

# Electronic Monitoring of Diet by Integrated Device

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**Abstract:** Most people don't care about their health, results in obesity problems. Food intake monitoring is an important problem in today's life. Food intake monitoring system in smart healthcare is designed to take care of a healthy lifestyle, which is specialized in calorie intake and calorie output monitoring. This application mainly focuses on calories that a person burnt after a walk or heavy work and what amount of calories they need to intake. As well we have included the food that should be taken by the diabetic patient. There are types in diabetics type-1 and type-2. We provide the nutrition suggestion in simply understandable format. In the application itself user can monitor calories burning and diet suggestion. We are going to design an application it acts like a Dietician.

**Keywords:** Food Monitoring, Nutrition Monitoring, Calories Calculation.

## 1. Introduction

Today daily Routine Most people don't care about their health, result of this most people suffer by obesity problems. Monitoring daily food intake may be a relevant and important problem in health care. During ingestion a wearable system within the sort of a necklace, which gets data from an embedded piezoelectric sensor capable of detecting skin motion within the lower trachea. This system accurately distinguishes between food types. This method didn't calculate the calories that person burn. It didn't provide any nutrition suggestion. It provides default number of calories to intake. Monitoring systems in smart healthcare are designed to take care of a healthy lifestyle, which specialize in calorie input and calorie output monitoring. We are going to design an application it acts like a Dietitian. This Application will do the following process:

1. Calculates the calories we burn.
2. This data is sent to the server.
3. If Nutrition is not sufficient to that person, it suggests the alternative food diet.

We use the following formula to calculate the energy required.

$$EER = 662(9.53 * \text{age}) + (\text{count} * 15.91 * \text{w}) + (539.6 * \text{h})$$

EER → Estimated Energy Required.

w → Weight.

h → Height.

We provide the nutrition suggestion in simply

understandable format. In the application itself user can monitor calories burning and diet suggestion.

As well we have included the food that should be taken by the diabetic patient. There are types in diabetics Type-1 and Type-2. Type 1 diabetes is the form where the pancreas doesn't produce insulin, so called insulin dependent Diabetic Mellitus or type-1 diabetes. Ten percent of sufferers have this form. People with this type must obtain an artificial sort of insulin. They either receive it from an attempt or from an insulin pump. People with type-1 diabetes usually are not overweight.

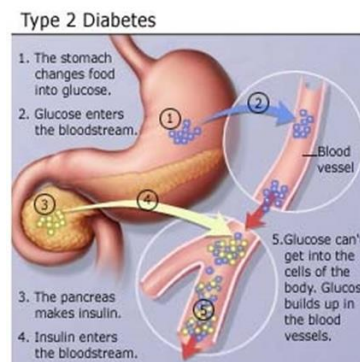


Fig. 1. Type 2 diabetes

As Fig. 1, implies in type-2 diabetes the pancreas produces insulin. This form was named as type II diabetes mellitus or type II diabetes. However, it may not produce enough insulin. And the body doesn't use it properly. This is known as insulin resistance. People with type-2 diabetes have to take diabetes pills or insulin. People with type-2 suffers from overweight. In some cases, it is often treated with exercise and a meal plan.

## 2. Literature survey

Jin Wang, et. al., [1] presented paper on An Enhanced Fall Detection System for Elderly Person Monitoring using Consumer Home Networks and the description is Various fall-detection solutions are in the past proposed to make a stable vigilance system for aged people with high requirements on accuracy, sensitivity and specificity. In this system, an enhanced fall detection system is proposed for aged person monitoring. With triple thresholds, accidental falls are often detected within the house healthcare environment. By using the

knowledge gathered from an accelerometer, cardiometer and smart sensors, the impacts of drop are often entered and noted from normal daily activities. The proposed system has been used in a standard system as exhausted in this paper. From a group of 30 normal actors, it had been found that the proposed system is able to do a high detection accuracy of 97.5%. Therefore, this technique can assuredly be developed and deployed into a consumer product to be used as an aged person monitoring with high accuracy and a minor false positive rate. This system accomplished a nearly immense sensitivity and specificity in laboratory mode. However, validating the system practically, that is the system was carried out with people aging from five to seventy years for two weeks, but other researchers have found that there was no sudden fall that occurred when the system was utilized. In future, a device with lower energy consumption and longer communication distance are to be developed to form the system more suitable for a broad-range of healthcare applications.

