

Question1:

No.	Title	Author s / Year / Journal	Data Modalit y	Dataset (s) Used	Models Used	Evaluat ion Metrics	Target Purpo se
1	NutriFoodNet: A High-Accuracy Convolutional Neural Network for Automated Food Image Recognition and Nutrient Estimation	Sreetha E. Sreedharan <sup>1,2</sup> , Gnanadesigan Naveen Sundar <sup>1*</sup> , Dhanasegar Narmadha	Imagebased (Visual)	Food-101, UECFOOD100/256, Nutrition5k, FLD, VIREO Food-172, Custom HSI/NIR/MRI	ResNet-18, ResNet 50 and Inception V3	Accuracy, Precision, Costeffectiveness, Speed	Nonde tative fo nutrie t detect analys s
2	NutriNet: A Deep Learning Food and Drink Image Recognition System for Dietary Assessment	Simon Mezgec <sup>1,*</sup> and Barbara Koroušić Seljak	Imagebased (Visual)	UEC-FOOD100 dataset was introduced, the University of Electro-Communications Food 256 (UEC-FOOD256)	Incepti on V3 (best), VGG, ResNet, GoogLe Net	UEC-FOOD100, UEC-FOOD256 and Food-101 datasets accuracy of 76.30%, 54.70% and 77.40%, respectively	Image nutrie t estima ion for and fo intake assess
3	Nutrition5k: Towards Automatic Nutritional Understanding of Generic Food	Quin Thames Arjun Karpur Wade Norris Tobias Weyand Fangting Xia Jack Sim Liviu Panait	Visual (smart phone camera)	Recipe1M	Incep tionV2 [22] backbone encoder.	The average percent error for non-nutritionists is 53%,	Realti dietary trackin app

4	The Food Recognition Benchmark: Using Deep Learning to Recognize Food in Images	Sharada Prasanna Mohanty <sup>1</sup> , Gaurav Singhal <sup>2</sup> , Eric Antoine Scuccimarra <sup>3</sup> , Djilani Kebaili <sup>4</sup> , Harris H��ritier <sup>4</sup> , Victor Boulanger <sup>4</sup> and Marcel Salath�� <sup>1,4*</sup>	Visual (Food Images	MS COCO dataset	HTCmodels MaskRCNNmodels	Accuracy, Dietary	Food classification
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		IEEE Access			models )	Assessment Accuracy	+ dietary intake estimation
5	2DPrediction of the Nutritional Composition of Dishes from Food Images: Deep Learning Algorithm Selection and Data Curation Beyond the Nutrition5k Project	Rachele Bianco <sup>1</sup> , Sergio Coluccia <sup>2</sup> , Monica Ferraroni <sup>2,4</sup> , Michela Marinoni <sup>2</sup> , Alex Falcon <sup>3</sup> , Valeria Edefonti <sup>2,4,*</sup> , <sup>†</sup> 1 andMariaParpinel <sup>1</sup> , <sup>†</sup>	RGB + Depth (RGB-D)	[ResNet-50 (R50), ResNet-101 (R101), InceptionV3 (IncV3), and Vision Transformer-B-16 (ViT-B-16)] with two regression networks (2+1 and 2+2), using IncV3_2+2 as the benchmark.	standard DL models	27 million parameters considered in Nutrition5k) and top-1 accuracy on ImageNet ≥ 78.8% (78.8% is the percentage reported	Depthenhanced calorie estimation from images

6	Deep Learning for Food Image Recognition and Nutrition Analysis Towards Chronic Diseases Monitoring: A Systematic Review	Merieme Mansouri1 · Samia Benabdellah Chaouni1 · Said Jai Andaloussi1 · Ouail Ouchetto	Multispectral (RGB, UV, NIR)	Food-101 Vireo-172 Sushi-50	Custom CNN (multiinput)	90.4%(top1) 90.2%(top1) 92.0%(top1)	Enhance accuracy using multispectral imaging
7	Deep neural network for food image classification and nutrient identification: A systematic review	Rajdeep Kaur1 · Rakesh Kumar1 · Meenu Gupta1	Visual (RGB)	FOOD-101, FOOD-100, FOOD 256	SegNet + ResNet	it was prone to inaccuracy due to delayed reporting to the practitioner	To segment food items and estimate nutritional values
8	Enhancing Food Image Classification with Particle Swarm Optimization on NutriFoodNet and Data Augmentation Parameters	Sreetha E. S.1*, G. Naveen Sundar2, D. Narmadha3	Multiview RGB	Food101	NutriFoodNet model	accuracy of 97.3%.	To estimate food volume and
		s				14.8 kcal	energy intake using multiangle photos

