

PROPOSAL: THIS=THEN=THAT

CART360, 15/10/2020

Martin Hanses

<https://marafrass.github.io/cart360/>

The Jiminy Cricket (Working title)

In a world struck by a global pandemic, mental health is perhaps more important now than it has ever been. With millions of people self-isolating, the struggle to maintain human contact and/or even keep their spirits up might be overwhelming, and for some, the pandemic has only exacerbated their already existing conditions of depression or anxiety. Some rely on close friends or family to help alleviate their pain: a friendly reminder, a greeting, an act of love - these are all things that may not solve the problem, but certainly make it a lighter burden to carry - but in isolated living, who will offer these reminders?

The Jiminy Cricket is a tool to help anyone and everyone suffering from depression, anxiety, and a perceived inability to perform even simple tasks. It offers reminders and suggestions for the user, helping them dissect and break down what seems like an insurmountable amount of work into more manageable efforts. While the Jiminy Cricket doesn't help the user file their taxes or fix their car, it focuses on the smaller things that victims of depression may perceive as exhausting or pointless. Getting out of bed, making a meal, turning lights on and off - making the simple things just a little easier and manageable.

Since it is such a personal tool, the Jiminy Cricket is very subtle and doesn't draw the eye. Even though mental health is becoming a more open issue and more widely discussed, the experience thereof can still feel shameful or intimate. As such, it is designed to be almost completely covered by clothing, as an extension of the user rather than an exterior utility.

The central idea of the Jiminy Cricket is to keep the user aware of aspects of their environment and their health that they tend to filter out. The irony of depression is that the victim oftentimes is hyper-aware of themselves, but shut out the exterior experiences and the world around them. The Jiminy Cricket reminds them of the world around them, or at the very least, their immediate surroundings, in a gentle, suggestion-based way.

The tool itself is a series of sensors and monitors, keeping track of the world around the user. The level of light in front of and around them is monitored, as well as sound and movement. It also tracks the pulse of the user, becoming more aware thereof whenever it drops too low or rises too high. Using these sensors, the tool attempts to figure out what exactly is going on, and gives suggestions based on its findings using a small speaker and a soft-spoken voice.

The relationship between user and device is almost opposite to the standard voice-control of smart home appliances. In a depressed state, no one wants to speak loudly and clearly, or even speak at all. It can easily feel humiliating and/or pointless, and if anything, make matters feel even worse. The Jiminy Cricket is designed to make interaction intuitive and physical for the user, and reach out to them when they might fail to do so. Instead of speaking to the device, the user simply reaches up to a soft pressure pad, placed on their shoulder, and in a movement similar to reaching up and clutching one's trapezius muscle when sore, the user quickly and subtly activates the system. It's a motion that feels personal and natural, rather than flicking a switch or pressing a button on a handheld device - similarly, it is soft to the touch, inviting the sense of warmth and welcome that a binary plastic button lacks. The design is focused on making the user feel like they're calling for help from themselves and from their own body. The user should feel like they're the ones taking action, and that they're the ones fixing the solution, based on data they know but might filter out during the depressive episode.

Sometimes, however, this readiness to ask for help or the thought even occurring is less likely. During these moments, fewer as they hopefully are, the device steps in to take action instead. It does so similarly as to when physically activated, but instead of user input, it bases these interventions on the exceeding of certain thresholds. For example, if the user's pulse speeds up beyond a certain normal level, the tool activates.

