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TRACKING THE IMPACT OF PM POSHAN ON CHILD'S HEALTH

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ABSTRACT:

Using our model to keep track of the daily protein, calorie, and weekly menu intake for each child. Make sure kids are going to school and getting at least one nutritious meal per day for their physical and mental development. Provide interested authorities access to a streaming service upon request so they may verify the status of the programme and acquire insights by monitoring and tracking the health of the pupils.
The Pradhan Mantri Poshan Shakti Nirman (PM POSHAN) Centrally Sponsored Programme would provide one hot cooked meal per day in Government and Government-aided Schools from 2021–2025. The Ministry of Education is carrying out the Plan. In addition to the 11.80 crore students in classes I through VIII attending the 11.20 lakh schools, the Plan also provides hot prepared meals to children in pre-schools or Bal Vatika (before class I) at primary schools. Without regard to gender or social background, the Plan is applied to all eligible children throughout the nation. The primary goals of the PM POSHAN Scheme (previously known as the Mid-Day Meal Scheme) are to address two of the most pressing issues facing the majority of children in India, namely hunger and education, by enhancing the nutritional status of eligible students in Government and Government-aided schools as well as encouraging low-income students from disadvantaged sections to attend school more frequently and support their ability to concentrate in the classroom. Calorie estimation from food photos using computer vision has recently been developed. However, the volume and mass of foods are not currently recorded in food image datasets, which results in an inaccurate calorie estimation. Using a deep learning algorithm for food detection and a novel food image dataset containing volume and mass records of foods, we provide in this study a full calorie estimation. Every image in our dataset has related food annotation, volume, and mass records as well as a specific calibration reference. Our collection consists of different photographs. In order to calculate the number of calories in the proposed dataset, we propose a novel food image dataset including records of food's volume and mass in this study. A deep learning technique employing Faster R-CNN is utilized to detect the meal and calibration item in the proposed dataset, after which we estimate each food's volume and calories. The outcomes of the experiment demonstrate the efficacy of our estimation technique. This dataset is the first publicly available set of food image data that can be used to assess calorie calculation techniques based on computer vision.

Keywords: Deep Learning, R-CNN, Machine learning, OpenCV, Algorithms

[1] INTRODUCTION

One of the most important centrally sponsored programmes that prioritizes human rights is Pradhan Mantri Poshan Shakti Nirman (PM POSHAN), formerly known as the National Programme of Mid-Day Food in Schools. The main goal of the programme is to raise the nutritional status of students in classes I through VIII who attend qualified schools.

The issue of untracked growth/health advancement of a youngster over the course of the programme needs to have a remedy put forth.

In order to ensure that nutrition intake is the primary factor in promoting a child's growth, the solution must be able to monitor if the appropriate amount of nutrition, as per the plan, is delivered to the specific child.

Also, it is used to monitor the kids' attendance for lunch and in class. The issue of a child's untracked and unmonitored growth at a school must be addressed, and this means that administrators must monitor attendance for both the midday meal and in class. Biometrics can be used for attendance, or, for quicker attendance, facial recognition. We will utilise Python 3.0's capabilities for machine learning for this.

Our solution is a portal which will enable functionality to monitor and help a user to track the attendance and health status of the beneficiary children of the PM Poshan Scheme.

To identify the item, determine the volume, and ascertain the calorie content, we employ a variety of image processing and classification algorithms. The food item was segmented using a combination of techniques, including canny edge detection, watershed segmentation, morphological operators, and Otsu's method. to count the calories on a food plate in order to monitor the effect it has on one's health.

There is no method to monitor how the resources offered to pupils in government schools are affecting them. Many suggested systems for food recognition, detection, and categorization employ food photographs that people have shot with their smartphones. One of the important steps in calorie monitoring systems used to treat chronic diseases like diabetes, high blood pressure, obesity, etc. is the identification of food items from their images. Photographs of various food poses were captured using various cameras and lighting conditions. Users can measure their calorie consumption and take a photo of the food using our system.

