

SoulFlower

PROJ02 - Conversation

Design for Emerging Technologies, *Fall 2019*

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SoulFlower is a potted plant that encourages healthier emotional intra- and inter- personal relationships. It helps its owners be more aware of their emotions, which often go overlooked during a busy day. Additionally, it encourages friends and roommates to better understand the unspoken emotional context, avoiding potentially awkward or unintentionally hostile conversations by simply looking at the state of SoulFlower. One flower of SoulFlower is capable of drooping and dancing, giving its owner instant feedback on the sentiment of sentences that are uttered. A bouquet within SoulFlower keeps track of the accumulated sentiment throughout the day, which is a useful indicator for people entering the room to see and adjust their words and actions accordingly. Our current embodiment of SoulFlower is for a single-person bedroom, but a future iteration may also find it in multi-person households,

where its utility in mediating unspoken emotional communication and empathy would become especially prominent.

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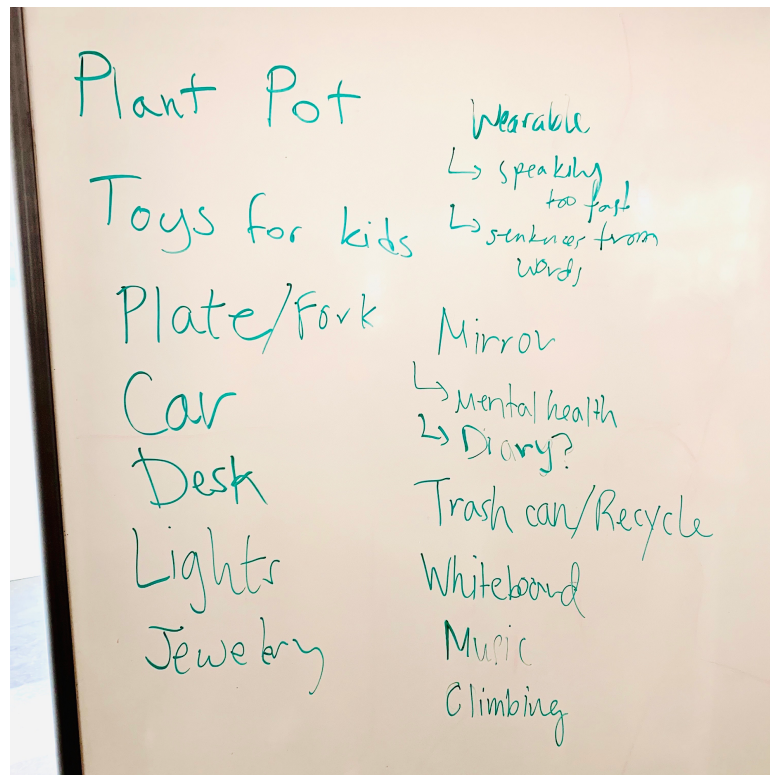
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Framing

We present SoulFlower, an interactive plant for single-person households designed to increase emotional awareness. Living alone comes with several challenges, one of which is being aware of feelings and sharing them. While not a replacement for human-human interaction, our plant, which we envision to be placed in a frequented area of the home, such as a desk or the kitchen, empathizes with its owner with mechanical motion, lights, and sound. This can provide some needed emotional support and encouragement when there might otherwise be none. Our plant also acts as an indicator of the overall emotional health of its owner. The bunch of flowers retreats as the owner says more and more negative things throughout the day and "grows" as the owner nurtures it by using positive language. This serves at least three purposes. First, it encourages the owner to be more in touch with his/her own emotions, which is known to be an important facet of mental health but nonetheless often goes overlooked in our increasingly busy lives. Second, it repurposes positivity into a responsibility and habit; just as one might need to water a real plant, one must make an effort to speak positively in order for this plant to thrive. Finally, it serves as a visual cue and representation of the owner's mood to anyone entering the room, which could eliminate potentially awkward or uncomfortable social interactions. It is known that having support can be especially important after a "bad day," yet many people are not comfortable to openly share their emotions about their day and seek support. If the plant is droopy and retreated, a friend who comes over can notice it and consciously decide to be a better listener, be more tolerant, or be more expecting of irritable behavior, all without requiring the owner to explicitly share details.

