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IOT CALORIE MONITORING SYSTEM USING WEIGHING SENSOR

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Abstract - *The main aim of this paper is to propose a system that helps the people to maintain their regular diet. The biggest hurdle that all are facing today is the absence of health consciousness. This paper proposes an weighing sensor that is used to measure the weight of the food and a QR code scanner which can be used to calculate the accurate calorie for packed food items and calculate the correct amount of nutrition needed to intake, provides easy means to manage people expenses and reduces time for the exercising activities. This is an user electronics product which includes of Wi-Fi enabled sensor for food nutrition quantification, and a smart phone application that maintains nutritional facts of the food ingredients. This system allows user to directly interact with their daily nutritional values. An integrated IOT based system which suggests the amount of calorie needed to taken for the next meal. In this system, we uses an open platform for data storage and analytics.*

Key Words*: *Internet of things, Smart devices, Wireless Fidelity, Prediction.

1. INTRODUCTION

Food is important factor for the survival of life. With the proper intake it leads to have a good healthy life. When considering the food, calorie intake and nutrition balance is the mandatory problem in health care. The energy value of food is measured by the unit calorie. The nutrients which is of different forms mainly carbohydrates, fats and proteins are the energy fuels your body. For those who are conscious of losing or gaining or maintaining the weight, healthy eating and active living is the best. To better manage your health, the need to control the calorie intake is often desired. When the body doesn't absorb the necessary nutrients, there occurs a serious problem, nutrient deficiency.

To prevent from nutrient deficiencies and excess, healthful diet is the best choice as it has the right balance of available forms of nutrients. By monitoring the consumption of calorie just doesn't unchain yourself from weight fluctuations but also develop healthy habits for the future. Overeating can lead to obesity which causes serious health concern in affluent societies today. Imbalance nutrition in infants and children can affected in numerous modalities.

2. RELATED WORKS

- Nabil alshurafa and his team has published a paper based on recognition ofnutrition intake using time-frequency decomposition in a wear ablenecklace using a piezoelectric sensor . This necklace prototype which has shown the ability to distinguish between only liquids and solids.
- Taichijoutou and his team has published a paper based on a food image recognition system with multiple kernel learning for 50 kinds of foods with the cross-validation-based evaluation only possible.
- Muhammad shoaib and his team has published a paper based on Towards Detection of Bad Habits by Fusing Smartphone and Smart watch Sensors. Some complex activities, such as smoking, eating, drinking coffee, writing and typing cannot be recognized with a smart phone in the pocket position alone.
- Edward johns and his team has published a paper based on An Intelligent Food-Intake Monitoring System Using Wearable Sensors. The results show a successful detection of activities along with sound over a rate of 80%, but fails to detect drinking activity due to low sound level and suppression by background noise.

DISADVANTAGES

- In the existing system there is not a dynamic application provided. Hence, the user can't interact with the system.
- There is no application with all the features needed for accurate calculation.
- The existing system does not provide a scheduled diet system.
- The cost of diet planning in gym or other places are high.

3. PROPOSED APPROACH

The design for the proposed system can be classified into four categories: user registration, nutrition acquisition, QR code scanner and weighing

sensor. A detailed explanation for the above mentioned categories are stated below.

A .User registration

In this module, it starts by allowing the user to register in this food monitor application. Registration field contains basic details like name, email etc and asks users height, weight, age & gender. On the time of registration user has to choose his diet plan scheduled accordingly. Once registered the next slide slows the brief summary of BMI comprising whether we are under weight, overweight or normal.

B. Nutritional acquisition

The main aim is to have the proper intake of calorie. Hence this module will set a chart with the type of the meal based on a predefined characterization which includes breakfast, lunch, snack and dinner. Based on the diet plan you choose it returns the summary of how much calories you must take in a day and that must be continued daily. The calorie intake varies accordingly to the diet plan.

C. Weighing sensor

The main objective of using the food weighing sensor in our paper is to calculate or quantify the calories consumed by the user. The ideal output of this sensor should be the weight of the food ingredients placed on it. It is a portable device that can be carried anywhere. Before having our food place the sensor under a table. Then place the food item that you are going to take. This sensor detects the amount of calories i.e. the weight and compares it with the diet plan suggested to us. If it has the weight equal to that of the insisted calories, then it is completely normal. Otherwise we get a pop up alert message notifying the huge consumption for more weight or less consumption for less weight.

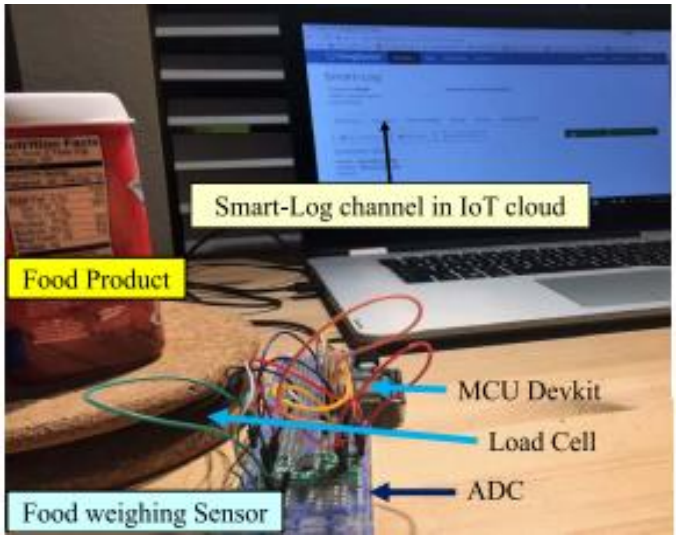


Fig -1: Weighing Sensor

D.QR code scanner

QR stands for quick response is a two dimensional matrix type barcode that contains a series of dots. It provides the instant access to know the information that is hidden in the code. As for our next module, we use this QR code that is integrated with smartphone. The cases exists wherein the packed items can't be placed on the weighing sensor to predict the amount of calories. Hence we use the QR code that uses the scanner to scan the packed items with smartphone builtin camera. This calculates the calories accurately.

