A SURVEY ON FOOD RECOGITION USING AUTO DIETARY SYSTEM

Neha Singh, Nerasimi Raj.X, Shamini.G.I

ECE Department, Sathyabama University, Chennai-119

Email: nehasingh9444@gmail.com, nirasmi1@gmail.com, gisham07@gmail.com

Abstract: Sustenance related sicknesses are nowadays a primary hazard to human wellbeing and posture awesome difficulties to restorative care. Inconsistencies in this adjust can prompt to sicknesses, for example, weight, anorexia, and other dietary issues, which may moreover fall apart into constant maladies if not truly treated. A stage to take care of the issues is to constantly quantify every day calorie adjust. There are numerous strategies to quantify calorie use, for example, Fitbit, Philips Direct Life, and so forth. Be that as it may, persistently and non-intrusively observing calorie consumption remains a test. We introduce AutoDietary, a wearable gadget to screen and perceive nourishment admissions in day by day life.

Keywords: AutoDietary, a wearable gadget, measure day by day calorie adjust, endless sicknesses, perceive nourishment admissions

Introduction: The framework is predominantly made out of two sections: 1.Embedded Hardware System 2.Smartphone Application. An inserted equipment is created to gather and pre-handle the sustenance expended information. The jewellery like acoustic sensors grabs astounding sound signs of eating practices in an easy to use and antenatal way. An application is produced which totals sustenance acknowledgment comes about as well as offers recommendations on more beneficial eating, for instance the individual being used ought to bite the nourishment gradually or ought to consumption satisfactory hydration. Nourishment sorts can be recognized from biting data, since the vitality applied in rumination basically relies on upon the basic and the textural properties of the sustenance material and can be acquired from the biting sound.Nourishment sort loner comprises of a few stages .Firstly, the acoustic signs are confined. At that point, the sound casings are handled by the concealed Markov show (HMM) in light of the Mel Frequency Cepstrum Coefficients to distinguish the biting

occasions. Likewise, we additionally identify liquid admission by gulping occasions. A choice tree based calculation is made being used to pull back the sort of nourishment taken by a man.

Literature Survey: The creators Sebastian Pabler, Wolf-Joachiam fischer and Ivan Kraljevski in the paper "Adjustment of models for sustenance admission sound acknowledgment utilizing most extreme a posteriori estimation calculation" inferred that heftiness and overweight are huge human services challenges in the total populace. Programmed consume less calories estimation calculations depends on investigation of sounds from the vibration of breathe in and offer the likelihood of being a valuable apparatus for improving information logging of sustenance eaten. Each client may have contrast sounds created amid eating which prompts to diminish in the characterization exactness accomplished with a client unspecific calculation. To vanquish this issue, the Maximum a Posteriori (MAP) estimation is executed and tried on one client expending eight sorts of nourishment. The reliance of the order change from the extent of the adjustment set is explored. General precision can be expanded from 48 % to around 79 % utilizing records of 10 cycles for each sustenance sort of one subject. An expansion by 7.5 % can be appeared for a moment subject. The calculation gives a fit approach to adjusting models and sustenance order is more solid. The exploration field of discourse acknowledgment offers various adjustment calculations to expand the acknowledgment precision on a solitary client. The Maximum a Posteriori (MAP) estimation gives an acknowledgment calculation low intricacy and necessity of adjustment information. An execution of this calculation is appeared being used with calculations for nourishment admission sound acknowledgment in this paper. An exploratory confirmation of the ease of use of the calculation in the field of nourishment admission sound characterization is given by rebuild a client

unspecific fundamental model to a solitary client's sustenance consumption sounds.

