# Gym Workout Fitness Report Generator

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## Abstract

In this fast moving world, people using gymnasium often do not have enough time to monitor the changes in their body after workouts. Ignorance about the change in body can affect the body metabolism. In order to avoid the adversities, our system can generate and send a fitness report to individuals who use gymnasium to make them aware of the changes in their body, so that they can mend their workout practices accordingly. Gym Workout Fitness Report Generator also makes the trainers aware of their trainee's health, which could help them in giving proper guidance to their trainee. Based on the BMI calculation, workout time and the change in the mass of the individuals, the fitness report for the respective individuals is generated.Our system will be employed in gymnasiums and is new to the market. Gymnasiums employing our system tend to attract more customers.

**Keywords:** Gymnasium, workout, fitness, report, Generator

## INTRODUCTION

Gym Workout Fitness Report Generator generates and sends a fitness report to individuals who use gymnasium on a regular basis. It also sends a warning message to the trainer regarding their trainee in case of any strange increase/decrease in Body Mass Index of the trainee [1]. In certain cases the gym trainee experience abnormalities in the body metabolism due to improper work out pattern. Irregularities include excessive weight loss or weight gain or even no change in weight at all. For each workout routine there are some predetermined weight changes. Deviation from these could result in the abnormal metabolisms in our body. Our system helps to check this.The functioning of the system involves measuring the weight of the

individuals prior to start of workout and this detail is updated in the database of the individual. The database account consisting of personal details, phone number and mail id for each individual is created on his admit in the gymnasium. Updates in the database arevalidated using a unique identification feature provided for each individual.The weight of the individual is measured once again when he finishes his workout. Based on the weights of the individual, the BMI difference of the individual is calculated[2]. With this difference as a parameter, an inference on the body and health of the individual is obtained.Based on the BMI calculation, workout time and the change in the mass of the individuals, the fitness report for the respective individuals is generated. This report is sent as a message to the trainer and the individual on a weekly basis. In case of any critical change in the BMI of the individual, affecting the individual's health drastically due to improper workout practice will be notified immediately to the trainer and the individual message and mail. Once the individual opts out of the gymnasium, his database is deleted.The detailed working of the system is mentioned below.

## COMPONENTS EMPLOYED IN THE GYM FITNESS REPORT GENERATOR SYSTEM

The system makes use of the following components: Authorisation device, timer (microcontroller), weighing machine, application interface, and database. This is shown in the block diagram (fig.1). The working of components is explained in detail below.

**Authorisation Devices:**

It is used to identify the individuals [3]. Each individual is assigned a unique identification feature. The authorisation device identifies the individual and accesses the individual's database and stores the details recorded by the weighing machine.
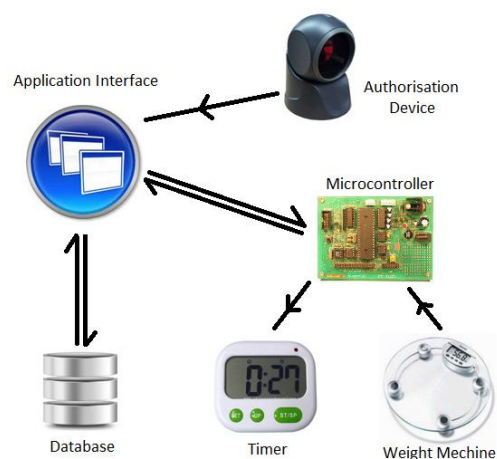


**Fig.1:** Components used in Gym fitness report generator system

**Timer:**
Accurate weight measurement of an individual is a potential challenge to our system, since the posture of the individual has an effect on the weight measured.A countdown system (timer) is employed which gives time for the individual to observe the correct posture for the measurement of weight. Once the countdown gets over the weight of the individual is measured. Timer is implemented using a microcontroller. The microcontroller counts down for a few seconds for the trainee to stabilize himself and the weight is recorded after time out. This feature is added to improve accuracy during weight measurement.

**Weight Machine:**
The weight machine measures the weight of the individual. The weight machine records the weight of the individual with high precision and stores the data in the database.

**Application Interface:**
The application interface validates the trainee using the authorization devices. The weights are recorded chronologically in the database and the progress is analysed. Reports are generated and sent periodically to the trainer and trainee. In case of abnormalities alerts are sent immediately to the trainer so that the exercise pattern of the trainee can be corrected immediately to provide positive results. The weights in the database are compared with the BMI chartand results are derived.

**Database:**
The details of the trainee are stored in the database along with the periodical weights that are recorded. The details such as name, authorisation details, contact details, trainer name, trainer's contact details and the periodic body mass recordings are stored in the database.

## BMI CALCULATION
The Body Mass Index (BMI) is done using the equations given below (eqn.1 and eqn.2). Based on the value of BMI for the individuals, the condition of the individual can be determined (table.1). The corresponding height and weight for some of the BMI calculated using the formulae is shown in the table below (table.2) [4].