Design Process

Concept Brainstorming and Ideation (10/07)



We collectively had an interest in the broad area of “mental health” and tracking emotions. Some considerations we made in selecting the item that would help us explore such an area included:

- **Size.** We wanted to select an object that could hold electronics and a reasonable number of additions (lights, servos, etc.) without taking on an awkward form factor. This eliminated several items from the above list, such as jewelry and forks. We also decided that overly large objects, such as a car or desk, would limit our flexibility to prototype in various spaces across campus.
- **Where people talk to themselves.** Since the theme of this project was “conversation,” we knew that we needed an object that could be talked to. However, we wanted to avoid unnatural interactions. For instance, while people (students, at least) commonly

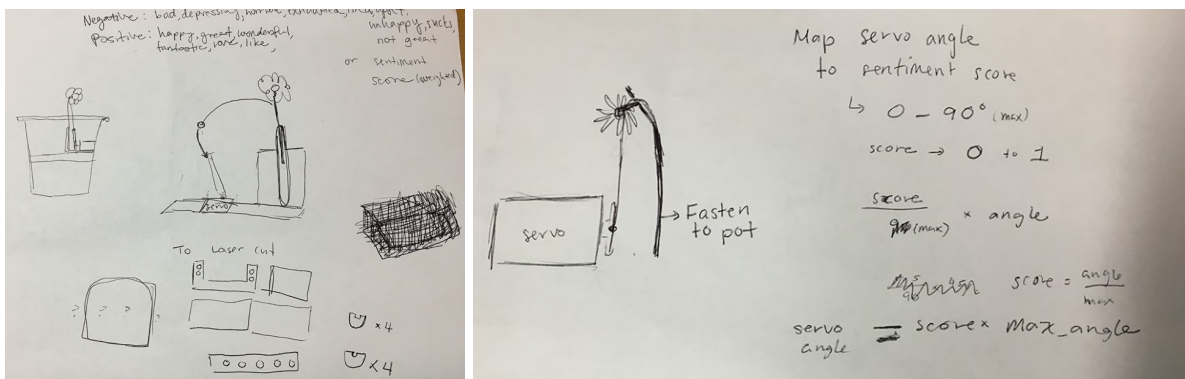
talk to themselves while working in the comfort of their own room, we thought it would be less natural to, say, talk in front of a plate or trash can.

- **Blending in.** Our goal was to find an object that was noticeable enough for a third person walking into a room to notice, but at the same time, we didn't want it to disrupt the ambiance of a room or otherwise stick out unnaturally.

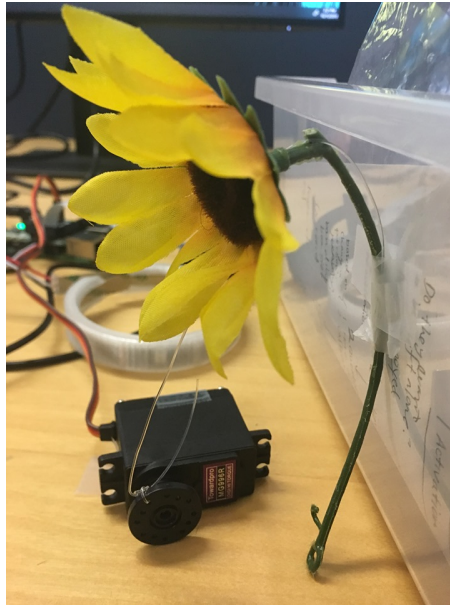
Implementation

Instant feedback flower

One flower of SoulFlower reacts to each phrase/sentence its owner says. It droops when negative sentiment is detected, with the amount of drooping corresponding to the degree of negativity. This was accomplished by attaching a branch of the stem to a servo. A range of angles that conveyed "happy" to "droopy" was determined and then any negative sentiment score was mapped to the range of angles. As we were slightly concerned that empathizing with sad/negative emotions could lead to further negativity, we tried to add a bit of lightness and humor to our "negative" reaction, intentionally exaggerating the drooping action. We also selected a "droopy" sound that we felt clearly indicated sadness but also was slightly comical, with the goal of not further depressing the owner. When a positive sentiment is detected, a small chime is played as simple audio feedback to indicate that SoulFlower "listened" to the statement. If the sentiment is positive enough, the instant feedback flower also "dances" back and forth.