Juan M.Fontana, Muhammad Farooq and Edward Sazonov intitled paper"Automatic ingestion screen: A wearable gadget utilized for observing of ingestive conduct" which portrays the expect to screen the sustenance we eat and intrigued conduct in a typical encompassing remains a major issue that has critical ramifications in study and treatment of weight and dietary issues. In this way, a framework is created with a sensor which can be worn called programmed ingestion screen, AIM is found for target checking of ingestive issue in simple way. The proposed gadget comprise of three sensos that are a jaw movement sensors, a hand motion sonic, and an accelerometer. All sensor combination and example can be perceived by utilizing a technique produced for subject autonomous nourishment utilization way. The gadget and the philosophy were approved with information gathered from 12 individuals wearing AIM over the span of 24 h in which both the every day exercises and the nourishment they admission were not limited at all. The outcomes demonstrated that the framework could identify sustenance eaten by them with a precision of 89.8%, which proposes that AIM can conceivably be utilized as an instrument to screen ingestive way in people. The improvement of AIM can keep away from weight pick up by eating nibbling, night eating, and end of the week gorging and would propel the investigation of sustenance utilization in heftiness and in other eating cluttered.
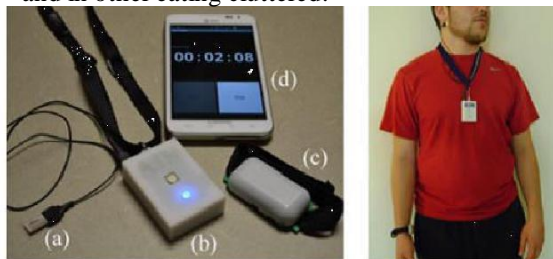

Fig. 1. Left: wearable sensor system: (a) jaw motion sensor, (b) wireless module, (c) RF transmitter, and (d) smartphone. Right: subject wearing AIM.

Hongsheng He, Fanyu Kong and Jindong Tan"DietCam:Multi-View sustenance acknowledgment utilizing a muti-part SVM" reviewed nourishment acknowledgment is a key segment in assessment of regular nourishment admissions, and its test is because of intraclass variety. We introduce a programmed nourishment arrangement technique, Diet Cam, which particularly addresses the variety of sustenance appearances. Eat less Cam comprises two noteworthy segments, fixing

identification and nourishment arrangements. Nourishment fixings are diagnosised through a mix of a deformable part-based model and a surface check demonstrate. From the recognized fixings, sustenance classifications are arranged utilizing a multi-see multikernel SVM. In the analysis, Diet Cam presents unwavering quality and outperformance in acknowledgment of nourishment with complex fixings on a database of 55 sustenance sorts with 15262 nourishment image.Food consumption appraisal is a building square of numerous medicines to general medical issues, particularly for corpulence control. In this paper, we introduced a programmed nourishment acknowledgment technique named DietCam. Exceptionally intended to address the difference issue of nourishment appearances, we built up another sustenance fixing finder and a multi-see multi-bit based SVM to arrange sustenance things. In light of the investigation on the created nourishment database of 15262 sustenance pictures, DietCam displayed promising execution as contrasted and regularly utilized sustenance grouping techniques. The proposed technique can possibly be actualized on cell phones, for example, advanced mobile phones

Fig.2 : Intraclass variance in the food category. From left to right, they are steaks, salads, fried rice, pastas, and sandwiches. There are a large variety of food types and even the same food type may look different.

Nourishment consumption evaluation is a building square of numerous medications to general medical issues, particularly for heftiness control. In this paper, we introduced a programmed sustenance acknowledgment strategy named DietCam. Uncommonly intended to address the change issue of nourishment appearances, we built up another sustenance fixing finder and a multi-see multi-piece based SVM to order nourishment things. In light of the trial on the created nourishment database of 15262 sustenance pictures, DietCam exhibited promising execution as contrasted and ordinarily utilized nourishment arrangement strategies. The proposed strategy can possibly be actualized on cell phones, for example, PDAs for helpful every day utilize.

Evaluation of sustenance soaking up has an extensive variety of utilizations in general wellbeing and way of life related incessant ailment administration. In this paper, Daniele Ravi, Benny Lo and Guang-Zhong Yang"Real-time sustenance admission grouping and vitality use estimation on a cell phone" had proposed a genuine time sustenance distinguishing proof stage joined with every day action and vitality use estimation. In the suggestion strategy, nourishment identification depends on various leveled grouping utilizing numerous visual prompts, upheld by proficient programming usage reasonable for ongoing cell phone execution. A Fischer Vector portrayal with an arrangement of straight classifiers are utilized to classify sustenance consumption. Day by day vitality use estimation is accomplished by utilizing the inherent stationary movement sensors of the cell phone. The execution of the vision-based sustenance acknowledgment calculation is contrasted with the present stage, demonstrating enhanced precision and high computational proficiency appropriate for realtime input. Client contemplates have additionally been performed to exhibit the useful estimation of the product environment.In this paper, we proposed an incorporated structure for continuous sustenance acknowledgment by abusing a chain of importance of visual elements separated from the PDA. The proposed programming condition is further incorporated with every day movement acknowledgment, permitting joined evaluation of nourishment admission and vitality use estimation by utilizing a solitary application. The proposed approach has been contrasted with the cutting edge calculations, exhibiting better exactness and simplicity of ease of use. Future work will be committed to the estimation of the rate of nourishment utilization and the joining of fortification learning for online adjustment of the arrangement calculation for client particular preparing and execution improvement

Fig. 3 Screenshot of the proposed mobile application for the food recognition problem. The bar on the left shows the first 5 classes recognized by the system for the current frame.