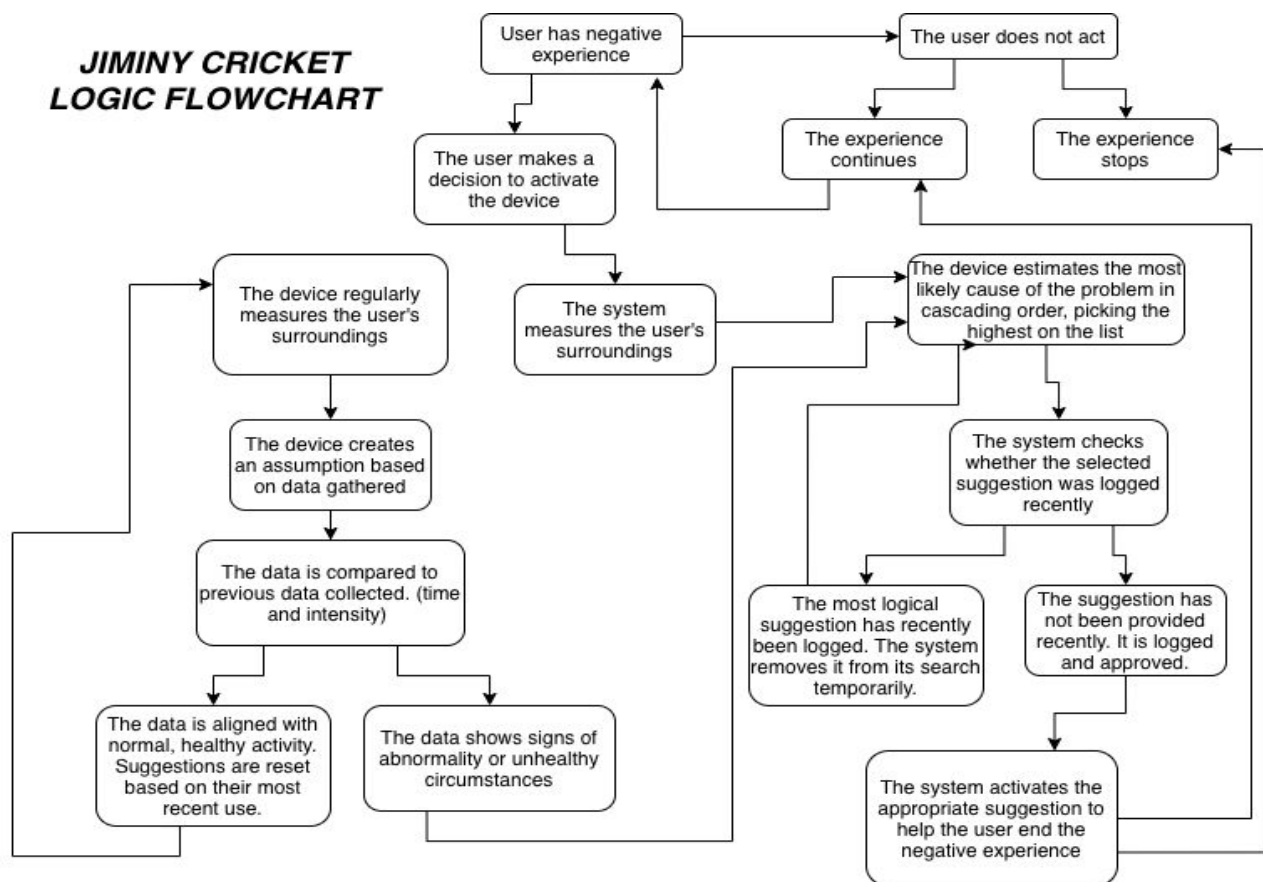
Although the device is worn very close to the body, its design is intended to be non-intrusive. The Jiminy Cricket doesn't have to be placed anywhere, it doesn't have to be checked like a phone or a watch, nor is it constantly visible to the user. Likewise, its user activation is inherently natural and normal to just about any user. For users with impaired limb control or motoric disabilities that would prevent them from touching their shoulder, the pressure pad can be moved to other places that allow for similar natural motion - between one's knees, on the upper chest for chin activation, etc.

This intimacy or simplicity in design exists to empower the user in a position where they feel very little. The device can only assume and make guesses based on estimates - in any single instance of user scenario, the tool can only observe as much as the user potentially could, and with the exception of the user's pulse, oftentimes less. Thus, there is very little in the sense of a power dynamic between the two. The user is always in total control, and never told what to do. The choice to act remains with the user, after consideration of the suggestions of the device.

