Development of Physical Fitness System for Mobile Applications

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Abstract—**Physical Fitness is now considered as an important indicator for telling a human's health status. In order to improve physical fitness, this study will create a physical fitness system. The system will match a user's personal information and habit of exercising to the database and give the user suggestions accordingly, which let the users choose a type of exercise with a recommended duration and intensity that is suitable for him/her.**

To set up the database, a questionnaire was applied to collect personal information and related data, including their habit of exercising and their physical fitness test scores. The participants are the students in National Chung Hsing University. After the data was collected, it was analyzed to retrieve useful information. By this way we can learn the interrelations between the personal information and the related data including the type of exercise they choose, exercise duration, exercise intensity, and performance of physical fitness. After the database was set up, we will set a range of difference tolerance and suggest each user the type of exercise that is suitable for him/her including duration and intensity of the exercise based on his/her personal condition.

A user can follow the suggestion to exercise and check their physical fitness status periodically. In this way the user may understand if his/her Physical Fitness has improved and adjust the settings accordingly to expect further improvement of their Physical Fitness.

1. INTRODUCTION

Due to the improvement of technology, a lot of daily activities are finished by machine to rather than man power, so people's daily physical activities decreased gradually. If people don't exercise regularly their body conditions might decline faster than they thought. In modern society, most of people do not aware of food consumption problems. Under the condition of over nutrition and nutrient imbalance, their health conditions become worse easily. Chronic illness can become the biggest threat to their health.

According to website of the Sports Administration, Ministry of Education department of Taiwan, Physical Fitness can be seen as a comprehensive capability of how a body adapts to its living, moving and environment, such as the factor of temperature, climate change, or virus, which shows the importance of Physical Fitness.

Healthy body is the key to a wonderful life. Physical fitness is considered as an important indicator that tells a human is healthy or not. Having good physical fitness can help a person in all the occasions of life, work, and emotion.

To conclude, this study expects to establish a physical fitness system to provide personalized functions that help people to improve their physical fitness and keep their physical health.

2. PAGE LAYOUT

System guide

The purpose of this system is to establish personalized functions to help the users have regular exercise. It can decrease their frequencies of ill and successfully help them to have a healthier body.

The system will firstly have the database built up and according to the users' exercise habit, give the users suggestions about the exercises with durations and intensities that fit their conditions to help them improve their physical fitness. The system also allows the users to record their exercise conditions. Then the users may check their physical fitness performance regularly to understand if their physical fitness have improved. Chart 1 is the system architecture diagram. A questionnaires was applied to set up the database, which details will be described in 2.3

Functions of the system include data setting (account register), goal setting, exercise type setting, exercise record, physical fitness test scores entering, reset of the system, and system guide. (Fig. 1)

• data setting (account register)：

In the beginning, in order to give suggestions to the users, the system have to know the users' basic physical condition. New users have to register before they start using this system. System will request the users to provide their personal information and recent Physical Fitness test scores.

Data that the users need to provide include personal information and recent physical fitness test scores. Personal information includes account ID, gender, birthday, and the users' height and weight. According to this information that the users provided, the system will also come up with the users' ages and BMIs. Physical fitness test scores include flexibility (Classical V-shape sit and reach test, CV-SR), muscular endurance (60 second sit up test), explosive power test (standing long jump), and cardio-respiratory endurance test (Distance Races 800 or 1600 Meters).

• goal setting：

In this function the users can set their own goals on every Physical Fitness score. The system will give the users a suggested average and high average scores for each kinds of physical fitness test. These suggested scores are given base on the personal info that the users provided and reference from the data publish by Taiwan Minister of Education. The purpose of these scores is to help the users to set a goal they want to achieve.

Columns in this function include the start date, deadline, the goal they want to achieve, and the suggested scores that system provided (Both the goal and the system suggested scores include

flexibility, muscular endurance, explosive power test, and cardio-respiratory endurance test.

• Exercise type setting：

In this function the users are able to set the types of exercise they want. The system will provide suggestions to the users according to their personal information in addition to the matched data that were collected from the questionnaire and filtered with different searching conditions. The suggestions include exercise type, recommended periods of days, recommended periods of time, and recommended exercise intensity.

Search conditions include matched Physical Fitness test score, same gender, less than one centimeter difference in height, BMI difference less than one, and same age. The users may pick up their preferred types of exercise from what the system recommended. This way may increase the users' willingness to continue exercising. The users may also set the day period, time period, and intensity according to what the system recommended.

