# Diet Monitoring System for Bed Ridden Patients

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**Abstract**
The diet of bed ridden patients is a vital aspect to maintain and monitor their health. This includes water intake, meals and also the prescribed medication. To achieve a continuous inspection, diet monitoring system is the solution. This system will monitor the diet 24*7 and also send messages and raise alarms if a discontinuity occurs. It is achieved by a non-invasive vibration sensor which continuously collects data in analog form. The data processing is done by an embedded hardware in a wired way to the sensor. This sensor can be wore like a necklace. This system when tested, gave a count of calorie content and also the type of food consumed (i.e. liquid or solid). If no intake is detected, then a message will be sent to the emergency contacts. A database is maintained for all the registered users.

**Keywords**
Diet Monitoring System, Smartphone Application, Data, Database, User Interface

## I. Introduction

The diet is monitored with the help of a vibration sensor. This vibration sensor is wore as a necklace and is connected in a wired way to the embedded unit. The vibration sensor collects data in an analog form and sends it for further processing to the embedded unit.
The embedded unit consists of a microcontroller and a ULN. The microcontroller is mainly used for converting the analog data into digital pulses and also for sensor interfacing. The microcontroller in connected to a Bluetooth module.
The processed data is sent to the Bluetooth module and then sent to the mobile application via Bluetooth for processing. The mobile application then processes the data and produces a suitable output for the user interface which is the mobile phone and personal computer.
This output data is in the form of text messages, database, application interface and alarms. There is also a setup for manual alarm which the patient can raise in any case of emergency.

## II. Block Diagram

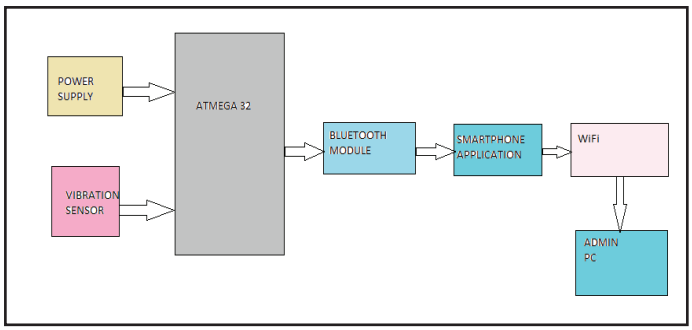


Fig. 1: Block Diagram of the System

The system architecture consists of a vibration sensor, power supply, Atmega 32, Bluetooth module, smartphone application, WiFi and admin PC.

### A. The Vibration Sensor

The vibration sensor used is piezo vibration sensor and interfaced arduino. The piezo senses vibrations and converts them into electrical charges. It is very sensitive to little vibrations too and hence compatible for the system.

### B. Atmega 32

The microcontroller is used for sensor interfacing. It also converts the analog electrical charge from the sensor to digital electrical charge. The processed data is in the form of data frames which are then sent to the Bluetooth module.

### C. Bluetooth Module

The Bluetooth used is HC-05. It is used for data transmission from the embedded unit to the smartphone application.
The Bluetooth module is mounted on the embedded unit itself.

### D. Admin Pc

The Admin PC is a database of all the concerned subjects. The database consists of daily recordings of the patients' diet and their medical history. Therefore it is useful in multi speciality hospitals.

## III. Smartphone Application Unit

The smartphone application unit applies suitable algorithms for the processing of received data. It then sends it to the user interfacing unit of the smartphone where the results are displayed. It also sends the results in a text message form to the emergency contacts given. The data is also sent to admin PC where database of all other patients can be stored.
The smartphone application unit uses distance measure algorithm to obtain results. Data is prefed into the unit with information regarding number of vibrations for the type of food and also number of calories present in a particular food item.
For use of the system regarding a particular patient data regarding his/her daily diet, dietary needs, diet intervals also has to be recorded and fed into the application. This is then compared with input required and data with the least distance from input data is produced as a result.

