Assignment M5, Health and Fitness Dashboard

Manick Mahalingam (mmahalingam6@gatech.edu)

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 M4, for the qualitative evaluation of a health/fitness dashboard, the paper prototype was chosen.

2.1 Pragmatics

Interview was conducted with 10 different participants with the family, friends, and acquaintances. The interview session was conducted for 20-30 minutes. The 10 participants are categorized with different demographics, including fitness coach, software engineer, a banker, local grocery store staff, elderly neighbor, half-marathon runner, cyclist, two construction workers, and three friends at my gym. Before scheduling the interview, I confirmed with them that they are iPhone and Apple watch users and uses Apple health for monitoring. The introduction part was to ask about their profession, age, gender, level of physical activeness, their fitness regime, nutrition tracking, and health awareness. These questions are framed to baseline a categorization of users. In the next part, I showed the paper prototype (*Appendix 6.1: Health/Fitness Dashboard, Original Design and Appendix 6.2: Health/Fitness Dashboard, Paper Prototype*) and gave a brief explanation of each widget for health, fitness, and nutrition, then, asked a set of questions about the interface which are listed below. Finally, I asked for some open feedback on the

interface, its usability, the time it would take to learn the complete interface, its tasks, and goals.

2.2 Raw Results

The participants have given their thoughts on the interface, the tasks that can be performed using the interface, the data points that are being supplied to the interface, its efficiency and invisibility.

- The placement of the widget for health, fitness, and nutrition by default, does it seem right, or does it need any change? – *When asked about the placement of the widgets in the order Health/Fitness/Nutrition all 10 participants agree with the design unanimously.*
- Does the nutrition widget have sufficient metrics, an user would ask for? – *Most of the participants liked the pie chart view of essential nutrition information like protein, carbohydrates and fat plus the calories consumed and water intake. Three users focusing on nutrition tracking looks for additional metrics like potassium, zinc, and magnesium. Five users like to have a history link to show the past 7 days calories intake.*
- How was the Usability on Edit interface to add/remove a metric component? – *60% participants found the edit interface overwhelming and cumbersome whereas 40% of participants found it useful. 60% participants like to have the metrics organized based on each widget.*
- How do you like the graphical representation of the metrics, does it help understanding the metric or a tool tip would help? – *Most of the participants think adding a tool-tip would be a nice option or showing a name for the metric rather a graphical view would be helpful.*
- How was the usability on adding an ad-hoc tracking? – Participants cannot log the metrics more frequently on an ad-hoc basis, because the interface looks for more detailing and it would be time consuming, 7 participants requested for reminder option and 3 participants requested for voice recognition option.
- Can the interface be used by accessibility users for their tasks and goals? – *Most participants think adding a voice recognition tool would be helpful, but they don't have much idea if the current interface would help them. Elderly neighbor requested for some tutorials to understand the interface.*

Finally, an open discussion session of 3-5 minutes was held with the participants on the feedback and improvements, the participants mentioned about adding improvement to additional metrics because the paper prototype had metrics scattered and needs organization. The goals, tasks and sub-tasks on the interface has their gulfs narrower and it is easier for the participant to understand the interface.

2.3 Analysis

Based on the interview with 10 participants with a different profession and their physical activity level, I feel the base design for this interface is settled with 3 widgets in the order of health, fitness, and nutrition. The participants are clear on their goals, the tasks and sub-tasks that can be performed in the interface. The expected feedback is adding voice recognition option to the interface which could not be focused more during the first iteration of evaluation plan. Accessibility users should benefit more from the interface, so more needfinding and evaluation should be done with that context. Editing an interface having unorganized metric details is due to the fact it is a paper prototype, when it is converted into a wireframe, it would be organized as requested. Adding additional metrics on nutrition like zinc, potassium, magnesium is surprising feedback because, I expected to have the nutritional information limited to three essential nutrition only.

2.4 Prototype Changes

The core interface design with 3 widgets, health, fitness, and nutrition would not involve any changes. As decided in the paper and card prototypes, each widget will have certain metrics by default (explained in a card prototype) which is also settled. But the 'Edit' and 'Track' interface needs some changes because for 'Edit', the additional metrics for each widget is not segregated properly and lead user confusing. For 'Track' interface, efficient way of adding metrics should be analyzed until then a reminder option can be integrated. Voice recognition is a wide spectrum feature which is requested by the participant and that needs more iteration of HCI which needs to be planned.

3 PREDICTIVE EVALUATION, CARD PROTOTYPE

In the previous assignment M4, for the predictive evaluation of a health/fitness dashboard, card prototype was chosen. Since the dashboard has a lot of features to it and it involves a user to use the interface and provide data points to the system, Cognitive Walkthrough was chosen.