The choice is meant to be empowering for the user, and give a sense of pride and confidence when they have the ability to act. If the Jiminy Cricket would notice the user is sitting

in a dark room and automatically turn on the lights, the user's pre-existing notions of uselessness or unimportance would only be confirmed - in that case, the user is taken care of and nursed by a computer, and is the passive actor in the interaction.

In this system, the user has two kinds of input - the direct, physical call for help (rubbing the shoulder) and the involuntary, "concern-based" type (Based on sensory input weighed against statistical recommendations, calculated by the device). As such, the user has little variety or control over their input, and the design of the device is to help when that information is unclear to even the user. "I don't know what to do" is key here - the feeling of inability or sense of being lost that is so pervasive in depressive episodes. The sensors of the device are similar to the senses of the user, and effectively assist them in their purpose, but without the dark filter of anxiety and dread that depression adds.



SENSORS:

The Jiminy Cricket is designed to react to things that demonstrably have an impact on human behaviour and mental state. The level of light in a room, for instance, is often a clear indicator on the activity that takes place therein. If the user remains in darkness and silence for a long time, for example, there might be cause for concern or to suggest doing something to change those conditions. While measuring light might be an effective first step, it obviously

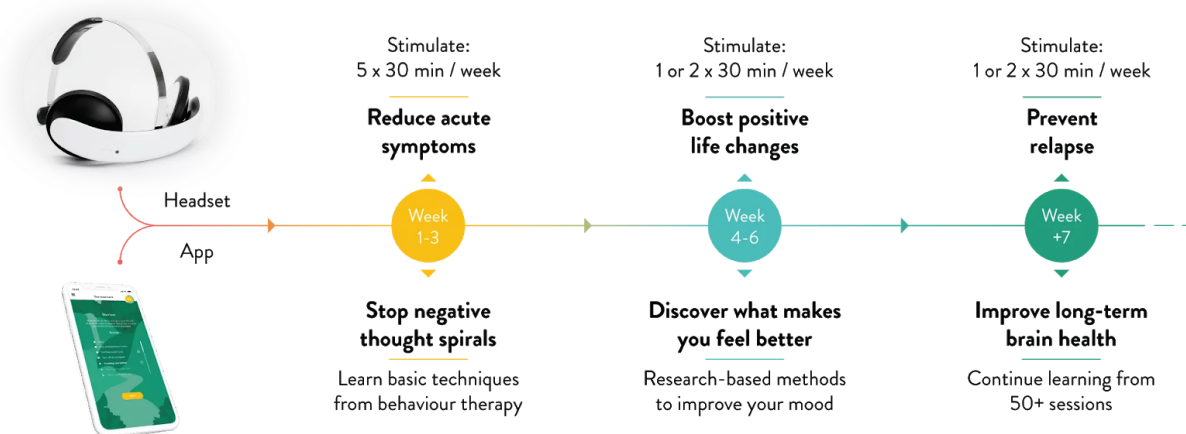
doesn't give us enough to go on - a sensor for the level of sound, similarly, is vital to gauging the amount of activity or life in a room. The estimate system of the Jiminy Cricket, therefore, is highly based on the interconnected data between simple sensors like these. Low light and high sound, for instance, could indicate that the user is listening to/viewing something on a screen. Strong light and low sound could indicate that the user is reading, and so on.

Beyond the two mentioned, the device should also be equipped with the ability to measure the user's heartbeat, for obvious purposes, as well as a motion sensor to check for general movement and activity on the user's behalf. The activation tool, as mentioned, is a pressure sensor; kinesthetic in nature.

With the sensory input of the device covered, the output is a slightly shorter list: a small audio speaker for playing voice lines, a servo for vibration and physical feedback, and three LEDs for visualising certain actions, as well as displaying basic information for the user.