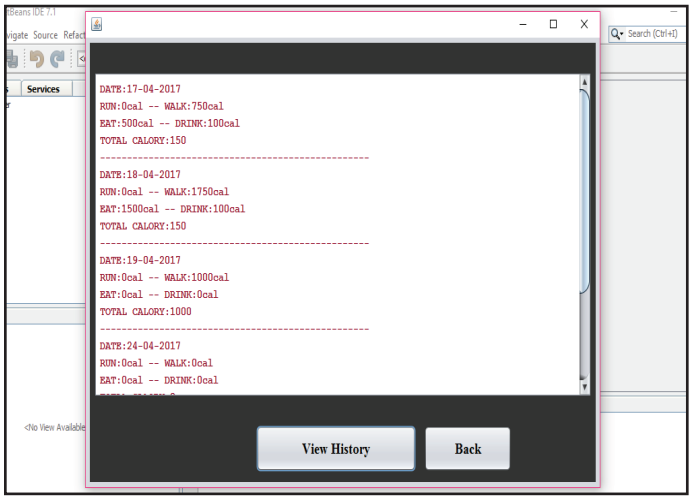


Fig. 2:

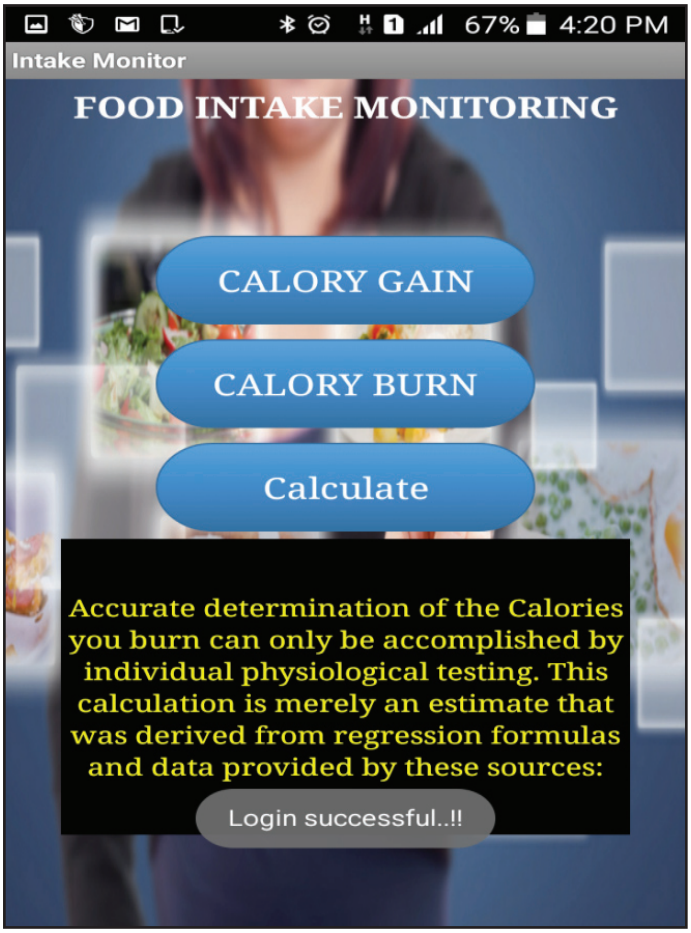


Fig. 3:

