



Human Benchmark

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Abstract : *In market, there are numerous software that are capable of benchmarking or gauging your computer hardware, mobile devices, electronics and all the gadgets pretty efficiently. But no one stops and wonders about the physical aspects. No way to benchmark them. The part that helps us exist, mental and physical attributes. All of this is because to implement them a lot of variables and parameters have to be considered and there hasn't been a single way to implement them seamlessly. The society that we live in has deemed these factors invaluable or something which takes lower precedence over other things. This is what our application is built upon. To work around this issue and provide a platform to overcome this individuality and provide a fresh perspective.*

I. INTRODUCTION

Human Benchmarking is a platform which deals with a human's mental and physical attributes. It provides a steady platform to test your mental and physical capabilities. As time passed on, people started to prioritize other things over their own health. The human body has been neglected for a long time and there's no application which is capable enough to fix that problem. This application takes in multiple factors, cross references them and puts out a desired output for the user. Once implemented successfully, it can change the way we look at these factors and it'll shine a new light to how we view our human body. It can be used to improve our characteristics, brush up on one's abilities and even used in medical fields. People with certain medical conditions can benefit from this platform. The purpose of this application to provide a platform which has the ability to work with multiple factors, take them into consideration and use the user data proficiently.

II. RELATED WORK

Upon analyzing multiple charts and diagrams to find the BMI of a human body it became clear that the actual classification system is misleading when mortality rates are taken into consideration. Considering that, the need to monitor BMI becomes a necessity [1]. After referring this paper, it became clear that the visible mass a human body is different to the actual percentage on paper. After looking at a study with over 5900 images of 2950 subjects the accuracy drops down to less than 30% [2].

Research showed that the idea of calculating body mass using just a few pictures of a human body is not far. The data gathered during the research was promising confirming the aforementioned idea [3]. A human brain cross references all the data that it has been given, analyzes it, checks with the past experiences and then it works on it. But due to all this the capacity of the human brain to take in new information drops down marginally after a certain amount of time. [4].

Papers also proved that any kind of change in the emotional state affects the attention and memory part of the brain. The stimuli of the body changes with respect to the emotions in the amygdala [5]. Considering the time constraints that it takes to store memory; OMCL is proposed with a Phase shift mechanism. Just doing this increases the performance by 86.1% but it also hampers the life of the system by a miniscule 3.4% [6].

Looking at the study from thousands of neuroimaging scans it became clear that the frontal lobe is the same in short term and long-term retrieval. The precognition task takes place at the same part of the brain and it becomes easier to retrieve information from the prefrontal cortex [7].

III. PROPOSED METHODOLOGY

The application currently has four different working modules that work seamlessly with each other to provide a result with sufficient user data. The modules are as follows,

3.1 REACTION TIME (RT)

This module puts forth multiple reaction-based problems in front of the user and takes in the time it takes for the user to complete those tasks. Firstly, as soon as the user clicks on the module a task pops up on the screen and a counter is started which records the stimulus of the user. This record consists of multiple tasks that are taken into consideration at the same time. As soon as the user completes one task, the counter is stopped and a new counter is generated. Meanwhile, the system takes out any delay caused by the onboard peripherals and software and puts forth a proper average of the user's reaction time by calculating its mean and displaying the obtained stimulus. This data is then recorded in the database for further usage by the user or the application. The tasks assigned are versatile and have multiple variables to have an accurate measurement of the reaction time of the user.

