Assignment M4, Health and Fitness Dashboard

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1 Abstract

Introducing a health/fitness/nutrition dashboard interface for Apple's health monitoring and fitness application to track various human health focused activities including workouts, outdoors, sleep, eating, sitting, breathing and vitals including glucose, blood pressure, BMI, ECG, pulse rate, heart rate, respiration, mindfulness, and mental health. Enhanced Dashboard will help to view customized feed on a different spectrum of users in one touch based on factors, including age, fitness levels, medical conditions, help users to feel comfortable, confident, and motivating to focus on their health and fitness, an ease-of-use interface, guided tutorials, additional health resources, customized nutrition plan.

2 QUALITATIVE EVALUATION, PAPER PROTOTYPE

In the previous assignment M3, the prototyping for health/fitness dashboard had paper, card, and wizard of oz prototypes. Out of these three, I am choosing *paper prototypes* for qualitative evaluation, that emphasizes the totality of a phenomenon.

The dashboard covers different context and different demographics of the user. For this evaluation, the core requirement in choosing users is that they should be interested in tracking their daily fitness, health, and nutrition routine. So, I will try to recruit people with common-interest for in-person and online interviews. The users that would be recruited are divided into two categories which includes fitness enthusiast, and health conscious, and combination of both.

The dashboard would have all three widgets and the most reliable is a fitness enthusiast for evaluating the fitness requirement. Users who heavily tracking heir nutrition would be reliable on evaluating the nutrition widget whereas users who have more technical expertise on medical would be reliable on evaluating the health metrics. This would help in reliability on whether a measure consistently returns the same results for the same phenomenon and precision on the level of details the measure supplies.

2.1 Designing a Qualitative Evaluation

The preliminary step for the interview with each user is to show the low fidelity paper prototype and get a *first copy opinion* on the interface. The opinion doesn't have to be detailed, even a glimpse of the feedback that correlates with the interface envisioned would be satisfactory as a designer for me. Then I would show a live demonstration of the interface of the paper prototype (not a wireframe) to the user explaining briefly and not provide too much detail on how to use the interface. There are three prototypes to show, and the evaluation would be synchronous based on the interview feedback. Think-aloud protocol would be followed to have some discussion with individuals on certain components or tasks inside the widgets. As part of this design exercise, I would get clarity or new scope of requirements on detailing nuances in the interface. I must make sure not to be trapped in a social desirability bias or recall bias while working with different individuals.

2.2 Information on Performing Tasks

- Fitness/health/nutrition dashboard is an enhanced health metrics that would help various health-conscious users to track their everyday routines.
- View Health widget that shows default and highly used metrics like heart rate, respiratory rate, glucose, blood pressure, oxygen saturation, and sleep.
- View Fitness widget that shows essential fitness metrics like steps walked, exercise minutes, calories burnt, active energy, track any sporting activity, workouts, and other outdoor activities.
- View Nutrition widget that shows the calories consumed, protein, fat and carbohydrates content in a pie chart format and water intake by default.
- Eye health, Ear health, breathing exercises are some of the additional metrics that could be added for monitoring.
- Ad-hoc basis metrics can be logged to the system that helps the widget to show data points.
- Metrics components inside each widget can be edited based on the user needs, it varies on individual's focus towards their health and fitness.

2.3 Interview Questions for Evaluation

Below are the questions that would be asked, based on the paper prototype and how that would help in evaluating the requirements and data inventory. The interview would be held for ~30 minutes.

- The placement of the widget for health, fitness, and nutrition by default, does it seem right, or does it need any change?
- How did you like the interface based on the needs of a fitness enthusiast?
- Does the nutrition widget carry all the metrics that would a heavy user look for, is there any other metrics that could be added by default?
- How was the Usability on Edit interface to add/remove a metric component?
- How was the Usability on adding an ad-hoc tracking?
- How do you like the graphical representation of the metrics, does it help understanding the metric or a tool tip would help?
- The interface is meant to be used by accessibility users; do you think it satisfy their needs?
- How satisfied are you overall with the interface on a scale to 1 to 5, 1 being lowest? Based on feedback, ask users on why they did not like the interface, which tasks made the user fall back on the interface?
- Spend last 5 minutes for open discussion on feedback. I must make sure that I don't try to convince the user with my thoughts which would end up in biasing.