SIMILAR PROJECTS:

Combating depression with technology is becoming increasingly common, and some of the approaches are decidedly higher fidelity than others. One high flyer is the company Flow Neuroscience, whose approach uses a headset to transmit "transcranial Direct Current Stimulation (tDCS)", which the company claims "restores brain activity in the DLPFC and decreases your depressive symptoms". The idea behind the device is that patients suffering from depression were associated with less activity in the frontal parts of the brain, which in turn would/could lead to appetite loss, sleep disturbance, and general low mood. The device stimulates those areas, and with the help of an app released alongside the tool for additional therapy, claims to be able to decrease symptoms and feelings of depression for its users.



Although the flashiest aspect of this process is the headset, it's important to note the importance of the therapy provided by the app; not only does it include virtual the rapy sessions, but also step-by-step directions on improving sleeping habits, the user's diet, and exercise routines. The use of the headset is fairly minimal, on the whole: the first three weeks are prescribed with 7,5 hours use in total, divided into 30 minutes, 5 times a week. The weeks

thereafter feature even less use of the headset, with the recommended amount of use only being 30-60 minutes a week, divided into one or two sessions. The experience with using the device itself is fairly passive - the user sits with the headset on, active, for 30 minutes at a time. The rest of the work has very little to do with technology, except of course that the information is provided through an app.

Another example of technology combating depression is a “Fitbit-like wristband”, developed by scientists at the Toronto-based Centre for Addiction and Mental Health (CAMH). Their device, worn on the user's wrist like a watch, measures physical activity as well as sleep, and, similar to Flow Neuroscience, uses a companion app to track this data, along with social engagement. In addition to the readings, the app prompts the user to keep an e-diary, logging their mood, health, routines and general life events to track changes in their overall wellbeing. The device and its application is designed specifically for teenagers and younger sufferers of depression, which is evident in its connection to smartphones and regular use thereof. It's worth noting that the device itself is hardly unnoticeable, which seems ironic for a demographic where “fitting in” is a fairly common desire.



The device will be used to survey and monitor the moods and mental well-being of teens participating in a study, which is important to note. The device itself does very little but monitor data for external research and study - the effects on the user are fairly minimal. As healthy as monitoring your own physical activity, health and sleep may be, that information is not necessarily applied by the device itself. A depressed person may additionally find it hard to gather the motivation needed to keep said diary, or even filling it in truthfully and regularly. Collecting data is additionally something a lot of people may have issues with, given that normal cell phone usage logs a considerable amount of information as it stands.

Considering the uses of apps in both previous examples, it's worth mentioning the sheer amount of software and apps designed to help fight depression and anxiety. These range from systems based on meditation or mindfulness, such as Headspace and Calm, and health trackers and virtual therapy tools similar to the previous example, like Moodkit.

Like all apps, presentation is key for user retention, and in the case of these apps, that presentation comes in the form of calm audio, bright but not excessive color palettes, and simple and intuitive operation. The drawback, from a technological standpoint, is that they all operate on touchscreen devices such as tablets or smartphones. The experience and its effect is completely dependent on the design and look of the app, with only minor variations in input. Swiping left, right, up and down only offers so much variation, and the object of input is invariably a smooth glass screen. The system being interacted with is a black box - the user doesn't necessarily understand exactly what is going on - and also highly exterior. It is hosted by a physical object that is carried on the users person. From a practical standpoint, a large part of the issue is once more the device that hosts the experience/tool; it is far from exclusive to the app in question. The same phone could very well be another cause of the anxiety the user is trying to combat, and hundreds of other apps, messages and notifications are vying for attention from the user.

The Jiminy Cricket differs from these systems in one major way: its focus on empowering the user. The data tracked by the device isn't simply used for storing or to monitor the health of the user, but is actively applied and used to better the day-to-day experiences of the user. The technology used in Flow Neuroscience's device, additionally, is almost medicative in its usage - taken in doses over a long period of time. It is an exterior tool that demands its own time and place. The Jiminy Cricket, on the other hand, is designed to build confidence and new habits. The suggestions given by the device should, at one point, become almost predictive to the user. This, in turn, gets the user into the mindset of solving their own problems and being aware of the little things they can do to make their condition easier to bear, allowing them to improve their ability to manage the minor details and intricacies of their life more instinctively and confidently. The device should allow for long-lasting changes to how the user goes about their life, creating a healthier and more sustainable approach to the mundane.