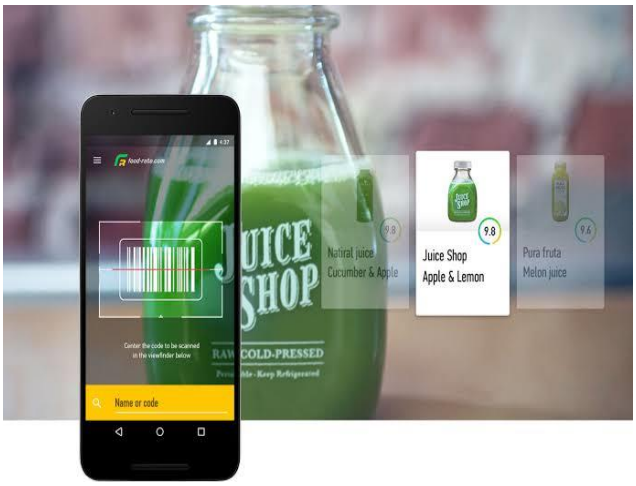
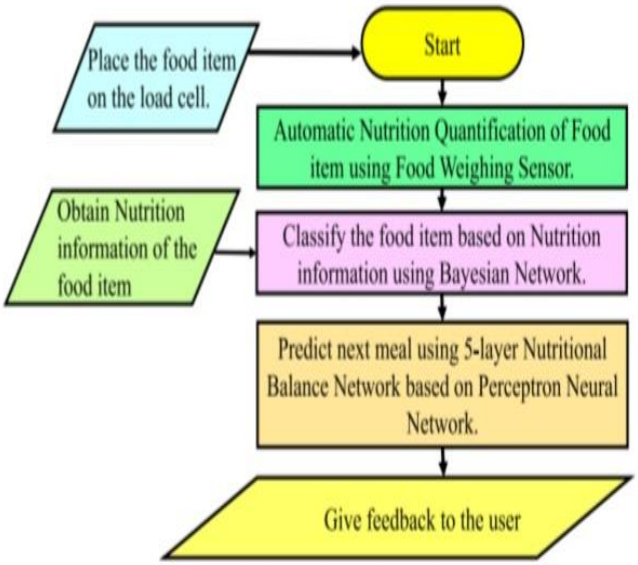


Fig-2:QR code sensor

4. WORK FLOW FOR PROPOSED SYSTEM

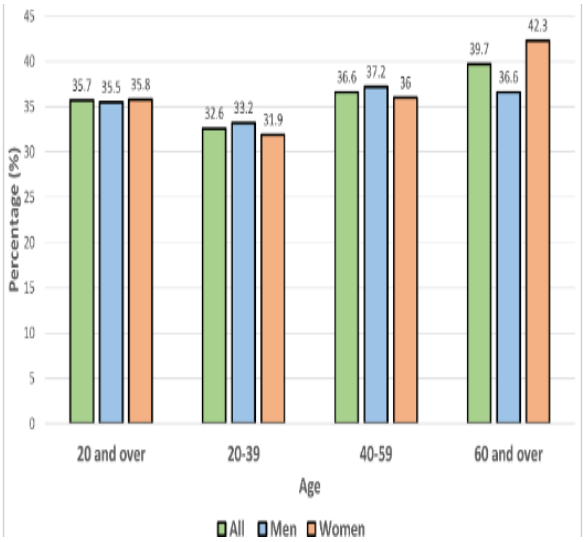


The various steps involved in building the CNN model is summarized as follows.
Step 1: The initial setup which comprises of importing the necessary packages namely Sequential, Convolution2D, MaxPooling2D, Flatten and Dense.
Step 2: The neural network is initialized using an object.
Step 3: The convolutional layers are added specifying the filter size, shape, dimensions and the activation function.
Step 4: Pooling is performed for feature map size reduction without losing the important image characteristics.
Step 5: Flattening is done by collecting all the pooled feature maps and putting them into a single vector.
Step 6: The full connection is created using the number of hidden layer nodes, relu function for hidden layer, softmax function for multiple outcomes and the output probabilities are randomly generated.
Step 7: The CNN model is compiled and image augmentation is done to train and test the model.
Step 8: The model is tested with unseen (new) image and the output is evaluated in terms of classification accuracy and Mean Square Error (MSE).

5. APPLICATIONS

- Cost efficient
- Easy to use by all the people
- Portable
- Easy tracking of calories to intake
- Identification of accurate nutrition based on food intake.
- Consumers can easily check their calories.

6. OBESITY PREVALENCE FOR MALE AND FEMALE



7. FUTURE SCOPE

In future, the current application
(i)Can be used for all people. So we can plan it to develop for diabetics and BP patients .
(ii)We can develop it all these features into an android application.
(iii)We can link it with different modes of food. The proposed system can help in analyzing the nutrition consumed on an everyday basis and provide suggestions for the user to address malnutrition. With a cost effective sensor system and seamless data logging method, the proposed system can be an essential consumer electronic device used in child care.

8. CONCLUSION

Thus demonstrated a portable easy to carry sensor to monitor the calorie intake and achieve nutritional balance. We have integrated QR code scanner with smartphone built in camera and a weighing sensor to predict the weight and quantify the calorie of the food items being placed. The implementation is cost efficient with high accuracy in diet planning. The proposed system can be more essential and helpful product for household and child care usage. The proposed system can be more essential and helpful product for household and childcare usage

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