Design Proposal: BeatBox

An active lifestyle can efficiently promote mental and physical health. However, due to the widespread popularity of social media and other distractions, people are embracing the sedentary lifestyle. According to WHO [1], more than 80% of adolescents and 27% of adults do not meet the recommended levels of physical activity. Therefore, this severe situation demands an innovative approach. Since traditional motivations are not sufficient to counter the temptation of the phone, the idea of “BeatBox” emerged. “BeatBox” is a revolutionary gadget that aids the boxing sport. Not only does it keep people engaged in the activity, but it also infuses the melodic rhythm into everyday life. The device targets the most critical obstacle that keeps people, especially those under 25 years old, away from being physically active: lack of motivation and discipline [2]. It is the infusion of fitness and music which helps users find their motivation to stay active.

BeatBox is a boxing gadget which consists of an Arduino Nano, a CMS-28528N-L152B speaker, a breadboard, a button and a light-emitting diode (LED). BeatBox's compactness is a crucial feature: all the components are plugged onto a breadboard and can be fit in a 84x56x30 box. Additionally, the product does not hinder the user's comfort in movement because it was equiped with Arduino Nano with the dimension of 18x45 mm and the weigh of 7g [3].

Each gadget is equiped with an ADXL335 accelerometer, a sensor that detects acceleration. After a user's punch, this sensor is activated, thus prompting the gadget to produce a melodic note in response to the motion. The sequence of played notes is harmonized into a song; hence, users can compose melodies, turning every interaction into a musical masterpiece. There will be 10 songs in the memory of the device and the user can use a button to switch between them. To further extend its user friendliness, the design is equiped with a Mini-B USB connector port. It is a small USB port for various devices, for examples, cameras and controllers. In this product, it helps users import songs into the device, expanding their workout song selection and keeping the experience fresh and exciting.

Beatbox can assess statistics, thus evaluating users’ improvement. The product is equipped with advanced technology to calculate the acceleration (the rate of change of velocity per unit of time) of each punch by measuring user’s hand position every 400 miliseconds, then storing them in a collection. Acceleration is an important factor in calculating force, according to Newton’s laws of Motion [4]. In addition to measuring velocity, BeatBox includes a punch counter which counts the

number of punches thrown within a minute. This feature allows users to track their punch frequency and set goals for improvement. The feedback provided by BeatBox enables users to make informed decisions about their training routine, fostering a sense of achievement and progress.

To conclude, modern distractions poses a serious threat to physical well-being. The revolutionary idea of “BeatBox” emerges to fulfill the need for an innovative solution by combining fitness and music. Its compact design with the ability to harmonize punches together with user-friendly features, namely song import and statistics reporting, makes the device a potential game changer. By turning every workout session into a music journey, BeatBox tackles the alarming problem of lacking motivation and discipline. With the combination of music and health by using technology, BeatBox might not be the prioneer, but it will stand out among products in the same category.

Reference

[1] “The Global Status Report on physical activity 2022,” World Health Organization, https://www.who.int/teams/health-promotion/physical-activity/global-status-report-on-physical-activity-2022 (accessed Nov. 13, 2023).

[2] A. Baillot et al., “Physical activity motives, barriers, and preferences in people with obesity: A systematic review,” PloS one, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8221526/ (accessed Dec. 6, 2023).

[3] “Arduino Nano,” Arduino Official Store, https://store.arduino.cc/products/arduino-nano (accessed Nov. 13, 2023).

[4] “Newton’s laws of Motion,” Wikipedia, https://en.wikipedia.org/wiki/Newton%27s_laws_of_motion (accessed Nov. 13, 2023).