Prabha Sundaravadevel, et. al., [2] presented paper on everything you wanted to know about Smart Health Care and the description is that the environment in hospitals are often very hard and tough especially for old people and youngsters. With enormous growth in the population, the value of doctor consultation has been extinct. This brings the health care system to be very essential. Smart Health care are often accomplished in the areas ranging from monitoring the health of elderly to new born infants. The difficulty and price of accomplishments differs supported the accuracy of each devices, performance and the standard in which they are applied. Smart health care also falls under various scopes such as VLSI, Embedded Systems, Big Data, Machine Learning, and AI and so on. This paper notifies the effectiveness, requirements and usage of Smart health care through recent enterprise outcomes. It provides a wider perception about different areas in which studies are often done in this discipline. The advantage of this system is: It provides a wide extent for researchers to continuously invent new outcomes and to enhance the current plans. The main disadvantage is handling of risks and the preservation of important details at both user and originator ends.

Saraju P. Mohanty, et. al.,[3] presented paper on Everything You Wanted to Know About Smart Cities and the description is this paper is a unique introductory of incoming modernized city management system. It is often being used by the researchers as a learning platform to undergo further researches in this domain. The smart city is initially a concept and even today it has not come to practice among the common people. In simple words the Smart City is a place where conventional networks and facilities are made adaptable, structured and feasible with the usage of data and upcoming technologies which helps to manage the city's services for the advantage of its residents. A city is made smarter with innovation in the infrastructure, transportation facilities, resource usage, and healthcare. These innovations helps in modernization of the city

management in terms of productivity. Conventional cities are transformed to Smarter ones by the use of information and communication technologies. The cities are made well organized and reactive by using the rising technologies of the web of Things and Large Data (BD).The growth in this technology has made the Smart cities to integrate. The major advantage of this system is the nominal application and operations costs are the factors of everlasting feasibility. The smart city project has been implemented in various part of the globe with some smart elements. The major disadvantage is: This is only survey paper it needs to discuss with real time.

Jun Wei, et. al.,[4] presented paper on Foodie: Play with your food promote interaction and fun with edible interface and the description is through this technique, people not only create unique food media and part with distant relations and friends, but also serve them with the food. This system includes natural and organic dimension - edible food with smell and taste, to energize the life. We believe the particular handling of real food via digital drawings would boost the commitment and hilarity for distant people, approaching the digital playfulness of food games with real life experience. Besides social entertainment, this spontaneous interface provides a wonderful medium for teenagers to undertake and learn cooking in a safe, creative and playful way. The advantages are Foodie is a rebel, interactive and physical medium for social communication and entertainment for food cooking and sharing recipes, which includes the digital food entertainment with the real-life edible food. It has some limitations and challenges for the current system. The mechanism can only craft using gelatinous food materials with certain fluidity, which is not applicable to solid foods.

Byeongkwan Kang, et. al.,[5] presented paper on IoT-based monitoring system using tri-level context making model for smart home services and the description is in future smart home that supports Internet of Things (IoT) will play an essential role, and it'll be a basis technology to grow up IoT-based smart home service. The paper presents an IoT-based home monitoring system using a tri-level context making model for context-aware services. The advantage of this system is that this paper presents a home monitoring system that supports Internet of Things using a tri-level context making model for context-aware services in smart homes. The major limitation is the next step for this study will emphasize the knowledge engine, handling data from appended sensors, and visualizing data and knowledge.

S.M. Riazul Islam, et. al.,[6] presented paper on The Internet of Things: Exciting Possibilities for Bettering Lives and the description is that Internet of Things (IoT) could also be a chain of noticeable physical objects (or things). It allows anyone, anything, any service, and any network connected to the web can fetch knowledge at any time and from anywhere they want. The Internet of Things provide solutions for a vast range of applications, including smart transportation systems, personal communication, consumer electronics, smart health care

monitoring, organizational services, securities, monitoring, and industrial controls. Some relevant scenarios and thus the comparable promising applications of the Internet of Things are identified. The article essentially divides the applications in three major fields: industry, smart city, and health care. To develop industrial applications like automated monitoring, control, and maintenance, related stakeholders and through analysts, researchers and developers across the world are working strong to develop unique result that fully influence the IoT. Therefore, the list of IoT applications, services, and uses is being broaden every day. The advantage of the system is that the IoT application scenarios scrutinized during this text are utilized in various form of our everyday lives to intensify users' experiences and luxury. The major limitation is that this is often slightly theoretical explanation, which should be tested with real time.

### 3. Methodology

Our proposed systems have an application part to done our required process. This application is going to act like a Dietitian, it will do the following process:

- 1) Calculate the calories we burn.
- 2) App is going to calculate the calories we burn.
- 3) This data is sent to the server.
- 4) If Nutrition not sufficient to that person, this application will suggest the alternative food diet.