Columns of this function include the start date, deadline, expected exercise frequency per week, expected time period of each exercising(around 30 minutes, around 60 minutes, around 90 minutes, or around 120 minutes), expected exercise intensity(barely puffed, somehow puffed, puffed, very puffed。

• Exercise record：

After exercising, the users can record related information according to their workout conditions. The system allows the users to check their history records and understand their exercise conditions and make sure if they have followed the settings they expected to exercise. The system will also calculate their reaching rate, finish rate and goal achieving rate according to their exercise records to help them understand their exercise conditions.

Reaching rate= frequency of exercising this week/expected frequency of exercising per week

Finish rate= (actual exercise time/exercise time that the users expected to reach) + (actual exercise intensity/exercise intensity that the user expected to reach)

Goal achieve rate= actual times the users exercised form the start day to the deadline/the expect times of exercise that the users expected to reach)

Columns of this function include actual type of exercise, exercise date, exercise period(around 30 minutes, around 60 minutes, around 90 minutes, or around 120 minutes), actual exercise intensity (barely puffed, somehow puffed, puffed, very puffed).

• Physical Fitness test scores entering：

In order to check the users' exercise results, this function allows the users to enter their physical fitness test scores.

The system suggests the users to do physical fitness test and type in the scores periodically (recommended once per 30 days). These physical fitness test scores can help the users to observe their exercise conditions periodically and know if their physical fitness have improved.

Columns of this function include test date, flexibility score, muscular endurance score, explosive power test score, and cardio-respiratory endurance test score.

• Reset of the System：

The users can eliminate all the data by using this function.

• System guide：

Provide details about how to use each function of this system, which helps the users to use this system.

3 Questionnaire detail

To provide Physical Fitness suggestions to the users, a questionnaire was applied in this study to collect personal information and relative data including physical fitness test scores of the respondents from the students in National Chung Hsing University. By analysing the questionnaire, the interrelations among Physical Fitness, exercise, and the exercisers will be found out. The system also gives recommendation based on this information.

Items of the questionnaire include gender, date of birth, frequency of exercise per week, average exercise intensity, and types of exercise.

4. Conclusion

This system established web mobile system due to the ubiquity of mobile devices in today's society. The users can access this system easily through their smart phones, which convenience may increase their willingness to continue exercising. Besides, this system expects to help the users to improve their physical fitness and keep their physical health.

However this study only collects data from the students in National Chung Hsing University. The age distribution is therefore limited between 18 to 25. If the questionnaire can be collected from different a wider distribution of ages, suggestions made by the system will be more accurate and suitable for the needs of the users.

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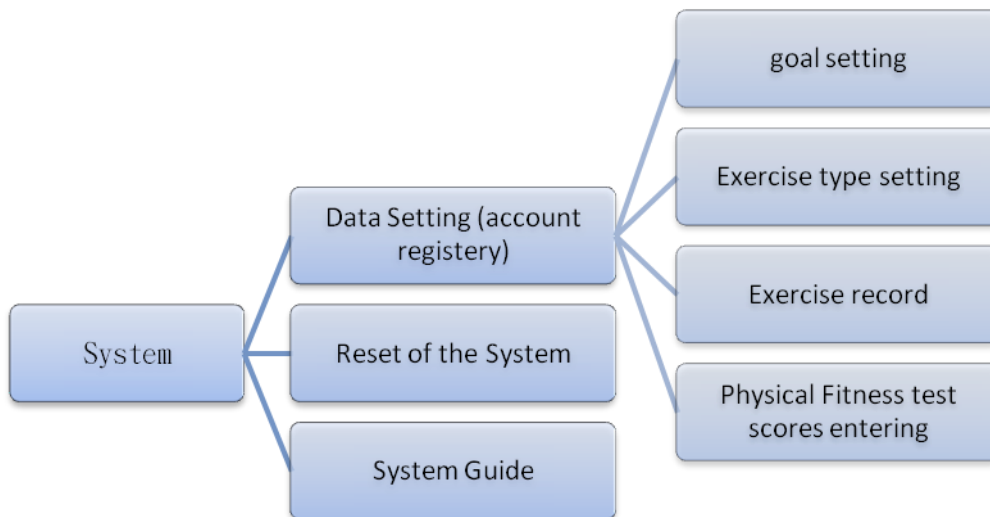7. U.S. Department of Health & Human Services(2022), *Physical Activity Fundamental To Preventing Disease*, Research Report

Fig. 2 System Architecture