2.4 Feedback on Evaluation

Based on the feedback provided by the user, I will go back to the drawing board and try to work on more detailing on the widget to perfection. Consider the points on user satisfaction, the tasks that made user fall back on the interface, get nuances on the usability study for ad-hoc tracking and editing the metrics components inside the widgets. These factors would help in redefine the tasks and help in narrowing the gulf and make interface invisible.

3 EMPIRICAL EVALUATION, WIZARD OF OZ PROTOTYPE

In the previous assignment M3, the prototyping for health/fitness dashboard had paper, card, and wizard of oz prototypes. Out of these three, I am choosing *wizard*

of oz prototype for *empirical evaluation*, that is based on numeric summaries or observations of a phenomenon.

For this dashboard, Wizard of Oz prototype helps in getting metrics or logging data through voice recognition commands. Both these tasks are done through wearables or phone voice commands and the response would be announced over voice and notified on screen. *The point of comparison used are haptic perception*, the tasks performed through touch screen are evaluated empirically through *voice recognition testing*.

Below are examples of the voice commands that a user can prompt to the system,

- "Track current running to fitness log"
- "Add 32 oz of water to today's hydration log"
- "Track swimming exercise for next 30 minutes",
- "Track current workout",
- "What is the number of steps I have walked today",
- "How many hours of active energy",
- "How many calories have I burnt today",
- "What is my heart rate and oxygen level right now",
- "Add 140/80 to today's blood pressure",
- "Add 100 to glucose level for today afternoon",
- "How many hours of sleep I had yesterday"

3.1 Conditions

The voice commands mentioned above can be prompted during different context by the users. The control and experimental conditions would be to listen to the commands at any circumstances or setting, annotate them and respond with feedback. For example, let's assume the interface is designed and being used by a user, they can be running outdoors or driving in a highway or in a concert, still the voice commands should be recognized, and the system should respond with feedback. Similarly, these are voice commands, the accent and dialect would vary based on demographics. The control variables are done in a fixed setting whereas experimental variables force us to transition from well-intentioned, broad yet untestable questions to narrower yet testable questions.

3.2 Dependent variable

Dependent variables are measured human behavior relates to speed and accuracy. The speed would be considered as task completion time, which is the time it takes to receive a command, annotate them, respond back with feedback. The accuracy is how accurate the feedback is, for example, the user asks for a heart rate while running but the interface responds back with calories burnt which is not accurate, these could lead to error rates. In terms of voice command evaluation, action times, reaction times, error rates and throughput can be gauged, and data can be stored.

3.3 Hypothesis Testing

Hypothesis testing is a rigorous process to test if the data allows to conclude a difference exists. Based on the data provided in previous evaluation, the point of comparison with haptic perception would conclude if a difference existed. For example, "open application dashboard" is a simple voice command, this could be recognized easily, and dashboards opens in quick reaction time, the same can be performed quickly with touch screen too, this would lead to *null hypothesis* as there could less data points for proving otherwise. Another example would be a complex command "add 140/70 to blood pressure" by a novice language user, this could have huge variation in time and lead to *alternative hypothesis*, because touch screen can do it quicker.

3.4 Design an Empirical Evaluation

While designing the evaluation, the context of this prototype is voice recognition, so the treatments could be multiple within one group of users. This comparison leads to a *within-subjects design*. The reason behinds this design is to a have a group of users with different demographics and provide different treatments in the voice commands. The treatment would include setting up a control variable like a lab, drive, loud hall, and experimental methods of using the interface through voice command features, the tasks that can be performed like mentioned in description. The tasks within their treatment would include prompting the voice commands, record each user's reaction time, error rates, throughputs, and other metrics. There is different spectrum of users, the data would be collected and evaluated based on their fluency, communication and how good they are in using the interface.

The limitation during needfinding exercise is that the voice recognition could be implemented but can it recognize multiple languages? The user groups would include non-English speaking users for evaluation, this could potentially be a *lurking variable* as interface may not recognize other languages or the user may have different dialect that system is yet to recognize.