**Eqn.1: BMI calculated using metric units**
    BMI = Weight (kg) / (Height (m) x Height (m))

**Eqn.2: BMI calculated using English units**
    BMI = Weight (lb.) / (Height (in) x Height (in)) x 703

**Table.1:** Categories for corresponding BMI values

| BodyMass Index(BMI) | Category |
|---|---|
| <18.5 | Underweight |
| 18.5-24.9 | Normal weight |
| 25-29.9 | Overweight |
| >=30 | Obesity |

**Table.2:** Corresponding height and weight for certain BMI values.

| BMI | 19 | 20 | 21 | 22 |
|---|---|---|---|---|
| Height(inches) | Weight(pounds) | | | |
| 58 | 91 | 96 | 100 | 105 |
| 59 | 94 | 99 | 104 | 109 |
| 60 | 97 | 102 | 107 | 112 |
| 61 | 100 | 106 | 111 | 116 |
| 62 | 104 | 109 | 115 | 120 |
| 63 | 107 | 113 | 118 | 124 |
| 64 | 110 | 116 | 122 | 128 |

## WORKING OF THE SYSTEM

The identification of the individual is identified using the authorisation device. When the identification of the individual is recognised, he/she is allowed to accessthe weighing machine. The timer starts to countdown. This gives time for the individual to adjust his posture. Once the timer finishes countdown, the weighing machinemeasures the weight of the individual and sends it to the application interface[5]. Based on entry or exit of the individual, the application interface updates the weight in the individual's database. These steps are shown in the flow chart given below (chart.1). The date of workout, time spent in workout, type and pattern of workout of the individual is also stored in the database. Based on height and the weights recorded in the database of the individual, BMI values for the corresponding weights on the corresponding date are calculated, using BMI calculations. The difference in the BMI values for a certain period (in our case, one week) shows the weight loss/gain by the individual. With BMI difference, workout time, workout pattern as parameters, a report is generated for the respective individuals. A report consisting of the weight difference, BMI difference and inference on the health of the individual is generated. This report is sent to the individuals by the application interface through the server on a regular basis. This will help the individual to mend his workout pattern and time accordingly[6]. A copy of the report is also sent to the gym trainer of the individual, if the individual wishes so. This will help the trainer in giving proper guidance to the trainee. In case of any critical change in the BMI of the individuals resulting in abnormal weight loss/gain, a warning is sent by the interface to both the trainer and individual immediately.
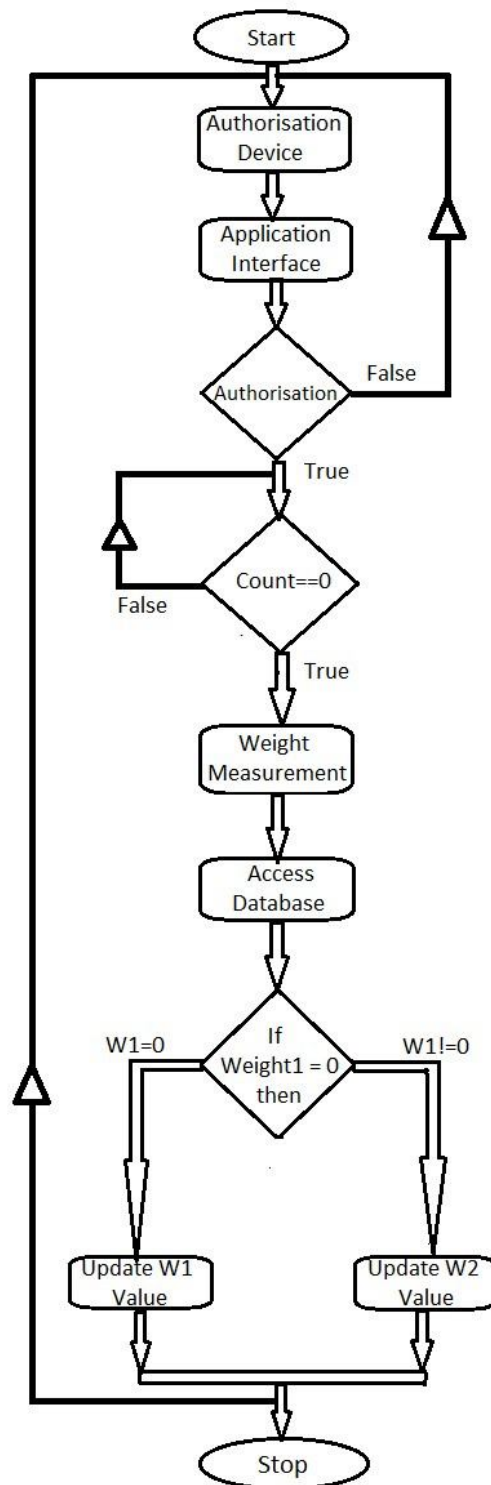
**Chart.1:** Flow chart representing the process involved in Gym fitness report generator system for storage of weights in database

W1: Weight measured during the entry of the individual into the gym
W2: Weight measured during the exit of the individual from the gym

## IMPACT OF GYM FITNESS REPORT GENERATOR SYSTEM

The system has a good impact on people using gymnasium and trainers in gymnasiums, proving very useful to them to take effective decisions on workouts. We evaluate the success of the system proportional to the number of gymnasiums employing our system, its usage in gymnasium and its helpfulness to the people. In order to sustain the idea, we have planned to upgrade our system from the initial implementation by updating it with the then advanced technology and by implementing some additional features like suggesting time to be spent on workout, exercises to individuals automatically based on their needs

## CONCLUSION

The Gym Fitness Report Generator system is a very efficient setup to analyse Body Mass Index of customers of the gym and inform them accordingly of their health status. It is a system that is of utmost necessity in Gyms and Fitness centres to improvise on the workout plans for their customers. The advantage of our innovation is that it is related to individual's health and hence the idea will reach well with people who are health conscious world-wide.

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