DIET ADVISOR: AN IMAGE-BASED FOOD INTAKE ANALYSIS AND MEAL RECOMMENDATION SYSTEM

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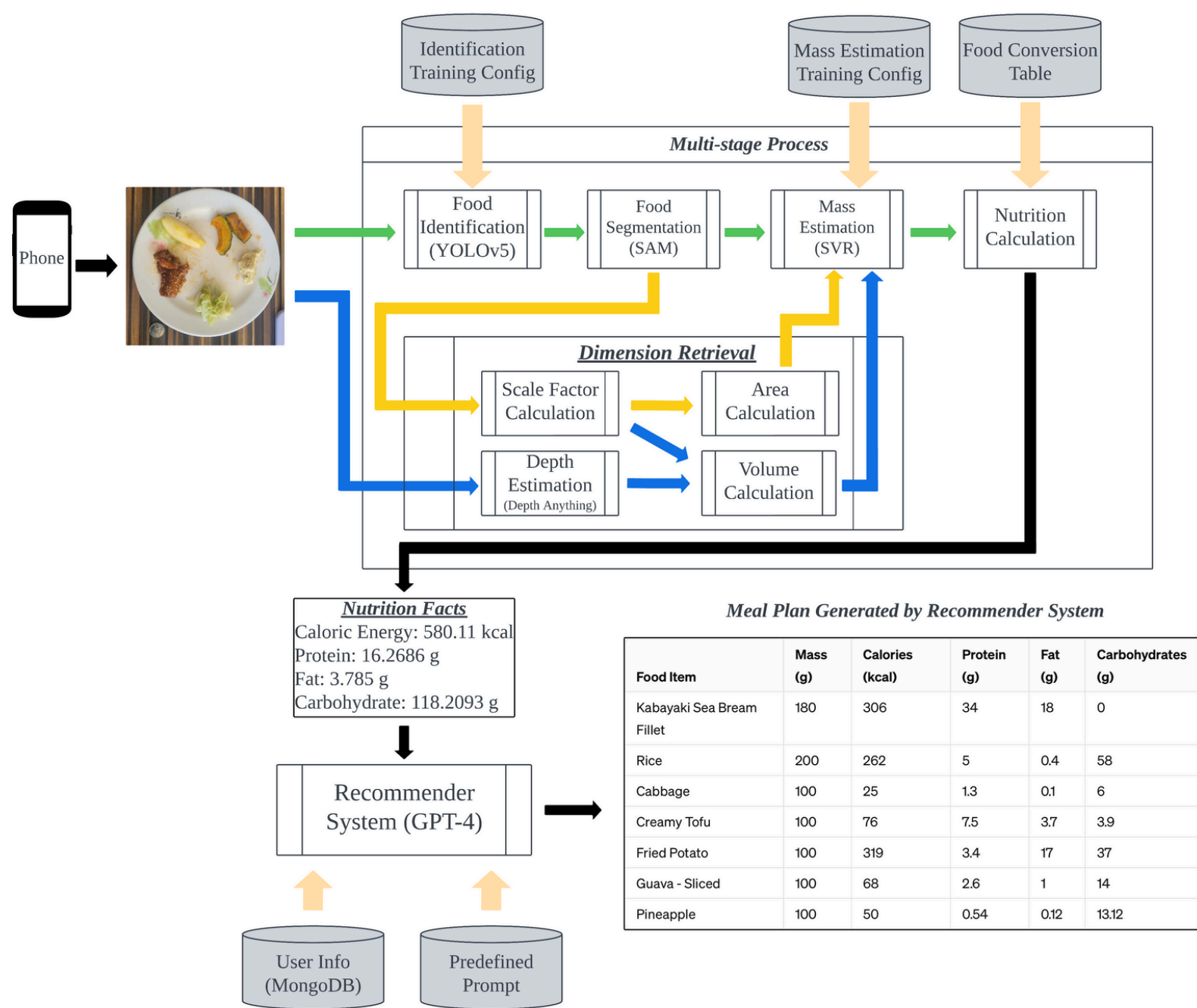DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION ENGINEERING,

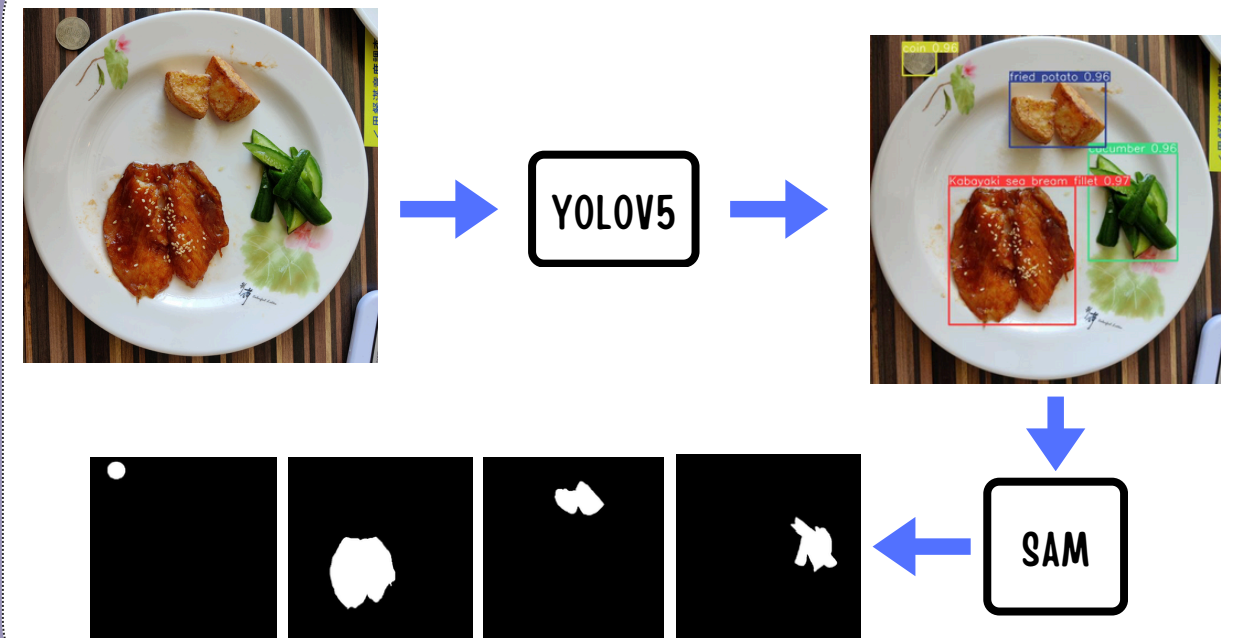NATIONAL DONG HWA UNIVERSITY, HUALIEN, TAIWAN