It not only measures and provides actual uncertainty results using food photos, but also explains and discusses uncertainties in image-based food calorie assessment. This appropriately situates our system within the context of instrumentation and measurement research and produces results for food identification systems that are more insightful. We employ four features: colour, texture, size, and form. Compared to utilizing fewer features, using four features considerably improves the system's accuracy.

[2] LITERATURE SURVEY

Year and Title	Algorithm	Result	Limitations /Drawbacks
2021, Computer vision for dietary assessment.	Haar cascade approach in machine learning.	Estimation of nutrients, portions, and calories by understanding the needs of each individual.	Estimating the volumes from the food photos is not accurate
2020, Food classification and calorie estimation using computer vision techniques.	Object detection using CNN. Image segmentation using grab cut algorithm.	Calculating the volume of the food item by image detection.	Cannot calculate the calories of fast food and cooked food items.
2019, Image-based estimation of real food size for accurate food calorie estimation.	CNN for food classification and GrabCut. DepthCalorieCam.	Estimation of food calories from the 2D size of food by combining real size estimation and food segment.	It does not consider 3D food volume data for large-scale calorie annotation.
2019, Food recognition and calorie measurement using image processing and CNN.	CNN for feature extraction and image recognition. CUDA DNN to improve the training speed.	Prediction of food image and estimation of calorie count.	Cannot measure calories of multi-food and complex food items.
2017, Estimating food calories for multi-dish food photos.	Faster R-CNN for detection of multiple foods from an image.Web image mining for classification of 21 category school lunch photos.	Estimation of total food calories from food photos of multiple dishes.	Accuracy is not high and does not work on low-resolution images for accurate results.

[3] BLOCK DIAGRAM

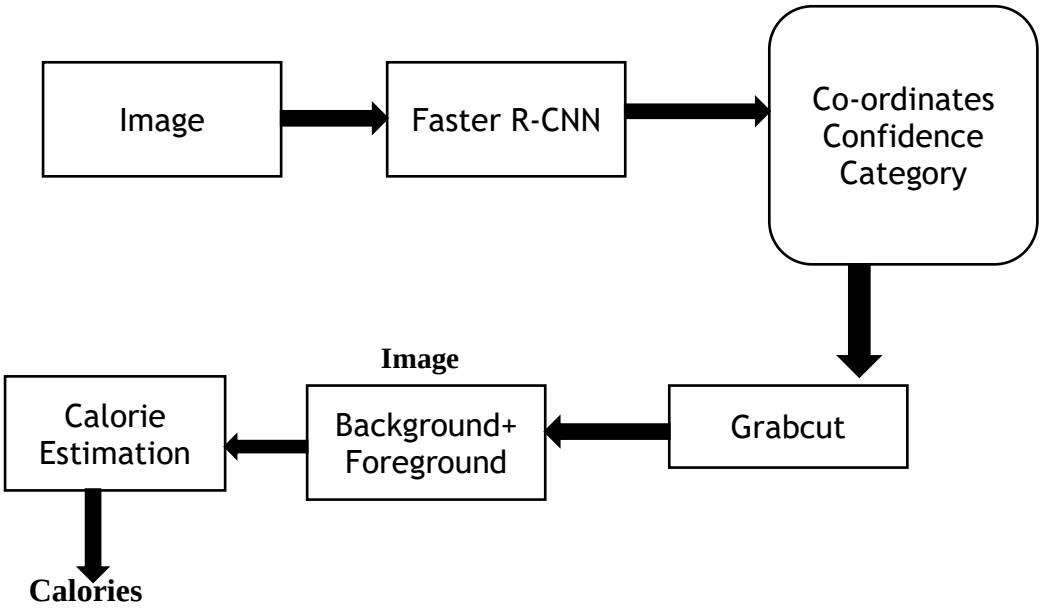

Fig. 1 System block diagram

[4] SOFTWARE REQUIREMENTS SPECIFICATION

The application of the suggested theoretical model is implemented using a desktop software platform. This project consists of a desktop application constructed with the ElectronJS framework for desktop implementation, Python for machine learning modules, and Flask for back-end modules. The front-end is coded with Python, and the user interface is designed with HTML, CSS, and JavaScript.

