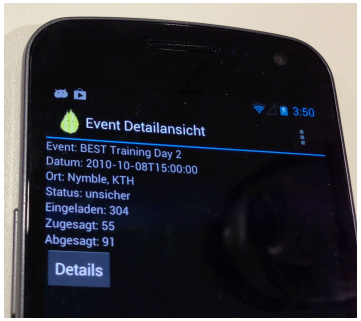

Figure 2. Too much information in the event detail view.

Figure 3. Playing with different colors of the flame.

Problems

Due to the Facebook SDK it wasn't possible to change the event status without using the Facebook app (see figure 4). That's why we had to redirect the user on an external Facebook app and when she changes the event status, the flame doesn't update itself on the fly, instead the user has to change in the detail view of the event. That causes problems in understanding the concept, that the flame is mapping the users event statuses. An other problem was, that tempt to cheat when they are demotivated to go out, but they like the flame shining very bright. One participant told us, that he would be able of doing this, accepting events but nor really attending them. Furthermore the tangible was for one participant too big for a small crowded desk to put it on a spot and connecting it with a phone via a wire. But the main problem was calculation the outgoingness, because we are using just Facebook events of the user and the people are not all relying on Facebook events for their outgoingness or socialization. A test user told us, that a light can't tell her properly if she is outgoing or not (see Figure 4).

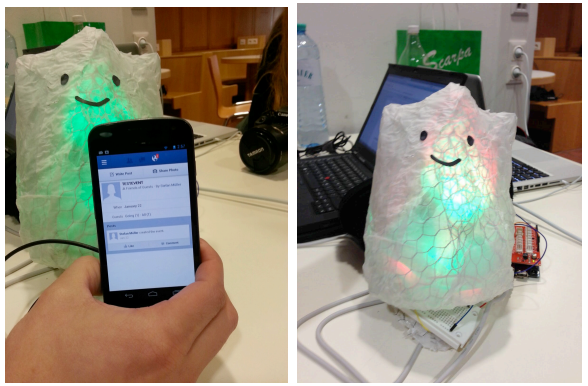

Figure 4. Left picture: When changing an event status, the external Facebook app is starting; right picture: showing outgoingness level of the logged in user.

User experience

Generally speaking the user experience was very good, the participants liked the color changes, the lovely appearance of the flame with a smile and also the idea whole idea of the project. A more direct influence on the flame with the mobile app would be appreciated.

Areas for improvement

We can summaries that the areas of improvement would result in a much more independent flame, not connected over wire but over Wi-Fi or Bluetooth with the phone. So the user can place the flame everywhere she likes and use it like a real accessory. The outgoingness calculation should have an extra screen on the app and the event update should have a direct reaction on the flame too. It should also custom colors be possible, for the event status or outgoingness, because not everyone is conceiving colors the same way.

Conclusion

During our research we found out that it is very important to include the future user in development of the new product. Our semi-structured interviews, paper prototypes and related work studies, brought us to the current friendly flame prototype. We conclude that the outgoingness visualization on the friendly flame is too personal, based on Facebook events we can't accurately tell if a person is outgoing or not. The flame is representing the relationship between persons, so it is in the fact very personal. A further development of the prototype can be seen in using the flame for other tasks like cooking, studying or cleaning your room. These tasks relate to a person to object relationship and can differently conceive by people as a person-to-person relationship. So a scenario could be, my friendly flame is turning darker again, I have to clean my room anytime soon.

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