INTRODUCTION

Introducing an innovative nutrition system that leverages advanced deep learning and computer vision to calculate the nutritional content of a meal from a single image. The system utilizes object detection model trained on a custom dataset, state-of-the-art segmentation, and depth estimation techniques to accurately determine the real-world size of food items, enhancing the precision of our machine learning model in estimating food masses for nutritional analysis. It also provides personalized meal recommendations based on user-specific physical and dietary information. The system is presented through a user-friendly interface, making it easy for users to access and navigate all functionalities.

ARCHITECTURE

Nutrition Facts
Caloric Energy: 580.11 kcal
Protein: 16.2686 g
Fat: 3.785 g
Carbohydrate: 118.2093 g

Meal Plan Generated by Recommender System

Food Item	Mass (g)	Calories (kcal)	Protein (g)	Fat (g)	Carbohydrates (g)
Kabayaki Sea Bream Fillet	180	306	34	18	0
Rice	200	262	5	0.4	58
Cabbage	100	25	1.3	0.1	6
Creamy Tofu	100	76	7.5	3.7	3.9
Fried Potato	100	319	3.4	17	37
Guava - Sliced	100	68	2.6	1	14
Pineapple	100	50	0.54	0.12	13.12

FOOD IDENTIFICATION & SEGMENTATION

DEPTH ESTIMATION

MASS MODEL PERFORMANCE

Regression Algorithm	Input Data	RMSE (g)	MAPE (%)
Linear Regressor	Food type + Area	9.02	16.53
	Food type + Volume	8.78	15.67
	Food type + Area + Volume	7.78	14.35
Decision Tree Regressor	Food type + Area	9.39	16.5
	Food type + Volume	8.94	15.07
	Food type + Area + Volume	8.13	14.58
Random Forest Regressor	Food type + Area	9.31	15.31
	Food type + Volume	9.01	14.46
	Food type + Area + Volume	7.01	11.85
SVR	Food type + Area	8.13	13.63
	Food type + Volume	8.07	13.14
	Food type + Area + Volume	**6.73**	**11.8**

REGRESSION MODEL RESULTS ON VALIDATION DATASET

Overall RMSE: 6.70
Overall MAPE: 11.40%
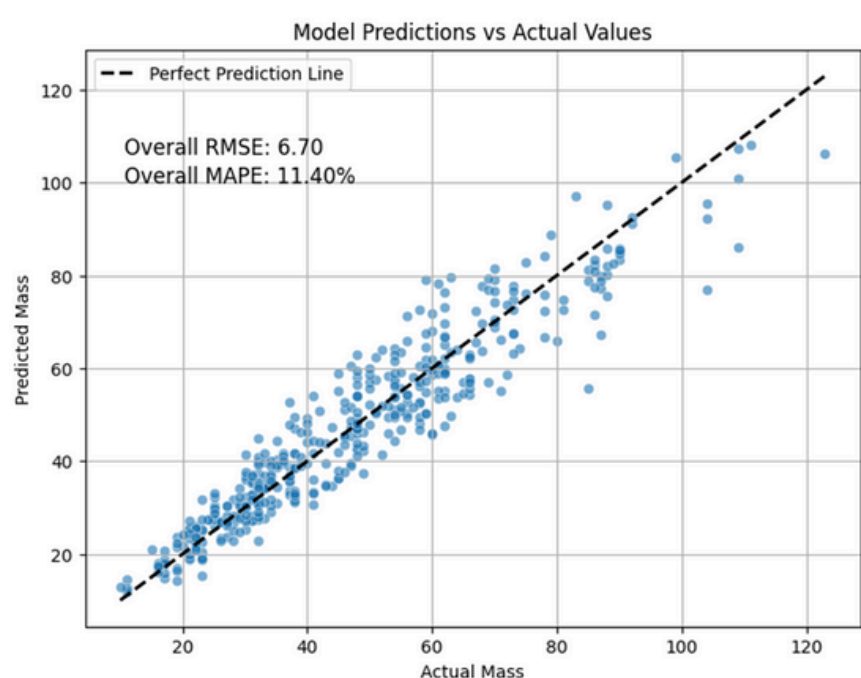
TRAINED SVR MODEL ON TEST DATASET

USER INTERFACE