Data-based Design Research on Getting up Behavior

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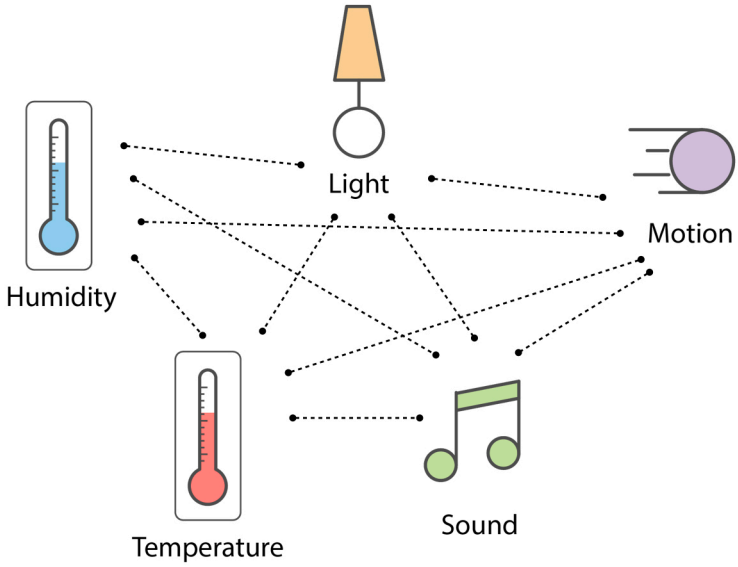
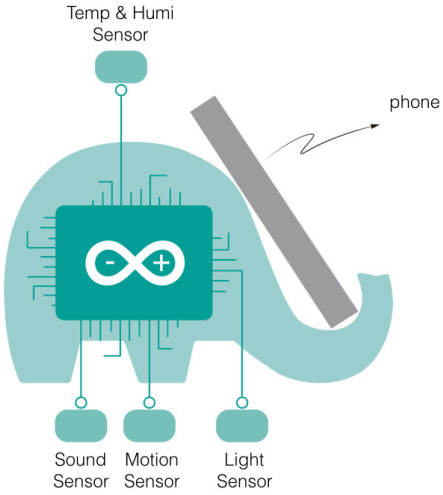
Background

We are curious about user behavior related to getting up in the morning because there are plenty of uncertainties during the half asleep period. We are interested in exploring the environment around the user in the morning, to see whether there are any correlations between different kinds of data, to speculate user behavior.



(Figure 1: correlations between different data)

We used Arduino Yún and four sensors which were Digital Light Sensor, Sound sensor, PIR Motion Sensor and Temperature and Humidity Sensor to collect data. We designed a phone supporter in an elephant shape for user to put his phone on while they are sleeping (shown in figure 2), thus the Sound Sensor was very close to the alarm in the morning. We put our elephant on the bedside cabinet, set the Motion Sensor towards the bed. Therefore, we could speculate whether the user was in bed (shown in figure 3).