Beyond the basic effects and goals of the design, the proposed device is also a lot more personal - both literally and figuratively a closer part of the user's everyday life. Interaction with the Jiminy Cricket itself has far less of an effort threshold than bringing out the Flow Neuroscience headset, or even unlocking your phone, maneuvering past any and all distractions, finding the app, and opening it

EXAMPLES OF USAGE:

Ex.1. The user has been motionless in a dark room for a long period of time. The Jiminy Cricket picks up no sound, ruling out the possibility of the user watching or listening to something. Their pulse has also remained the same, showing no signs of slowing down, and it knows it's currently mid-day; the tool assumes the user is not asleep. Based on this data, the Jiminy Cricket assumes the user is stuck in their own head and may be experiencing a moment of severe depression. It chooses to intervene, gently suggesting the user move their legs, stand for a moment, and/or turn on the light.

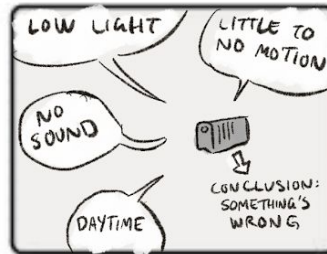
Ex.2. The user feels overwhelmed, on the verge of a panic attack, and calls for help from the Jiminy Cricket by rubbing their shoulder and activating the tool. Similarly to the first example, the tool then uses its sensors to build as comprehensive a situation as possible, and attempts to draw a conclusion from that. Since the user's pulse is quickly rising, the system assumes that something is wrong or something is growing worse. The Jiminy Cricket lights up, softly, and servos within the shoulder part of the tool slowly start to vibrate to suggest a slower breathing pattern for the user to follow. Simultaneously, the light fades in and out to the same rhythm.



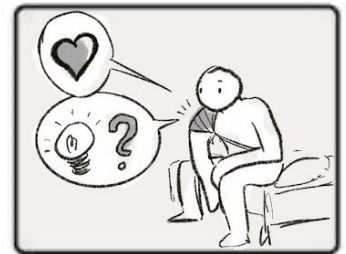
THE DEVICE IS PLACED ON
THE SHOULDER OF THE USER,
CLEARING ROOM FOR THE SENSORS



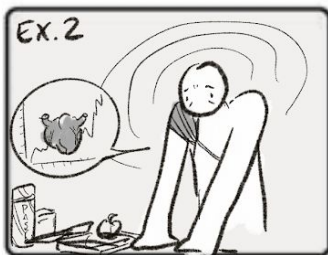
THE USER EXPERIENCES AN
EPISODE OF DEPRESSION. THE
DEVICE MEASURES THE SURROUNDINGS.



THE SENSORS COLLECT
VARIOUS DATA AND FINDS
THE MOST LIKELY SITUATION



USING THE DATA, THE
DEVICE TRIGGERS THE
MOST HELPFUL SUGGESTION
IT CAN FIND



THE USER EXPERIENCES
AN OVERWHELMING NEGATIVE
EMOTION -> HEART RATE SPIKES



THE USER REACHES OUT,
ACTIVATING THE DEVICE AND
SIGNALING THE NEED FOR HELP



THE SENSORS MEASURE THE
MOST LIKELY CAUSE OF DISTRESS,
IN THIS CASE A HIGH HEARTBEAT



THE DEVICE VIBRATES AND
PULSES LIGHT IN SLOW RHYTHM
TO HELP FOCUS BREATHING.

Sources:

<https://www.ctvnews.ca/health/smartphone-psychiatry-how-doctors-are-harnessing-tech-to-fight-depression-anxiety-1.4268392>

<https://flowneuroscience.com/>