Fitlody – Generating Music and Images by Exercising

Physical Computing & Interaction Design Studio

Team X

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Team Domain

After a semester's experience with the Physical Computing Project, we have learned a lot from the course and the teaching team. Obviously, this year is a great change compared to previous years, due to COVID-19. We met a lot of difficulties, as everyone does. Luckily, we overcome these complex situations with team cooperation and the teaching team's support.

The domain of our project is musical metrics. Based on this domain, we designed and produced a digital device which could generate the images and music by collecting the data from the users themself when they are exercising on it.

According to the domain of musical metrics, we hope to use a non-instrumental way to let users enjoy music. After conducting the user research, we found that most people have the habit of listening to music during exercise. Moreover, after reading the literature, we found that music can promote people to do more exercise. Therefore, to increase people's interest in sports, we decided to design an interactive device where music can be created by users themselves. At the beginning, we hoped that this device could be placed in a public space. By coincidence, our team's domain quite matches the lockdown cases, while outdoor activities are not encouraged. So, we focused on indoor exercise motivation and brought joyful elements to our project. During the lockdown period, people spend less time on activities. We believe that placing it at home is more conducive to people's continued exercise to maintain their health.

Individual Work

Under this domain, our team had a clear task division, Peiquan personal focus is collecting data through multiple sensors, these data will transfer to Tianyi. Shane's work was to design and produce all the content related to visual images. At first, in the initial idea of the project, visual images were not the key research direction of our project. However, we interviewed some users who own the Nintendo Ring Fitness Adventure and found that the rich visual factors have greatly increased the user's interest in sports. Through the feedback of the first prototype, users believe that LED strips and the patterns in unity were important factors for attracting users in this project. So, in the result, Shane successfully used Unity to draw dynamic patterns and controlled by pressure sensors. The color of the LED light will also change according to the pressure sensor.

Project Reflection

In the project, we explored the relationship between music, images, and sports. We found that in different sports, different music effects will bring different feelings to users. How to choose suitable music and images for specific sports is a problem that needs more in-depth research. If there is an opportunity, we hope to add more optional patterns and music to this project. Our project is fulfilled by connecting data input, data processing, and data output together to form a closed loop. During the exploration of the project, we learned about psychology, kinematics, and circuit-related knowledge to provide assistance for group projects. After a semester's cooperation, we found ourselves supporting each other well by connecting each part smoothly and collaboratively and fixing some small issues with tutor's help. We are promoted to use those online tools that we barely used before like Zoom and Miro board and found them quite useful, surprisingly. Obviously, COVID-19 will change our lifestyle and these tools could help us to connect with each other regardless of physical locations. Also, we think working well with the team is vital in a studio course, our team members achieved this goal in this semester as we respect each one's thoughts, listen patiently and feel free to express our initial thoughts while discussing issues.

We got a lot of feedback from our user that have a deep influence on our final product during different stages of our design process. After the team project proposal, we received feedback that suggest us to pay more efforts on how our product motivate the user on exercising, therefore we did furthermore domain research on the relationship between people's motivation on persist in keeping fit. There were also very detailed comments suggesting us to make the music jump in progressively. We were very agreed with the idea because it's quite similar with the rewards system in gaming where user get rewards after accomplishing certain achievements. The influence of these feedback embodied in our later iterations.

For the music aspects, at the early stages of the design process, we plan to make our approach on two attributes we defined for music, which is the rhythm and melody. Specifically, rhythm refers to focusing on each beat made by the user and convert it into tempos, and melody refers to look down to the specific reading from the sensor and match it with different pitches. So, in the first iteration, we tried to separate the rhythmic and melodic music and matched them with different types of exercises. However, the feedback showed that the melodic feedback was much harder for user to sense and understand, especially when they could only watch the demo video instead of actually standing on it. We also receive feedback from tutor saying that we need to be more focus on the relationship between the data and the output. Considering

we were also expecting our feedback promote the user's motivation, and we need to have our user easily understand the output from the device, we decided to focus on "rhythm" only to ensure that the concept "music create from data" is emphasized, but with some physical and technical design we could also maintain the completion and quality of our outputs.

Many User also expected our product to somehow guide their exercising. At the beginning we did not quite understand the idea, because we stuck in a thought that if the music is coming from the user, it could not back to influence the user. As the design process went further, we realize that we could have our design in some way adjust user's exercising. The music is generating from user's data, the user has to adjust their pace of actions to keep the music playing steadily and enjoyable. These features could sure expand the prospect of our concept.

Outcomes

After the final product was built, we have achieved most of the intended concept, mostly by translating the physical variable pressure into music, and users can instantly "hear" the efforts they have put on exercising. The interactions including music and dynamic patterns are fulfilled, and LED strips are included to enhance users' perception. Though vibration is considered less obvious, so we did not include that feature in the final product. What we did not achieve, compared to the ideal concept, is that the mat can only hold one person's weight rather than multiple people, thus, lower the social interactions. Also, the overall look of the mat is still rough and not flexible enough to carry around, and aesthetic design still needs to be improved to provide a good-looking packaged product. One of the regrets is that we didn't have time to purchase a larger pressure sensor, so the activated area on the mat is limited and thus, lowers sensitivity. If the time was allowed for shipping, we will overcome this.

Overall, our project succeeds in bringing joyful experiences in fitness exercise by involving instant gratification and additional playful interactions and thus, promote people to keep fit through exercising. Our team is satisfied with the final product and its outcome. We involved a small scale of users to test our final product and they enjoyed playing with this device and had fun, mostly from the interactions with dynamic music which attracted their attention. However, under the restrictions of a pandemic, we think the biggest problem is that it is difficult for us to find a suitable time and place to work together. When we encounter problems, we cannot get help from tutors' face in face. More importantly, it is even difficult for us to find users to test our devices. These unfavorable factors have reduced the efficiency of our production projects. As a result, we did a lot of useless work. If we can make it again, we will spend more time communicating with tutors to find better solutions. Of course, there

is still a lot of space for improvements for this product, our team will keep working on that in the future. Our design could also lead to further exploration focusing on motivations, data translation and guidance to the user.