Manika Puri Zhwei Zhu, Qian Yu, Ajay Divakran and Harpreet Sawhley
"Recognition and volume estimation of food intakes **using a mobile device"** presented a system that improves accuracy of intake of food assessment using computer vision techniques. Traditional dietetic method suffers from the drawback of complex lab measurement. Our solution is to use a mobile phone to capture images of foods, know the food types, estimate their respective volumes and finally show nutrition information. There are following challenges to deal with. (a) There exist a large variety of food types that people consume in everyday life. (b) a single category of food may contain large variations due to so many routes of preparation. Also, diverse lighting state may lead to varying visual appearance of foods. All of these pose a challenge to recognition approaches. On top of it, the low quality pictures captured using cellphones make the task of 3D reconstruction difficult. In this paper, we combine several vision techniques to achieve quantitative food intake estimation. Evaluation of both classification and reconstruction is provided in the experimental results
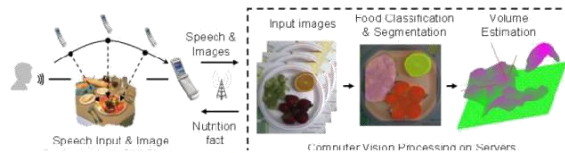.

Figure 4. Data flow of the entire system

We have presented a system that given a set of three **images along with speech of a user's meal, performs** object recognition and 3D reconstruction to estimate food volumes, which are reported back to the user. Our proposed pairwise classification framework, which is particularly designed for this application, **makes full use of the user's** speech input to improve both accuracy and computational efficiency of the system. Also, our framework is easy to extend to include new types of foods. Quantitative results show our food recognition and 3D volume estimation provide an automated and convenient solution to carry out studies on dietary intakes of individuals.

This work of creators Mohammed Farooq and Edward Sazonov"Segmentation and portrayal of biting sessions by checking temporalis muscle utilizing brilliant glasses with piezoelectric sensors" .The proposed information obtaining gadget was fused into the sanctuary of eyeglasses. The plan was reliable by ten members in two section tests, one under controlled research facility conditions and the other in remiss living. The forthcoming sustenance retention concession technique

initially acted a vitality based division to disengage competitor chewing sections (rather than utilizing ages of settled term by and large detailed in research writing), with the ensuing assignment of the fragments by direct SVM models. On member level consolidating information from both research facility and typical living trials with 10-overlay forget one cross-approval, bite were perceived with normal F-score of 96.28% and the resultant territory under the bend was 0.97, which are higher than any of the beforehand noted result. A multivariate relapse model was utilized to gauge bite tallies from fragments with a normal mean total mistake of 3.83% on benefactor level. These choice recommend that the proposed framework can distinguish gnawing fragments within the sight of discourse and movement antiquities, and in addition normally and impeccably measure biting nature, both under created research facility conditions and unhindered enviorment.This work exhibits a novel wearable sensor framework for recognition and portrayal of biting sessions within the sight of movement curios starting from physical action and discourse. The proposed sensor depends on observing of the action in the temporalis muscle to distinguish champing. A multistage calculation first recognizes competitor chomping sections and after that utilizations direct SVM models to arrange biting sessions with the normal F1 score of 96.28%, in both controlled lab circumstances and in addition unhindered free living tests. In the last stage, a multivariate direct relapse demonstrate gauges the bite checks with the mean supreme blunder of 3.83% (total mistake over lab and free-living examinations). The outcomes recommend that the framework can identify the nearness of nourishment admission and can precisely assess bite tallies in complex circumstances including discourse and physical movement as well as exercises performed in every day
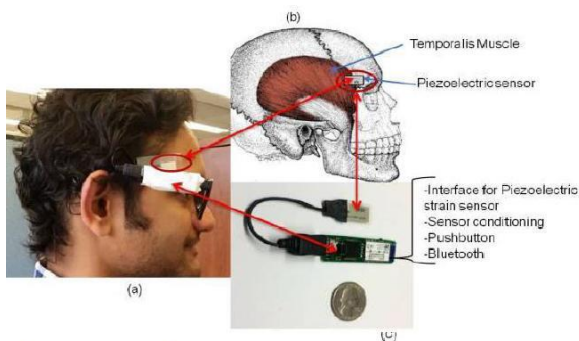