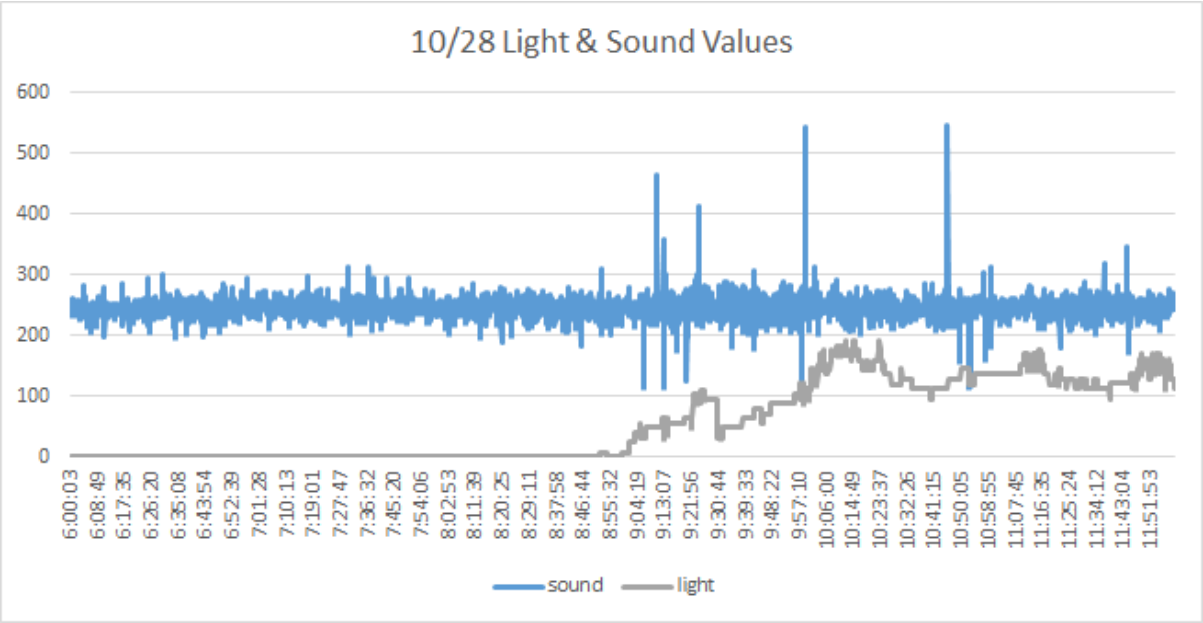


(Figure 2: elephant bug)

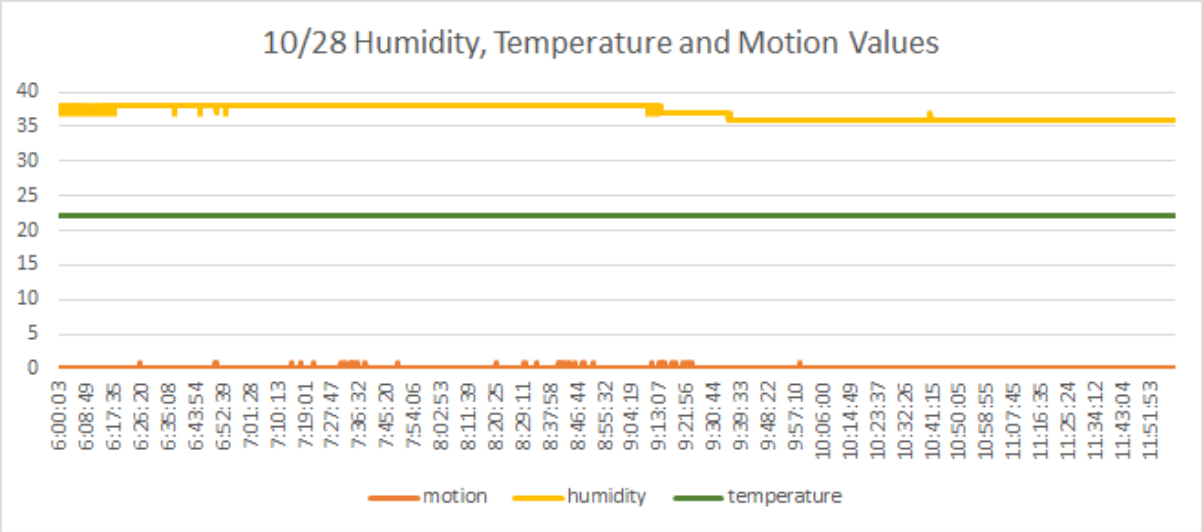
(Figure 3: bug location)

Design Opportunities

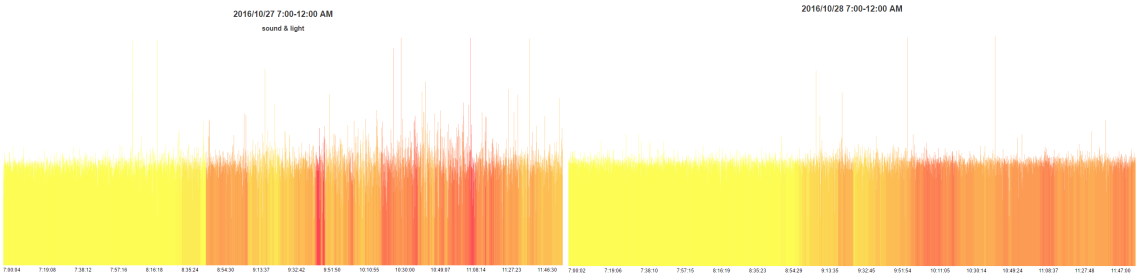
After collecting data for four days, we got our bug back and began to analyze the data in memory card. We found that the temperature and humidity value were almost the same during this period and the motion value was also very easy to get disturbed (shown in figure 4 and 5), so we failed to explore the relationship between waking up behavior and temperature, humidity and motion. We visualized the rest of the data (sound and light value) using D3 library and got one picture of each day, whose x and y axes are accordingly time and sound level, with color filling in the waveform which means the light level (shown in figure 6). The higher the sound curve is, the noisier the environment is; the redder the color is, the lighter the room is.