3.5 Analysis

Based on the empirical evaluation, the data points can be collected with different treatments provided to the users in the groups with ordinal or nominal tests. The haptic perception can be compared with auditory perception on various statistics using variables like reaction time, action time, error rates, throughput, trials, and success. This would help in understanding how the actions performed through on screen and voice varies and the lack of technology advancements in voice recognition. Complex voice commands are not perfectly executed and the communication barrier in using the interface for voice and other related data points could lead to making improvements in Wizard of Oz prototype with proper background.

4 PREDICTIVE EVALUATION, CARD PROTOTYPE

In the previous assignment M3, the prototyping for health/fitness dashboard had paper, card, and wizard of oz prototypes. Out of these three, I am choosing *card prototypes* for *predictive evaluation*, that is based on systematic application of pre-established principles and heuristics.

4.1 Analysis

The health/fitness/nutrition dashboard is an enhanced interface which has additional widget on viewing metrics. Though, some of the users may be familiar with a similar kind of interface to track fitness and nutrition, due to the layouts and the complexity in different metrics being shown inside the widgets, I would consider users as novice and prefer doing a *cognitive walkthrough of the interface*. Card prototypes shows user what happens when they click on the buttons or metrics icon that shown in the widget and dashboard or scroll down the widgets that would show additional options.

The users that are intended to use this interface are considered truly interested in logging their health, fitness and nutrition and view their metrics frequently. Fitness enthusiast, Nutrition loggers, Health-conscious users are the ones who would engage on more tasks within the interface, the metrics would help them motivated in staying healthy and fit.

4.2 Task Description

Some of the tasks that can be performed on the high level as part of cognitive walkthrough are described below:

- Get to know the interface
  - User would open the application and see the landing page which would be the dashboard.
  - User quickly analyses the dashboard, the widgets and most likely, click on the top which has Medical ID, Emergency Contact and Personal Information.
  - User would try to scroll all the way to the bottom and understands the UX.
  - User would click on any of the icons in the widget and try to explore that.
  - Lastly, User would try to click on Track or Edit buttons to know what those buttons are
- View metrics on health/fitness/nutrition widgets
  - Each of the widget has various metrics that can be viewed. User can task that out to know about their health metrics.
  - Each metric component has a meaning, sometimes novice users cannot understand the icon, so a tooltip could be of help with an exclamatory mark.
  - Health can have heart rate, glucose, etc, Fitness can have calories burnt, exercise minutes, etc., Nutrition can have calories consumed, water intake, etc.,
- Log metrics manually for any of the three widgets
  - User can log metrics on ad-hoc basis when their smart watch missed tracking them.

- Click on Track button will take the widget to a new screen where the user can manually add the metrics in free-form textboxes.
- Edit the metrics components inside a widget based on custom needs
  - Users can customize the view by editing the metrics components. One user would prefer having run in sporting activity and another user can be interested in swimming.
  - Users can customize these metric components by clicking on Edit. Edit would open a new screen and show additional metrics.
- Emergency calling option
  - Call law enforcement authorities or family members in case of emergency
  - Click on Emergency in health card under the interface.

4.3 Goals

As per the evaluation principle, there are no actual users here to evaluate, so the tasks should be on the user's thought process. The goals of the users would be *learnability*, where the users would try to learn the interface by navigating through various screens, *memorability*, where the users would try to memorize the layout of the widgets, haptic perception on scrolling, clicking, and zooming; *satisfaction*, where the users is satisfied with the UX experience on layouts, fonts, buttons, icons, colors, and other usability factors.

4.5 Operators and Actions

The operators that would help in accomplishing the tasks are the interface itself, the metrics icons, Track button, edit button, Emergency call which would help in achieving the tasks through various actions like scrolling, tapping, zooming, and typing.

5 PREPARING TO EXECUTE

Based on the above three evaluation plans, I would like to prepare Qualitative and Predictive evaluation for execution. The reason behind choosing Qualitative, it involves interviewing multiple level of users and I feel they can provide better insight during the interview which would help shape the interface. The feedback from open discussion posts the interview questions would help as well in various

dynamics of the interface. Predictive evaluation on the other hand, thinks the user from my perspective and understand how the user can be trained to narrow the gulf. Both these evaluation executions would lead to biasing which I would be conscious enough to mitigate. Wizard of Oz prototype in the context of the dashboard has a wider scope and good to have feature, so I am eliminating Empirical evaluation.

6 REFERENCES

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