In this system, we provide a solution for calculating the burning calories and diet suggestion. The advantage of the proposed system is: this application provides the nutrition suggestion in simply understandable format. In the application itself user can monitor calories burning and diet suggestion. As well we have included the food that should be taken by the diabetic patient. There are types in diabetics Type-1 and Type-2. This application provide food for the diabetic patient based on these types. This application mainly focuses on calories that a person burnt after a walk or heavy work and what number of calories they need to intake.

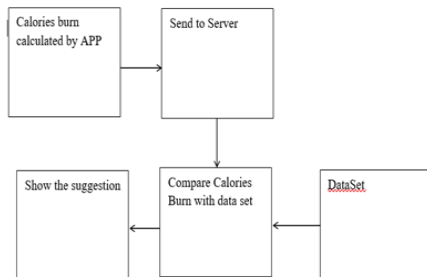


Fig. 2. Architecture diagram of proposed system

#### A. Calories burn calculated by Application

The calorie that is burnt is calculated by the application that we created. This application calculates the calories that were burnt when a person walks or does heavy work by using the accelerometer device which will be inside the mobile phone.

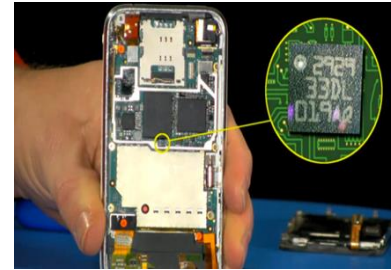


Fig. 3. Accelerometer in mobile phone



Fig. 4. Functioning of accelerometer

#### B. Send to server

The calories burnt are calculated by using the accelerometer and the energy required is calculated by using the formula and the resulting value is sent to the database.

#### C. Compare calories burnt with dataset

The calculated value is compared with the data in the database which consist of dataset. The value that matches the data in the database will be taken as the result.

#### D. Show the suggestion

The result from the compared value is used to suggest the food to be taken by a person.

#### E. Module description

##### 1) Module 1: user registration

The first page of the application is login, if you have already registered you can login directly using the mail-id and password.



Fig. 5. Login page

If you are a new user then click on the registration button. You will get the follow page Fig. 6.

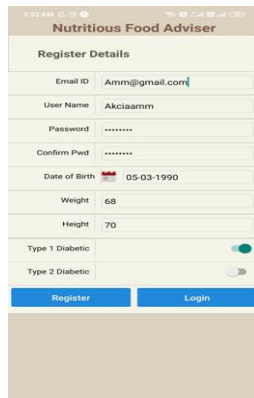


Fig. 6. Registration page

Enter all the details that is required and if there is any error in entering the data that will be indicated when you click on the register button. Once you register all your personal detail will be stored in the database and you can login easily once you registered using the mail-id and password.

#### F. Module 2:login

After registering one can directly login into the application by entering the email-id and password in the login page as below Fig.7. If the mail-id and password is incorrect that will be indicated when you click on the login button.



Fig. 7. Login page

#### G. Module 3: calories calculation

When you logged in, you get the following Fig. 8, then click on the start calculation button, which will start sensing your body motion and calculate the calories that is burnt.

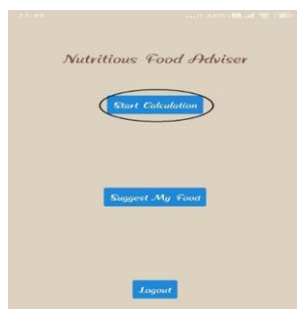


Fig. 8. Calculation screen

Then stop the calculation and click on the suggest my food button, it suggest the food you need to intake based on calories you burnt.

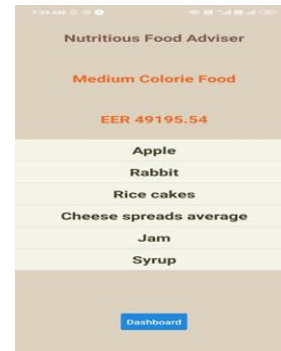


Fig. 9. Food suggestion

#### 4. Conclusion

Since an open nourishment databases are utilized, the information dataset contained certain items logged on numerous occasions. To conquer this, the client is given extra alternatives to address an information passage just if there should arise an occurrence of repetition with comparing increment inside the last precision. Notwithstanding an examination of the supper nourishing substance, proposals are made by the frameworks to diminish the threat of the imbalanced eating routines.

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