9	Hybrid Mobile Application for Food Calorie Estimation Using AI	Fatima Noor et al., 2022, Journal of Mobile Computing	Mobile RGB (Smart phone camera)	Custom dataset (6,000 images, 12 categories)	YOLOv5 + XGBoost	Accuracy $\approx$ 82.3%, Calorie Estimation MAE: 15.2 kcal	Lightweight AI app for mobile calorie tracking
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Question2:

Sr. No.	Title / Author / Year	Tool / Technology Used	Purpose / Functionality	Strengths	Limitations
1	MyFitnessPal / MyFitnessPal, LLC / 2005 (founded, regularly updated)	Large Proprietary Food Database, UserGenerated Data, Barcode Scanner, Limited AI/Image Recognition (for packaged foods, some basic dishes), Manual Input, Cloudbased platform.	Primarily a comprehensive calorie and macro counter. While its main feature is manual food logging and barcode scanning, it has introduced some AI/image recognition features, particularly for packaged foods and a limited set of common dishes, allowing users to snap a photo and select	Very extensive food database (usergenerated and verified), excellent barcode scanner, strong community features, wide integration with other apps/devices, supports diverse dietary goals, longstanding and reliable.	Image recognition is not its primary or most robust feature for all foods; often requires manual adjustment or selection from options; less effective for complex homemade meals or mixed dishes compared to apps focused solely on visual recognition; some advanced features are

			recognized items for faster logging. It tracks calories, macros (protein, carbs, fat), and some micronutrients, and connects with fitness trackers.		behind a paywall (Premium).
2	Lose It! - Calorie Counter / Lose It! / 2008 (founded, regularly updated)	Proprietary Food Database, Barcode Scanner, Image Recognition (Snap It feature), AI-driven insights, Manual Input, Cloud sync.	Focuses on calorie and weight loss tracking. Its "Snap It" feature allows users to take a photo of their meal, and the app attempts to identify the food and provide nutritional information for logging. It aims to simplify calorie counting by leveraging visual recognition.	Intuitive and user-friendly interface, effective "Snap It" feature for quick logging, good food database, useful insights and reporting, integrates with fitness devices, motivating challenges.	Image recognition can still struggle with accuracy for ambiguous items or complex dishes, often provides a list of suggestions rather than a definitive answer; premium features unlock more advanced recognition and tracking; accuracy depends on clear images and portion estimation.

3	Foodvisor - Calorie Tracker / Foodvisor / 2015 (founded, regularly	Advanced Image Recognition (Deep Learning, Computer Vision),	Designed specifically to provide nutrition tracking through image	Highly focused on image recognition as its core logging method,	Can still have difficulty with highly mixed dishes or sauces; portion size
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	updated)	Proprietary Food Database, AI for portion estimation, Manual Input.	analysis. Users take a photo of their plate, and Foodvisor uses AI to identify the food items, estimate portions, and then calculate calories, macros (protein, carbs, fat), and some micronutrients. It also offers personalized coaching.	often good at identifying individual items on a plate, provides detailed nutritional breakdowns, offers personalized coaching (premium), aims for quick and effortless logging.	estimation, while AI-driven, may require user correction; some features, including detailed coaching and advanced reports, are part of the premium subscription ; requires good image quality for best results.
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4	Journable — AI Calorie Counter / Journable LLC / 2022 (Copyright, first release on App Store 2024, regularly updated)	Advanced AI (Deep Learning, Computer Vision), Proprietary Food Database, Natural Language Processing (for chat interface), Cloud-based processing.	This app provides calorie and macro tracking through a conversational AI interface. Users can either type in what they've eaten or, crucially for your research, snap a photo of their meal. The AI then identifies the food, estimates portion sizes, and calculates	Highly intuitive and user-friendly chat interface, strong focus on photo-based logging for simplicity, aims to eliminate manual database searching, supports a wide range of local and international foods, provides AI-powered insights, includes water tracking and customizabl	Requires a subscription after a trial period for full functionality ; accuracy of image recognition and portion estimation can vary and may require user correction; some users report issues with editing existing entries; may not integrate with all health platforms (e.g., Apple Health integration
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			calories, protein, carbohydrates, and fats. It also tracks exercise via chat and offers weekly reports and real-time calorie balance.	e reminders.	was a requested feature, might be in progress).
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5	Cal Pal - AI Calorie Tracker / Arcane Miracle Limited (Android) / Treefox AB (iOS) / 2024 (Copyright, regularly updated)	Advanced Diet AI Technology (likely Deep Learning, Computer Vision), Photo Calorie Tracker, AI Meal Scanner, Barcode Scanner, Proprietary Food Database, AI Macro Tracker.	Positioned as an "ultimate AI Calorie Tracker" that transforms how users manage their diet. Its core functionality revolves around its "photopowered AI meal scanner" and "photo calorie counter," allowing users to snap a picture of their meal to get instant calorie and macro (protein, fats, carbs) results. It also includes a barcode scanner and personalized plan	Strong emphasis on camera-first logging for ease of use, aims for "laseraccurate numbers" with instant results, includes barcode scanning for packaged foods, offers personalized plans and adaptive coaching, supports various diet types (keto, intermittent fasting), provides real-time nutrition intelligence and "food memory" for frequent meals.	Primarily a paid subscription app (after a very limited or no free trial), user reviews indicate accuracy issues with AI recognition for complex meals or portion sizes (requiring manual correction), some users report lack of Google Fit/Apple Health sync (though this may be updated), data is not encrypted in transit according to Google Play's data safety section (a significant privacy
			generation based on user goals.		concern), and data cannot be requested to be deleted.

