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Food Nutrition Recognition Using Deep-Learning Neural Networks

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Abstract — Recently there has been a lot of increase in the field of image-based nutritional evaluation. Classifying and recognising are crucial steps for nutritional evaluation. Growth in the deep learning and artificial neural networks proved to be a blessing for the image classification and recognition tasks, especially for food recognition. Our results show that the precision of our system is acceptable and it will majorly improve and facilitate current method of nutrition recognition techniques.

***Keywords*- Food Recognition, SIFT, ANN, neural networks, food image, deep learning.**

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I. INTRODUCTION

Health has become a topic of major interest and it is mostly linked to good quality of life. Latest and innovative information technologies have brought a new meaning and depth to this topic. It is now possible, thanks to the devices like smart goggles, smart watch, to get a vast range of information such as steps walked, rate of heart , baby temperature, human respiration, etc. and examine the obtained information in terms of calories spent, stress level, amount of sleep, etc. A valid calculation of everyday nutritional intake gives a useful solution for maintaining healthy lifestyle and to avert diseases. Our framework , utilises Scale invariant feature transformation or element change (SIFT) for food photo preparing, and ANN for classifying.

II. PROBLEM STATEMENT

In our Framework we tried to build an efficient and easy to access nutritional recognition app that will help the user find the nutritional facts associated with the food it is eating. The framework can calculate the nutritional values of the clients food based on the algorithms used.The problem with the current calorie measurement system is that patient's dietary information is given to the nutritionist and based on the he will give the client the output if his current diet is healthy or unhealthy also the nutritionist might make them aware about the effects of such diet on their health.In this approach client might accidentally give wrong information or inaccurate measures which all might affect the calorie estimation.

III. RELATED WORK

In the computing world the current topic that are being researched are neutron detection of food and calorie calculation, and also classification of food. Multiple ways have been researched to solve the 2 problems.The first one is to detect the food automatically.This is the most vital step for an computerised food evaluation system. In some instances, it is sufficient to only classify the image of the food, when the main aim is to elucidate images that include food for the motive of

arranging them into various categories. In appellation of dietary assessments it should be able to find out what food is in the photo and correctly classify it.

1. Food Image Detection

The food or non-food classification is a job of discovering whether the image provided contains a food item. Given image is classified as food or non-food based on the food classifier . This is almost identical to any other image classification issue where a classifier is edified on data of image using techniques used in machine learning.Approaches used to classify image and extract features such as key point descriptors from scale-invariant feature transform (SIFT) , stock the attributes into a vector form e.g., bag of words and Fisher Vectors and then use algorithm for clustering such as Support Vector Machine (SVM) for classification. Some applications can detect food automatically by based on dining plates in recurring recorded video acquired by a wearable device.

2. Food Image Recognition

Most research in food identification presume that only one food item is present in the photo. Thus, food identification or recognition can be solved as a multiple class classification problem.Food recognition using conventional approaches based on classical features and machine learning has been worked by researcher for many years. Joutou et al. came up with a Japanese food dataset with 50 classes. They suggested a Multiple Kernel Learning (MKL) method using a combination of features including SIFT-based bag-of-features, colour histogram and Gabor Texture features. A precision of 61.3% on their dataset was attained. Scale Invariant Feature Transform (SIFT) was developed by Lowe for feature detection and is very efficient in object recognition applications.The SIFT feature extraction mainly has four steps. First is to calculate a scale space extrema using Difference of Gaussian (DoG). Secondly, a key point localization where the key points are localized and purified by removing the low contrast points. Third, a key point orientation assignment on local image gradient and at last a descriptor generator to calculate the local image descriptor for every key point. The SIFT algorithm modifies the image into a collection of local feature vectors. These feature vectors are aimed to be distinguishing and invariant to any rotation, translation and or scaling of the image.SIFT algorithm is evaluated for incorrect and correct matches . For each image malformation, true positive rate is calculated and statistics of the positioning difference between the matched key point are also studied. This can be used for further work on optimisation for matching in SIFT algorithm.

3. Food Image classification

Artificial neural network (ANN) classifiers have been implemented successfully for various quality examination and grading tasks of diverse food products and also placing food in categories. ANN are great pattern classifiers because of their capability to learn patterns that are not linearly detachable and concepts dealing with unusualness, noise and random events.

IV. PROPOSED SYSTEM

We proposed a food nutrition recognition system that can aid any person willing to measure the nutrients in the food .It can be used by dieticians to obese people willing to lose weight by eating healthy.Our framework takes a picture as an input and uses nutritious certainty tables additionally SIFT is utilised and extraction and classification using ANN algorithm is done to give an accurate result the user. Our outcomes show that the correctness of our framework is satisfactory and it will change the current manual nutrition estimation systems. In our framework, the user needs to take a picture of the food and in a matter of few seconds the output.