- **ElectronJS -** Electronjs is a framework to implement cross-platform desktop applications using web technologies (HTML, CSS and JavaScript).
- **Python 3.0 -** Python 3+ provides broad support for machine learning libraries and methods with which we will use image recognition applications.
- **Flask framework -** Flask framework allows us to combine python modules with frontend technologies. The flask framework is used in project implementation to bind python modules with the front end.
- **Web technologies -** HTML, CSS and JavaScript are the web technologies used to implement front-end and user interfaces.

4.1 Dataset

Our dataset was created by manually photographing a food item by the participants in this research. Also, we made advantage of the GitHub dataset. The dataset includes XML files for each image of a food item as well as the image itself. The coordinates of the food item in the specific image are found using the XML file. The collection includes pictures of ten various foods. Apple, banana, bread, donut, mango, lichi, lemon, kiwi, orange, and egg are a few of these. The images are trained using the dataset. Each food item contains thousands of photos in the dataset. We have photos in our dataset with both a single food item and many food items.

[5] Hardware

If available, each class will need its own set of cameras, which will be the hardware needed for academic monitoring. However, installing a single camera at the entrance to a hallway may be a cheap choice.

The particular school may choose how to set up cameras for attendance monitoring. In addition, there will be two cameras in the canteen, one for the top view of the plate and the other for the student's face in front as well as the height of the plate for volume calculations. To ensure that no student is missed while being served, two cameras will be mounted at the serving line's exit.

[6] RESULTS

We will talk about the outcomes of our project's implementation in this section. Our project consists of three phases, and the outcomes of each module are described separately. The computer used for all of our investigations was an Intel(R) Xeon(R) with a 2 GHz CPU, 16 GB of RAM, and an 8.0 GB graphics card.

6.1 Image Detection Results.

This section displays the outcomes of the Faster R-CNN algorithm. To do this, we ran the algorithm on our dataset using a range of testing and training picture counts. Initially, we requested 80% training and 20% testing. Afterwards, we submitted applications for 60% exam and 40% training. Then, we submitted applications for 75% testing and 25% training.

Each image was run via the TensorFlow framework to train the dataset. Once the dataset had been trained, it was tested, and the outcomes were confirmed by examining the image. For all of the photos, it was discovered that the detecting algorithm's accuracy was above 90%.

6.2 Image Segmentation Result

In this part, we go over the grab cut algorithm's findings. The dataset was gathered and entered into the grab cut algorithm. The output was the segmented image.

6.3 Calories Estimation Result

Our project is successful if the computation error is less than 20%. The outcome of the same is shown in the table below.

Food	Calories Original	Calories in results	% Error
Apple	95	92	3.1
Banana	105	99	5.7

Bread	53	57	7.5
Donut	195	203	4.1
Mango	201	210	4.4
Lichi	6	7	16
Lemon	17	18	5.8
Kiwi	42	46	9.5
Orange	87	91	4.5
Egg	78	83	6.4

[7] CONCLUSION

The POSHAN Abhiyan is a good tool for the systematic evaluation of States' and UTs' readiness-related performance. Rich learning has surfaced that will serve as a roadmap for approaches and data enhancement to raise Scores. It is a crucial tool for comprehending the complexity and variability of the nation's performance on nutritional indicators. It represents the first effort to provide a tool for comparing the performance of States and UTs across a range of preparation parameters within specified domains (Governance and Institutional Mechanism, Strategy & Planning, and Service Delivery Essentials). It may not have been flawless on the first try, but it did lay the groundwork for a methodical output- and readiness-based performance monitoring.

[7] ACKNOWLEDGEMENT

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