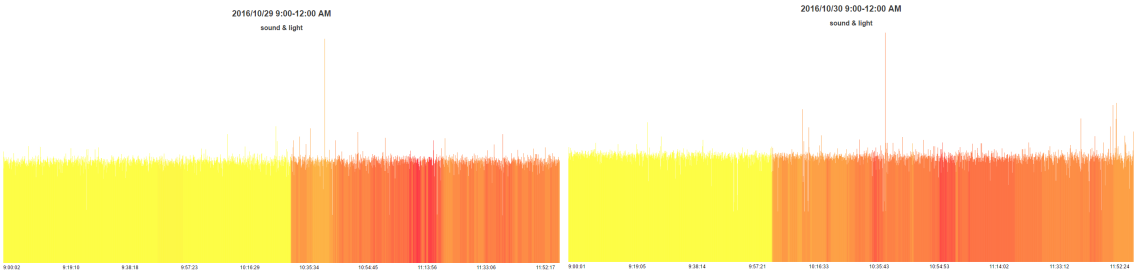


(Figure 4: Initial data visualization of light and sound)



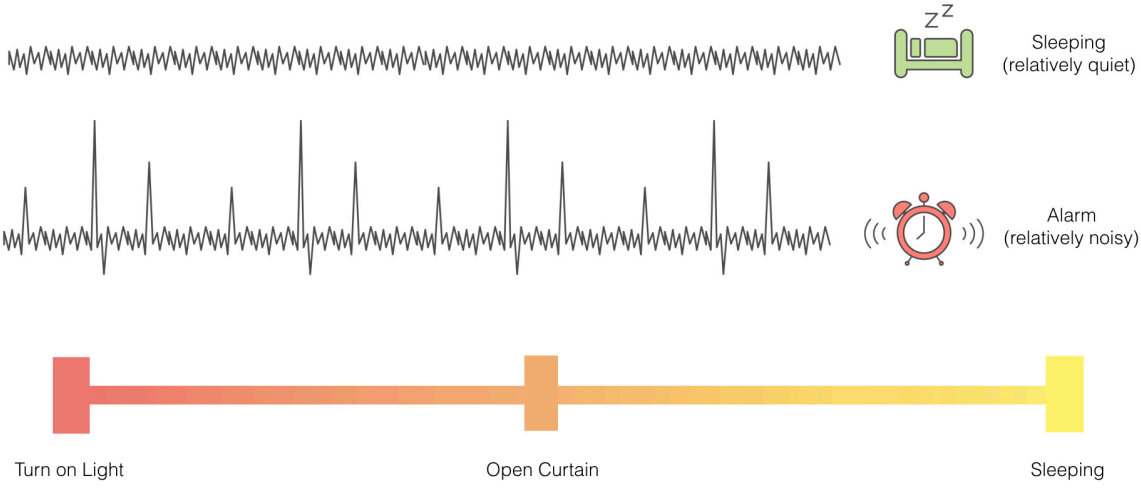
(Figure 5: Initial data visualization of temperature, humidity and motion)