A. SYSTEM ARCHITECTURE.

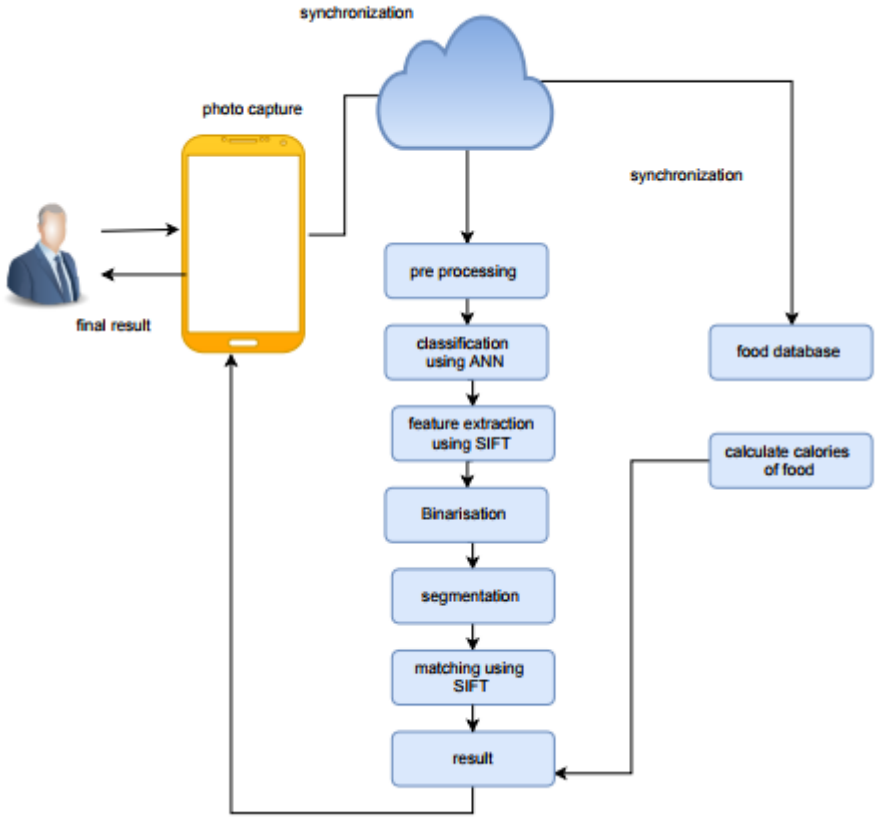

Figure 1.1. Architecture

V. ADVANTAGES

- Our system uses fact tables and is built on food image processing.
- Time required to calculate calories manually is totally eliminated
- Ease of access.
- Accuracy is better and improved.

VI. APPLICATION

Our framework can be used to efficiently calculate nutrients of the food based on the image.
It can be used to monitor healthy eating habits.
Allows to maintain daily calorie intake as you can check the calories along with other nutritional information on the app

VII. CONCLUSION AND FUTURE SCOPE

We have built an app that can calculate the nutrients based on the image provided. It can do this in no time. This proposed system can benefit many people including diabetic patients ,people that want to loose weight.As most of the health problem are due to unhealthy diet .Food calorie measurement can help a lot in your daily diet intake.In the future this system can be made much more accurate by adding in features like distance estimation and weight estimation.

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REFERENCES

[1]Pouladzadeh, P., Kuhad, P., Peddi, S. V. B., Yassine, A., & Shirmohammadi, S. (2014, July). Mobile cloud based food calorie measurement. In Multimedia and Expo Workshops (ICMEW), 2014 IEEE International Conference on (pp. 1-6). IEEE.

[2] P. Pouladzadeh, S. Shirmohammadi, A. Bakirov, and A. Bulut, Abdulsalam Yassine "Cloud-Based SVM for Food Categorization", Multimedia Tools and Applications, Springer, Published online, June 2014.

[3] Pouladzadeh, Parisa, Shervin Shirmohammadi, and Abdulsalam Yassine. "Using graph cut segmentation for food calorie measurement." Medical Measurements and Applications (MeMeA), 2014 IEEE International Symposium on. IEEE, 2014.

[4] P.Pouladzadeh, S.Shirmohammadi, and R.Almaghrabi, "Measuring Calorie and Nutrition from Food Image", IEEE Transactions on Instrumentation & Measurement, Vol.63, No.8, p.p. 1947 – 1956, August 2014.

[5] N. Ryu, Y. Kawahawa, and T. Asami, "A Calorie Count Application for a Mobile Phone Based on METS Value," Sensor, Mesh and Ad Hoc Communications and Networks, 2008.

[6] Yue Y, Jia W, Sun M. Measurement of food volume based on single 2-D image without conventional camera calibration. Proceedings of IEEE 34th Annual Conference on Engineering in Medicine and Biology; 28 August–1 September; San Diego, CA. 2012. pp. 2166–2169.