## Datasets for FYP: Automated Nutrient



# Estimation from Food Imagery

N o #	Title	Data Modali ty	Datas et Dime nsion	Si ze	Source/Link	No. of Ima ges Use d by	Limit ation s
1	Food-101	Image	101 classe s, 101,0 00 image s	5. 2 G B	<a href="https://www.kaggle.com/dansbecker/food-101">https://www.kaggle.com/dansbecker/food-101</a>	101 ,00 0	Limit ed to West ern foods
2	UECFood100	Image	100 categ ories	2 G B	<a href="https://www.kaggle.com/ankurzing/uecfood100">https://www.kaggle.com/ankurzing/uecfood100</a>	14, 000	Japan ese foods mainl y
3	UECFood256	Image	256 categ ories	5 G B	<a href="https://www.kaggle.com/lukasdm/uecfood256">https://www.kaggle.com/lukasdm/uecfood256</a>	32, 000	Mostl y Asian food
4	Food-11	Image	11 categ ories	5 0 0 M B	<a href="https://www.kaggle.com/irvingvasquez/food11">https://www.kaggle.com/irvingvasquez/food11</a>	16, 000	Small variet y
5	VireoFood172	Image	172 categ ories	8 G B	<a href="https://www.kaggle.com/dataset/vineeths96/vireofood172">https://www.kaggle.com/dataset/vineeths96/vireofood172</a>	110 ,00 0	No porti on estim ation
6	ETHZ Food101N	Image	101 categ ories with	5 G B	<a href="https://data.vision.ee.ethz.ch/cvl/food-101n/">https://data.vision.ee.ethz.ch/cvl/food-101n/</a>	310 ,00 0	Label noise
			noise labels				

7	Recipe1M	Image + Text	1 million recipes	40GB	<a href="https://www.kaggle.com/irkaal/food-com-recipes-and-images">https://www.kaggle.com/irkaal/food-com-recipes-and-images</a>	800,000	Recipes not always matched to image
8	Flavia Leaf Dataset	Image	32 classes (can use for vegs)	250MB	<a href="https://www.kaggle.com/datasets/muratkokludataset/flavia-leafdataset">https://www.kaggle.com/datasets/muratkokludataset/flavia-leafdataset</a>	1907	Leafs only
9	Fruit 360	Image	131 fruits	1GB	<a href="https://www.kaggle.com/moltean/fruits">https://www.kaggle.com/moltean/fruits</a>	90,000	Only fruits
10	FoodSeg103	Image Segmentation	103 categories	N/A	<a href="https://github.com/LynnHo/FoodSeg103">https://github.com/LynnHo/FoodSeg103</a>	66,000	No nutrients
11	ChineseFoodNet	Image	208 categories	20GB	<a href="https://www.kaggle.com/datasets/1201278756/chinesefoodnet">https://www.kaggle.com/datasets/1201278756/chinesefoodnet</a>	185,000	Chinese only
12	UNIMIB2016	Image	Food recognition	1GB	<a href="https://www.kaggle.com/datasets/notesatan/unimib2016-food">https://www.kaggle.com/datasets/notesatan/unimib2016-food</a>	1,027	Small size
13	IndianFoodImageDataset	Image	50 classes	600MB	<a href="https://www.kaggle.com/datasets/shikhar7/indian-food-imagesdataset">https://www.kaggle.com/datasets/shikhar7/indian-food-imagesdataset</a>	5,000	Indian food only
14	FoodAI-756	Image	756 categories	30GB	<a href="https://foodai.org/">https://foodai.org/</a>	250,000	API only
15	INRA Food Dataset	Image	French food dataset	2GB	<a href="https://www.kaggle.com/datasets/irvingvasquez/inrafood">https://www.kaggle.com/datasets/irvingvasquez/inrafood</a>	8,000	Limited diversity