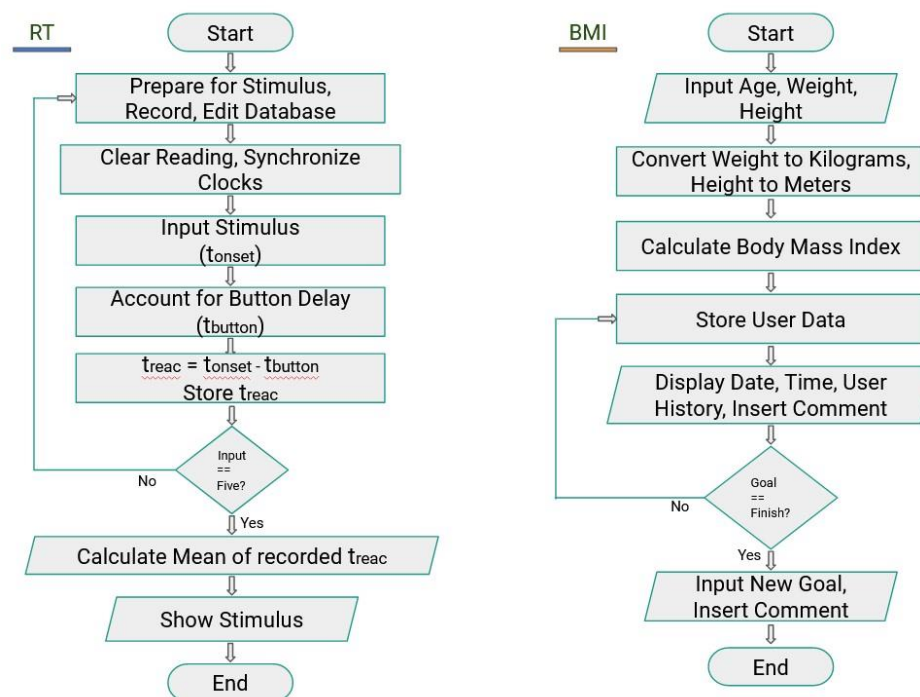


Fig. 1 – flowchart for reaction time and bmi

3.2 BODY MASS INDEX (BMI)

This module takes in user's body parameters and calculates BMI of the user. BMI indicates if the particular individual is healthy and of good body weight. Based on the reading that is calculated using the user's data, if the user is underweight, overweight or healthy it displays a user specific dialogue. For example, if the user is underweighted, he/she will be recommended to eat more, work out and increase their overall calorie intake. These BMI recordings are kept in a database so that it can be used later on by the application or by the user.

3.3 SEQUENTIAL MEMORY (MA)

This module works to develop the Hippocampus. As soon as the user clicks on the module, a pattern is displayed with multiple counters such as stages, number of attempts, number of failed tries etc. This module is designed in the form of a game to keep the user intrigued and hooked to develop their Hippocampus. If the user, remembers the sequence correctly an even more difficult sequence is then displayed on the screen and so on and so forth. Once completed, the user is displayed with their final score and the result of their performance. They can even view their history or choose another test to improve upon.

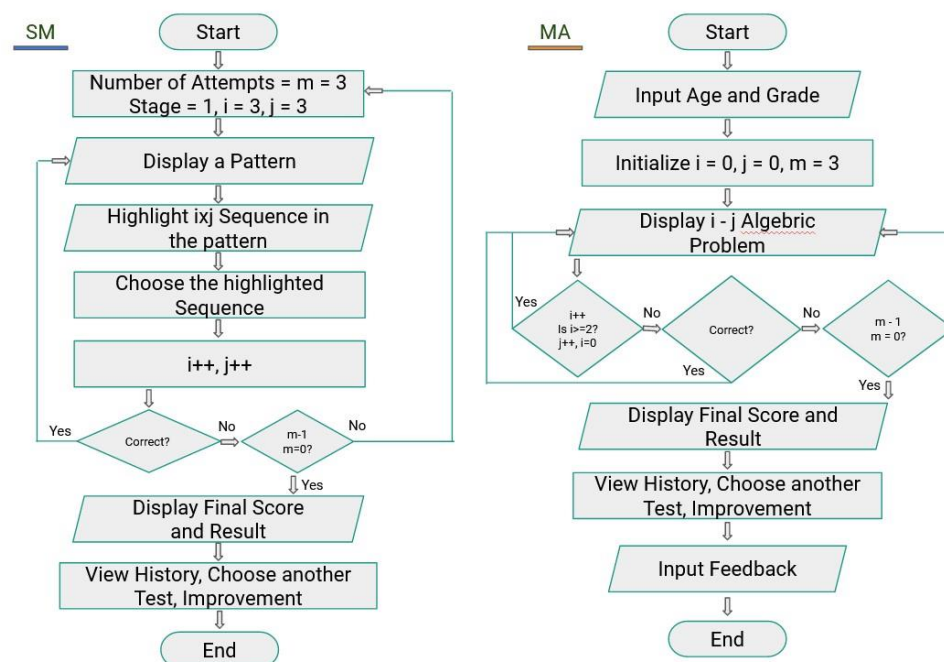


Fig. 2 – flowchart for sequential memory and mental algebra

3.4 MENTAL ALGEBRA (MA)

This module works on developing the Parietal Lobe areas of the brain. Once the user enters the module, they'll be asked to input their age and their grade in (if any) to have a more user specific question set. After taking the inputs, a user specific math problem is displayed with a timer and a counter to take in the score. As soon as the user picks an answer, a more difficult question is displayed on the screen. In case the user answers incorrectly three times, they'll be displayed with a dialogue box stating that their test is over. The user can check in with their history, choose another test or improve upon the current one by redoing it. They can even add inputs on their scores so that they have a better view upon it while looking back at a later date.