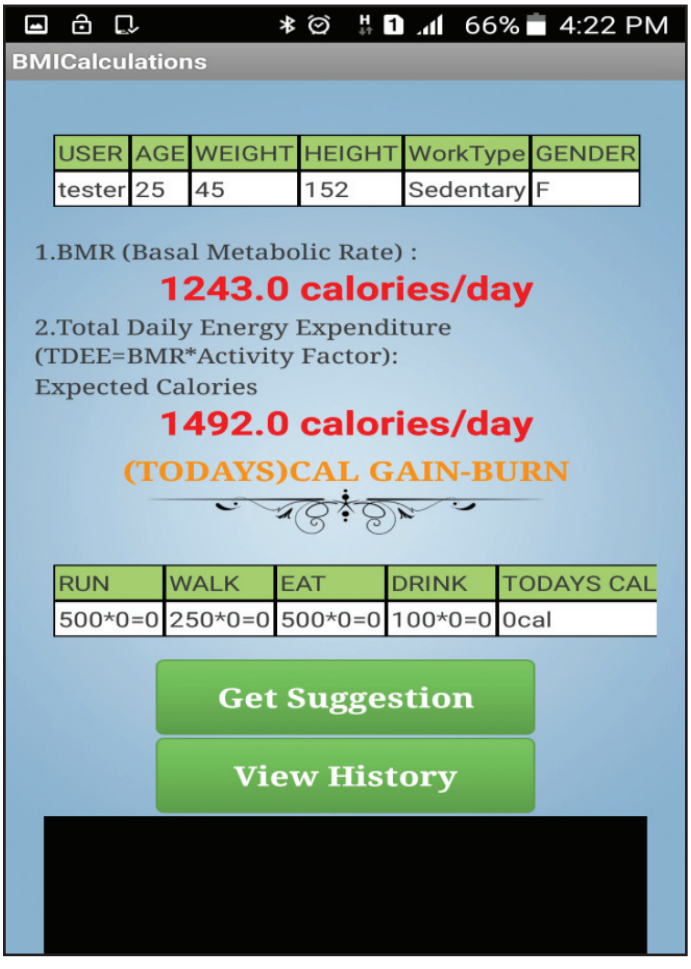


Fig. 4:

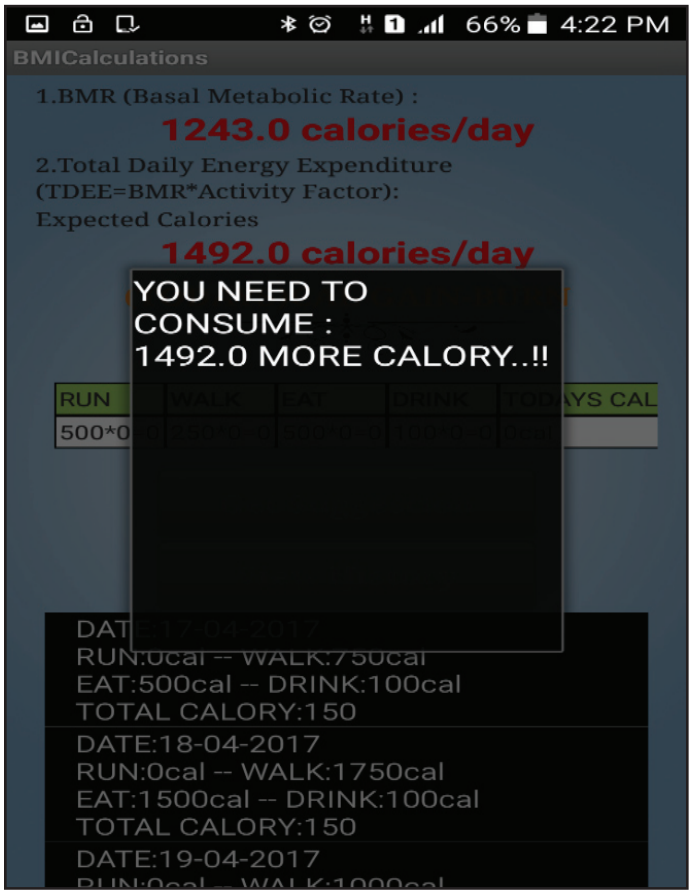


Fig. 5:

## IV. Result

The obtained result is in many forms-

- The application interface displaying number of calories and food intake type.
- The database.
- The text messages sent to emergency contacts provided.
- The manual or automatic alarms raised.

## V. Future Scope

The system can be implemented in multispeciality hospitals where it will ease the doctors' and nurses' work. The system can be also used to monitor individual- at- home patients.

## References

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