Fig. 5. (a) A participant wearing smart glasses. The wearable sensor system is connected to the temple of glasses. (b) Temporalis muscle is involved in controlling jaw movements during chewing and the sensor location on the muscle. (c) Data collection device which comprises of an interface for piezoelectric strain sensor signal, signal conditioning circuitry, Bluetooth and a microprocessor.

Conclusion

There are some sustenance consumption observing framework exist yet they are either off base or incorporate complex sensor framework which restricts their selection in day by day life. To address this test, we have thought of an Autodietary framework to screen the nourishment allow in every day life. Tests demonstrate that the precision of nourishment sort - acknowledgment via AutoDietary is 84.9%, and those to arrange fluid and strong sustenance utilization are up to 97.6% and 99.7%, individually. A review with respect to wear solace and functionalities of AutoDietary was directed. The outcomes demonstrate that the present outline of AutoDietary is adequate to most clients for day by day utilize.

IV.   References

1.   Sebastian Pabler, Wolf-Joachiam fischer, Ivan **Kraljevski , "Adaptation of Models for Food** Intake Sound Recognition Using Maximum a Posteriori Estimation **Algorithm" IEEE, 17 May** 2012.

2.   Juan M.Fontana, Muhammad Farooq, Edward Sazonov,**"Automatic Ingestion Monitor: A Novel** Wearable Device for Monitoring of Ingestive **Behavior"IEEE Trans** Biomed Eng 2014 Jun;61(6):1772-9.

3.   Mohammed Farooq, Edward Sazonov **"Detection of Chewing from Piezoelectric Film Sensor Signals using Ensemble Classifiers "** Engineering in Medicine and Biology Society (EMBC), 2016 IEEE 38th Annual International Conference on 16-20 Aug. 2016.

4.   Hongsh**eng He, Fanyu Kong Jindong Tan,"** DietCam: Multi-View Food Recognition Using a Multi-**Kernel SVM"** IEEE Journal of Biomedical and Health Informatics (Volume: 20, Issue: 3, May 2016).

5.   Daniele Ravi, Benny Lo an, Guang-Zhong Yang **"Real**-time Food Intake Classification and Energy Expenditure Estimation on a Mobile Device **"Wearable and Implantable Body Sensor** Networks (BSN), 2015 IEEE 12th International Conference on 9-12 June 2015.

6.   Manika Puri Zhwei Zhu, Qian Yu, Ajay Divakran ,Harpreet Sawhley **"Recognition and Volume** Estimation of Food Intake using a Mobile **Device"** Applications of Computer Vision

(WACV), 2009 Workshop on 7-8 Dec. 2009.

7. Mohammed Farooq and Edward Sazonov **"Segmentation and Characterization of Chewing** Bouts by Monitoring Temporalis Muscle Using **Smart Glasses with Piezoelectric Sensor"** in: IEEE Journal of Biomedical and Health Informatics (Volume: PP, Issue: 99) Date of Publication: 14 December 2016

First Author: **Neha Singh** was born in Andaman and Nicobar Island, India in 1994. She is pursuing B.E. in Electronics and Communication Engineering from Sathyabama University, Chennai. Her interested areas are embedded hardware, Biomedical Instrumentation and Image Processing.

Second Author: Nerasimi Raj.X was born in Tamil Nadu, India in 1996. She is pursuing B.E. in Electronics and Communication Engineering from Sathyabama University, Chennai. Her areas of interest are embedded Hardware, Biomedical Instrumentation and Image Processing.

Thrid Author: Shamini. G.I was born in Tamil Nadu, India in 1989. She received her Bachelor Degree in Electronics Engineering from Kerala University. M.tech in VLSI Design from Sathyabama University, Chennai in 2013. She is working as Assistant Professor in Department of ECE in Sathyabama University. Her keen interested are towards VLSI Design, Low Power VLSI Design and wireless communication