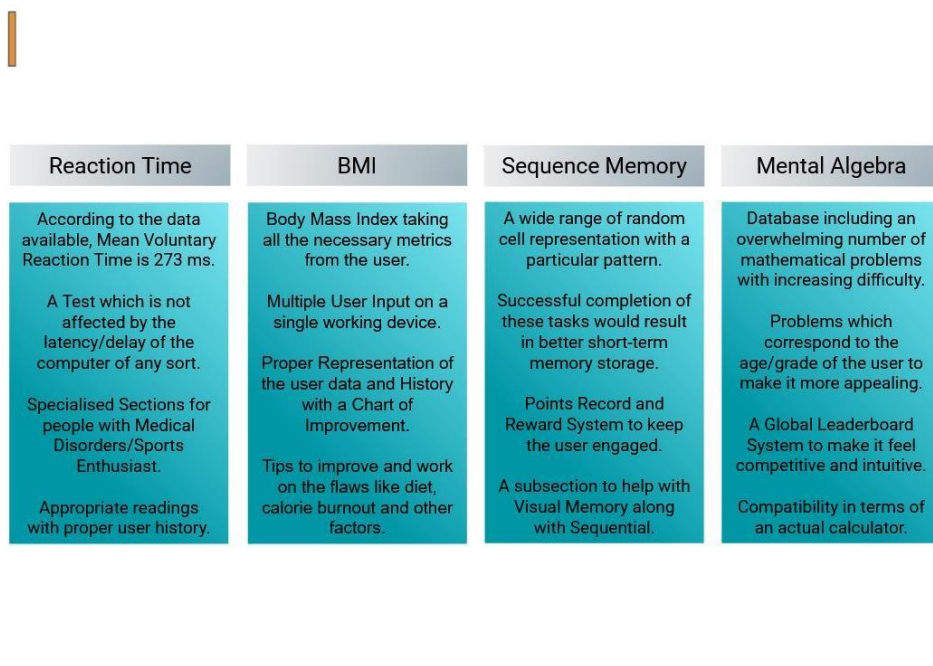


Fig. 3 – workflow of the modules

IV. RESULTS AND DISCUSSION

The demonstration of a few of the respective modules is as shown in figures below,

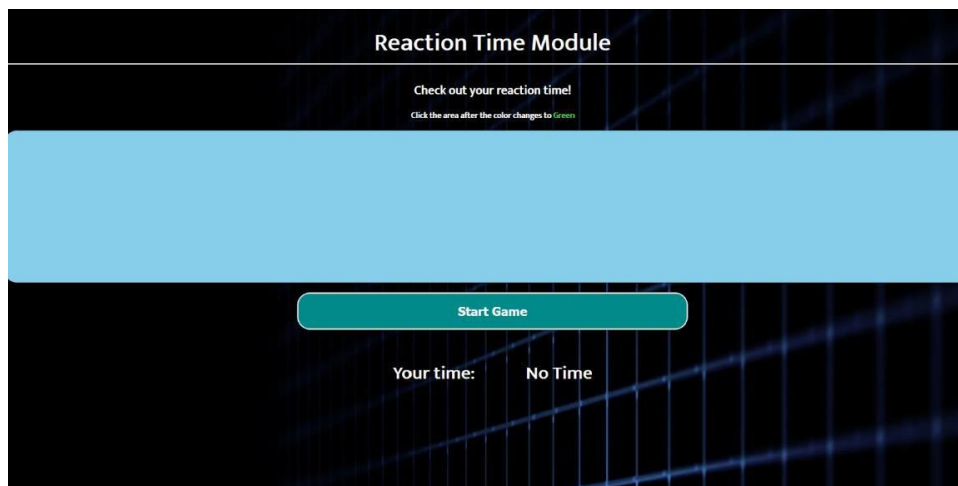


Fig. 4 – demo of RT module_1

Once logged in, the user is prompted with a screen with all the available modules to use. Reaction Time module has a startup screen where it waits for the user to give the initial input to start the test. It has multiple counters ready to use once the test is started. The test screen consists of three phases that it goes through. Upon completion of stage one, it moves on to the next stage.