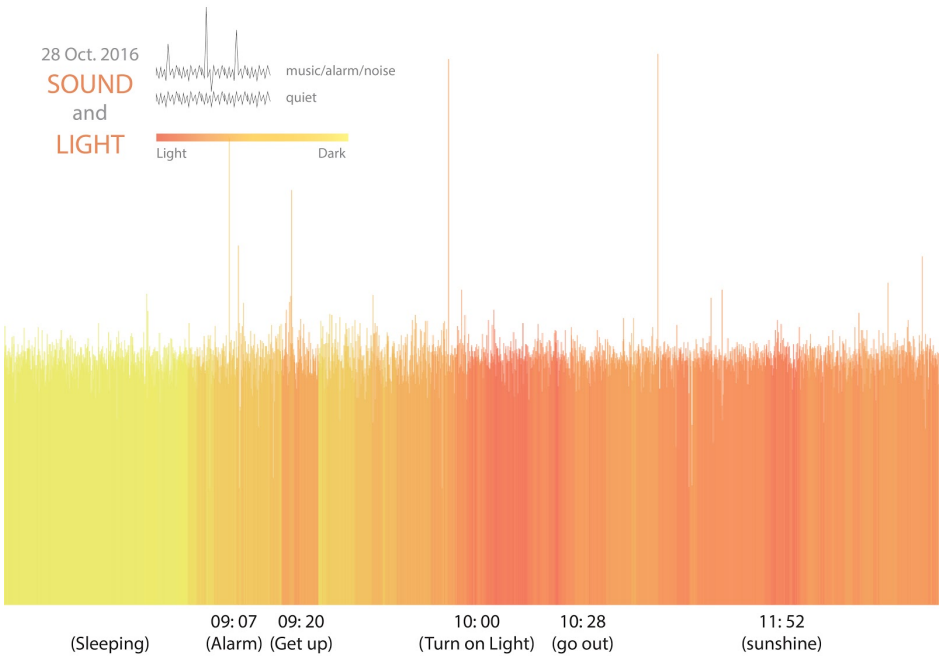
(Figure 6: D3 data visualization)

Although we have got data and visualization, we still can't really understand the relationship between the data and the wake up behavior. Therefore, we did an extra test to find the correlation. We collected light and sound data respectively when sleeping, alarming, opening curtain and turning on light, then visualized the data we got (shown in figure 7).

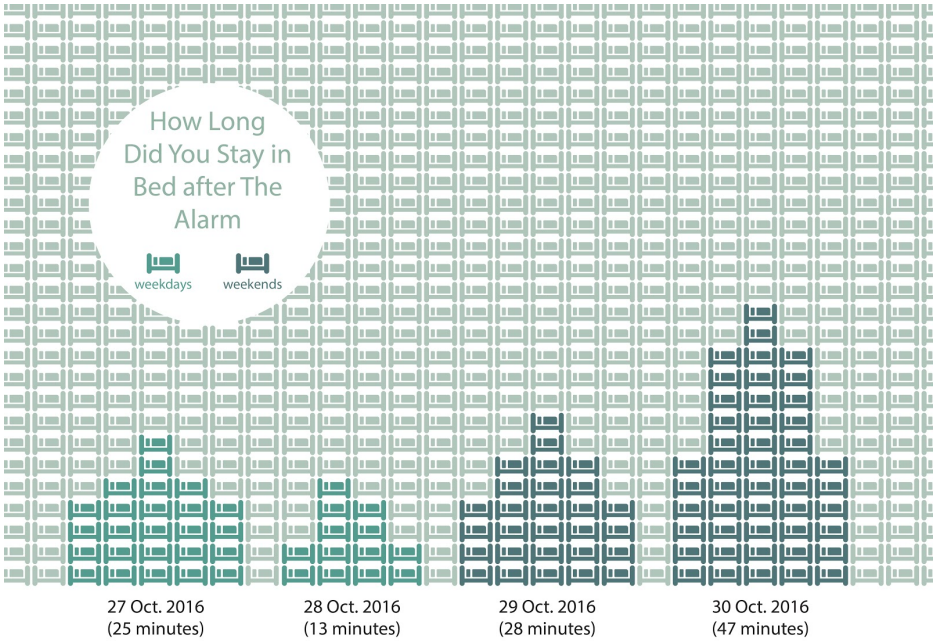


(Figure 7: meaning of the lines and colors)

According to the figure above, we reanalyzed the visualized data (shown in figure 8) and found a gap between the alarm time and the real time to get up. By visualizing the gaps during these four days, we got that the user was obviously struggled to get up every day especially at weekends (shown in figure 9). We decided to go deep in this area and tried to explore the factors which may influence the gaps.



(Figure 8: re-analyzation of the data)



(Figure 9: gap time visualization)

Design method

After interviewing some classmates and reading online resources, we discovered one of the influencing factors is a lack of motivation [1]. When people realize they have a lot of work to do for the day, they tend to stay in bed for a shorter time. This

explains why our data shows the user spent more time staying in bed on weekends than weekdays in a sense.