Initial Prototyping Ideas



Drooping Mechanism - in progress

Cumulative sentiment bouquet

SoulFlower also features a bouquet that reflects that accumulated sentiment throughout a day. It retreats a little every time a negative sentiment is expressed and “grows” a little every time a positive sentiment is expressed (with the amount of growth being proportional to the magnitude of positivity). We implemented this by attaching the bouquet to a servo using a pivot joint and including a physical area reduction. This meant that as the servo rotated, the bouquet would stay relatively upright, but would bunch together more as it pulled down. We initially tried to implement this with a rack and pinion mechanism. However, it proved to be fairly complex to mount the mechanism in the flower pot in such a way to keep the bouquet upright, to keep the rack/pinion aligned, and to achieve a small spreading/bunching effect as the bouquet moved up and down. We then decided to simply attach the bouquet to a servo directly. We threaded the bouquet through a horizontal plate with a hole to guide its movement and create a slight bunching effect as the bouquet was pulled down.



Initial Rack and Gear Mechanism Design



Bouquet with area reduction piece - in progress

Plant base

To accentuate the “celebration” of having an extremely good day and the “alarming” nature of having an extremely bad day, we constructed a base beneath the plant pot to add more motion and lights to SoulFlower. The box was made of laser-cut $\frac{1}{8}$ ”-thick acrylic. We left the backing paper inside the box to help diffuse the LEDs but we carefully trimmed the edges to keep the look of the box transparent on the sides. We also designed a box for our servo to ensure it is properly mounted and is reliable enough to shake the plant. The LEDs were attached so that they could have a disco ball-like effect for times of celebration but also uniform enough that a solid blue could be used for the extreme bad case.

We at first faced the LEDs inwards. However, we were unhappy with the unnatural shadows that the LED strips created, so we decided to wrap the internal servo holder with the LEDs facing outward to achieve a more diffused effect without shadows.

We chose to use a flashing blue “alarm” (plus an accompanying alarm sound) in the “extreme bad” case to signify a warning to the owner that help or remedial activities should perhaps be sought out. In the future, possible expansions of this feature include an automated call/text to a friend or relative or the automatic playing of a favorite song, but for now, we wanted to focus on SoulFlower as simply a plant to foster emotional awareness.



Moving Base - Servo and LED Position

Aesthetics

Finally, we wanted to make the plant seem as natural as possible, so we covered up all the electronics and mechanical pieces inside the pot with leaves and disguised the microphone as a sunflower:



Final Polishing with Leaves

Video Demo

<https://www.youtube.com/watch?v=jrJ6WAsjsq0&t=13s>

Future vision

We focused on demonstrating this plant as an entity in a single-person household, but future versions of it may also have a role in multi-person homes. Here, the desire to quickly gauge the emotional health of the home may be especially strong, especially when various household members return from spending a busy day outside. Ideally, a future plant would be sensitive to more than just words to indicate the overall health of a home. For example, it would also respond to tone of voice (e.g. when a household member is speaking exasperatedly, dejectedly, excitedly, etc.), the number of voices participating in a conversation, etc. We also envision more advanced interactions - the plant could turn to whomever is speaking, the plant could speak back. We avoided having too much speech output here because we felt that the unnaturalness of the text-to-speech voice detracted from our goal of making technology blend into our plant, a natural element in one's home.

Links

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| Video | https://www.youtube.com/watch?v=jrJ6WAsjsq0&t=13s |
| Presentation | https://docs.google.com/presentation/d/1iN6GoQkciUoCF5Vtx_ULhR3q8YtMSBu-2HOHkQKXUQ/edit?usp=sharing |
| Image | https://drive.google.com/file/d/13BjSJe3O5ZKzs6zNFQcojk2bRL0NvRqN/view?usp=sharing |
| Design Files | https://drive.google.com/drive/folders/1aWrAzX6Op0b7wUbDTbWStHbj7W7w3x7s?usp=sharing |
| Code | https://github.com/tinataleb/DET-proj2 |