3.1 Cognitive Walkthrough: Walkthrough

The health/fitness/nutrition dashboard is an enhanced interface which has additional widget on viewing metrics. To make use of the dashboard in an effective way, the user should be having an apple watch that tracks everything needed for health and fitness metrics. However, for nutrition metrics the user should be logging data manually. There are 3 widgets in the dashboard for health, fitness, and nutrition.

- Health widgets would show default vitals like Heart Rate, Blood Pressure, Glucose, Sleep, Respiratory Rate, Oxygen reading with the option of editing the component and modifying with a different one. The widget would be restricted to 6 components to have better visibility for other two widgets
- Fitness widget would show metrics in graphical format with steps covered, exercise minutes, outdoor activities, cardio fitness, stand hours a day, workout trends with the option of editing the metrics.
- Nutrition widget would show metrics in graphical format, one of the pie charts will show basic nutrition like protein, carbohydrates, and fat. The next pie chart would show calories consumed vs calories target for the day. The next water icon chart shows the water intake for the day. This widget is restricted with only 3 components.
- For all the 3 widgets there are options to edit the component with a different one but restrict to its number of components. Additionally, there is an option to track on individual metrics manually. On top of all the widget would be a small widget with Medical Id, Emergency contact, an Emergency call and Personal Information.

3.2 Cognitive Walkthrough: User Knowledge

Based on the card prototype provided, user would be attentive that there is a dashboard, and it has 3 different widgets for tracking metrics. The titles in each

widget would help user understand metric needs and how they are organized based on their metrics. For example, Health widget having heart rate, fitness widget having steps walked, nutrition widget having calories consumption.

Each widget's components have meaningful names like heart rate, respiratory rate, glucose, oxygen, blood pressure, exercise, naming the outdoor activity, steps walked, exercise minutes, trending charts. For nutrition widget, it has only pie charts, a user will hover over to each of the pie chart to understand the nutrition name whether it is protein, carbohydrates, or fat. The other two charts are self-explanatory for water and calories.

The card prototypes have visual appeal of customized dashboards for fitness enthusiast and people with disabilities. This would help understand the user that the widget can be edited, however, nutrition widget has no change because its components cannot be edited. There are 2 hyperlinks on each widget on the right corner named 'Trac' and 'Edit'. User can click on those two links to explore the other screen.

Clicking on 'Track' would open a new screen. Nutrition would have an option to log food manually with free-form textbox, view calories history and nutrition records up to two years. There is an option to Scan food using a Scan button at the right corner of Log food widget. Fitness would have an option to choose workout plans, other activities like swimming, kayaking, hiking, and sleep tracking metrics. Health would have an option to view medical history, upcoming appointments, history of health check metrics.

Clicking on "Edit" would open the new screen like above. Nutrition widget has less option to edit because of the basic nutrition that are needed are already visible. Fitness would have option to editing metrics, if user wants to see BMI, Fat percentage instead of trend charts, they can do that. Health metrics can have additional metrics like eye health, ear health, breathing patterns, and symptoms which could be added instead of any existing metrics.

Back to the main interface, there are options to make the emergency call or show emergency contact, personal information, and medical id. Any apple user would know that medical id is integrated with their health based on recent studies. The

additional tip can be shown as popup or information tip to wear a smart watch which cannot be explained in a card prototype.

3.3 Cognitive Walkthrough: Design Principles

As per design principles, users can identify the tasks that can be performed in the interface using various usability widgets, clickable hyperlinks and navigation to the next screen. This is a simple step as the cognitive load on this is just to open the interface and the widgets will show and would be stored in user's memory. For the rest of interface knowledge, a user would go through a *predictor model* where the interface would get into the minds of the user to experience it, gather the *usability* metrics (like modifying the widget with different metrics components, manual tracking, logging food, hovering over the nutrition information) and update the interface accordingly. In terms of the *participant model*, the interface can be weighed based on different context like working out, outdoor activities, sitting, walking, driving and more. The *processor model* may not be best of the principle to discuss since the user may not be an expert on the interface yet.

4 EVALUATION SUMMARY

4.1 Summary: Additional Needfinding

Based on the above two evaluation plans and its execution, the prototypes have come up well up to the expectation, however based on feedback from interviews, cognitive walkthrough, there are more improvements that can be done to the prototypes. So, I have decided to do additional needfinding approaches. Some of the needfinding exercise I would be focusing on the next iteration are *interviews, think-aloud and surveys*. Since I have a settled prototype and areas of improvement, I can use the same for the next needfinding exercises, frame questions based on the improvement of prototypes for interviews and surveys, request for feedback from different demographics of users using think-aloud and post-event protocol.