We tried to use the correlation to create a connection between user and the wake-up service using emotional design method [2]. What we want is not a cold and annoying machine, ringing every morning to pull user back to cruel reality from beautiful dreams. Instead, we prefer to endow the service with emotion, to build an affection bond between our service and user.

We propose to replace the ring of the alarm with a phone call, just like a friend waking you up and helping you start the day in a better mood. Combined with product semantics theory [3], we designed a small robot with a clock head named ‘Tibot’ (shown in figure 10). Its appearance speaks to user directly about its function: it is related to time and it is your friend.

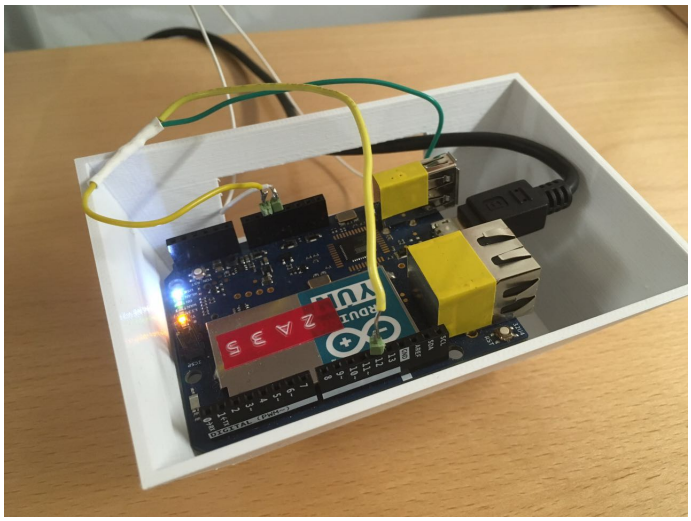
(Figure 10: Product design - Tibot)

The basic use case of Tibot is setting the alarm before sleep and getting a phone call from Tibot next morning which gives you two options - sleep more and get up. The former one means it will call you back after five minutes. However, the Tibot will smartly detect the light value in the room to judge whether you really get up even you choose the latter one. If so, you will also continuously receive the call from it.

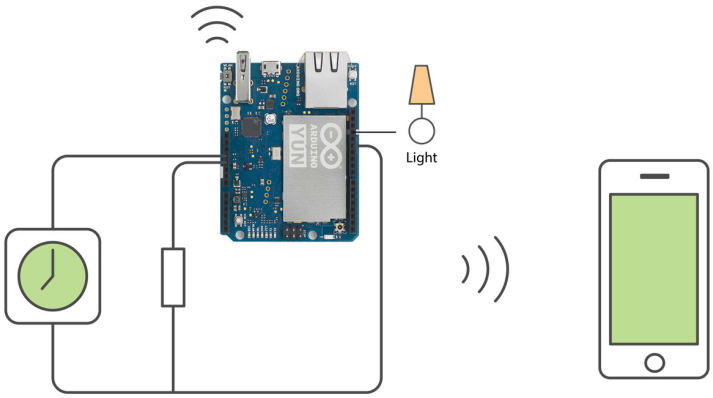
The Tibot can also be connected to Google Calendar to read your timetable, thus enhancing the interaction. The times and frequency of the phone calls depend on whether you are tied up today. At this point, you even don't have to set an alarm before sleep; Tibot will get all the data from the calendar. As weather may affect your getting up time [4], Tibot can get weather information online and smartly arrange your time – calling you ahead of time in case of being late on a rainy day. Tibot can even chat with you just like Siri. If you have problems in getting up, Tibot will keep talking to you until you solve a complex mathematic problem.

Reflections

We intend to collect data about the user's schedule from Google Calendar, but it wasn't implemented successfully because of the failed access to API of Google. We achieved Tibot V1.0 by connecting a clock to Arduino Yún using a circuit [5] (shown in figure 11) and with the help of Temboo [6] and Nexmo platforms [7], we successfully make phone calls to the user (see Figure 12)



(Figure11: circuit between Arduino and clock)



(Figure12: schematic diagram of Tibot V1.0)

References

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[2] Norman D A. Emotional design: Why we love (or hate) everyday things[M]. Basic books, 2005.

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