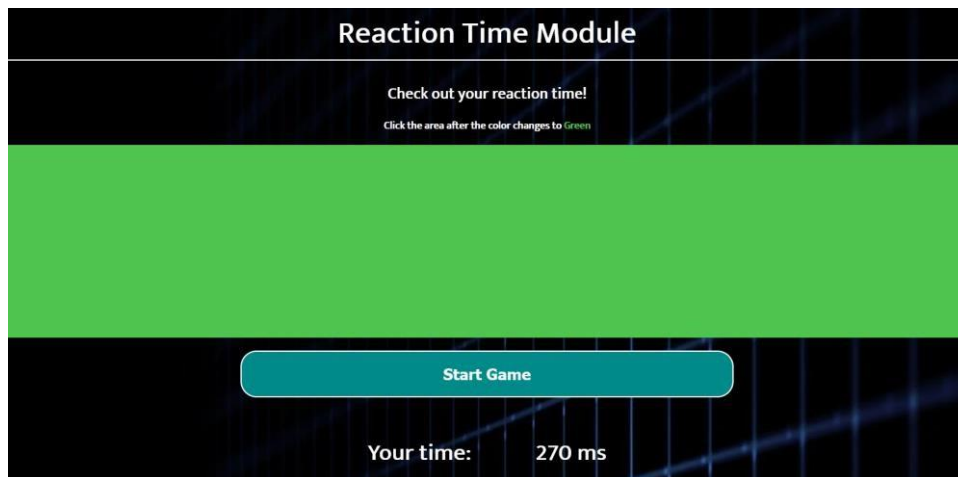


Fig. 5 – demo of RT module_2

Once an input is generated by the user, the screen turns red for a random amount of time decided by one of the counters. As soon as the screen turns back to green and the user clicks on the screen, the counter stops and calculates the reaction time in the background by deducting the delay caused by the peripheral devices. After averaging out a total of 5 attempts, it then pushes out the latent time of the user in milliseconds.

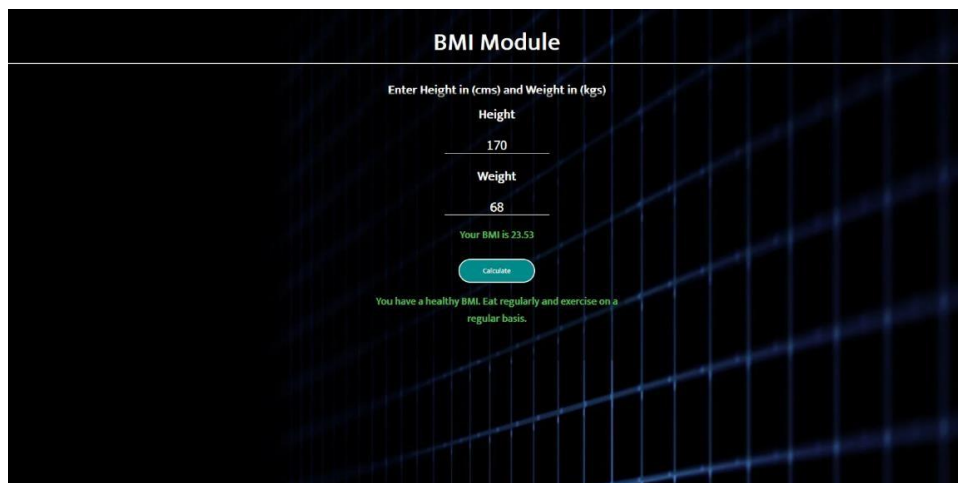


Fig. 6 – demo of BMI module_1

In the BMI Module, the user is asked for their height and weight in cm and kg respectively. Once entered, the system checks in with its database for any previous entries by that particular user. It then calculates the BMI of the user in the background and displays it on the screen along with a message prompt directed for the user based on their current BMI scale when compared to the Universal BMI Chart. The application also cross references the data with previous scales and tells the user whether their BMI has improved or it needs improvement. It also has an integrated link which redirects the user to a proper calorie intake chart and food recommendations by dieticians and doctors.

A few of the user entered examples of the BMI Module are given,



Fig. 7 – demo of BMI module_2

V. CONCLUSION

The proposed work namely “Human Benchmark” started with the need of a multipurpose platform for the human body. The tools demonstrated in the paper show that upon constant stress, Hippocampus and Parietal Lobe of the brain get more efficient and faster. This proves that it is possible to reduce your latent period and improve your cognitive abilities by constantly overworking it. The research also proved that the BMI module can be worked upon using digital photo enhancements which can be used to analyze the weight of the body using just the images of the user.

People with inhibition control problems like ADHD may also have processing speed affected, which in turns affects response time which can be monitored using this application. Neurodegenerative disorders like Alzheimer's, Parkinsons, MS, or Huntington's diseases have long affected humans. Human Benchmark is capable of closely analyzing these problems at a deeper level using charts and previous data to help the Medical Staff to come up with appropriate treatment for the patient.

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