Health widget currently has 6 metrics by default which can be customized by the user based on their need, but with additional surveys, the default metrics can be pre-loaded based on their age and other preferences. Fitness widget can have additional links for history of trends in calories burnt or physical activities. Nutrition widget has 3 metrics by default, this can be enhanced with additional

metrics on other nutrition information like sodium, potassium, zinc and more. Nutritional tips can be added underneath the widgets for staying on a healthy diet. A special widget can be added for accessibility users for sickness monitor, fall risks, reminders and more.

During this needfinding exercises, I will try to recruit people from different demographics and profession show them the *paper, a wizard of oz and card prototypes* and come back with opinions. Again, biasing would be avoided based on open discussion questions on interaction with test users.

4.2 Summary: Design Alternatives

Once the needfinding exercises are completed, I would envision on getting inputs from different demographics of users. The core interface would stay the same because there is a certain set of cognition and invisibility established with the user on looking into the prototypes, so additional design changes within widget are expected like re-arranging the metrics icons, their color, icon style, external links, default metrics based on preferences. One of the major additions, I would be thinking is to add voice recognition within the interface. During the first iteration, it was not feasible as the design and prototypes were not settled, since I have room for it now, that would one of the new designs that can be thought through.

4.3 Summary: Prototypes

Based on the current paper and card prototypes, with the needfinding execution on interviews, surveys, and think-aloud protocol with different demographics of the user, I can design *wireframes* which would mimic the walkthrough of interface. The wireframes can be designed for a common set of users to get a better visibility on the interface, and it would be designed for multiple tasks that can be performed and evaluated in the next step. For voice recognition, I will enhance some of the phrases that are used as part of the *Wizard of Oz* prototype in Assignment M3.

4.4 Summary: New Evaluations

During the previous iteration, qualitative evaluation and predictive evaluation was executed. For this iteration, I will use a *Wizard of Oz* prototype for *qualitative evaluation* by having surveys or interviews. This will help to identify various voice commands a user would try to use, their demographics, context, and linguistic
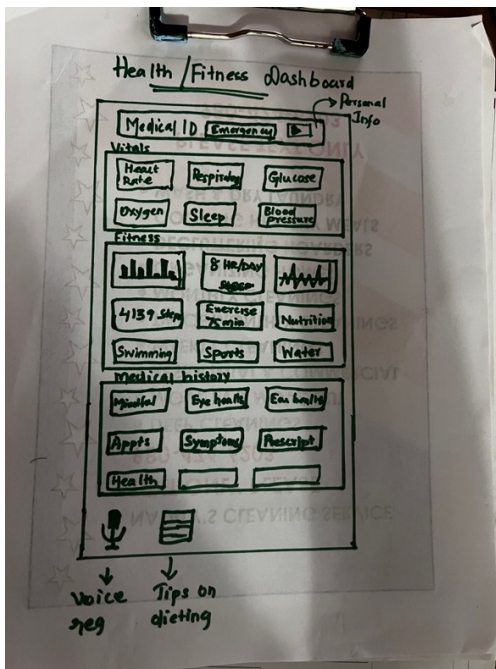
abilities. For *wireframes* prototype, I can use *predictive evaluation* by designing GOMS model which gives efficient understanding for a user with a pictorial representation of goals, operators, methods, and selection rules. This would be more than one GOMS model based on health, fitness, and nutrition widget in the interface.

5 REFERENCES

1. https://www.apple.com/ios/health/
2. https://www.apple.com/apple-fitness-plus/
3. Reference to prototype available in previous M3 assignment submission, https://gatech.instructure.com/courses/274818/assignments/1163586/submissions/1108094?download=35861977

6 APPENDICES

Appendix 6.1: Health/Fitness Dashboard, Original Design

Appendix 6.2: Health/Fitness Dashboard, Paper Prototype

Nutrition Widget   Tips for Dieting.

* adding nutrition information

* show Protein, carbs, fat intake.

* show calories consumed.

* Hydration level.

Elderly sickness

ECG
fall risk
Emergency Calls.

manual labor   Fitness dashboard

fall risk
hydration
heart rate
alerts

Exercise   Walking
Minutes   Steps

Bank| IT
* Walk
* Meditate
* Alerts

Workout Plans.

Swimming laps

Running/Walking.

Additional
metrics

| Fat % | Eye |

Health Widget.

Basic.

| ♡ | BP | Glucose | O₂ |

Additional

| Resp | Cardio | Temp | Active ♡ |

| LDL | HDL | Creatine | Adair Glucose |

Use Soft Colors

Sleep tracking. ▼

Movements in sleep.