

FRUIT CLASSIFICATION AND CALORIE ESTIMATION USING MACHINE LEARNING

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Accurate nutritional tracking is crucial to health care, but the traditional methods of establishing fruits and estimating their calorie content are cumbersome and imprecise. This article presents a unified approach utilizing machine learning, specifically Convolutional Neural Networks (CNNs), for applying automatic fruit classification and subsequent approximation of calories using digital images. We developed and trained a CNN model using TensorFlow and Keras on a heterogeneous set of thousands of fruit images and achieved good classification accuracy (97.96% on independent test set) across nine fruit categories (Apple, Banana, Cherry, Chickoo, Grapes, Kiwi, Mango, Orange, Strawberry). The system integrates this classification with a database query for nutrition to provide rough caloric content per standard serving (100g). Key contributions are: Effective CNN architecture tailored for fruit image classification; An end-to-end Python-based pipeline incorporating classification and calorie information retrieval; and An interactive GUI developed using PyQt5 to illustrate the real-world application. The model is very accurate in identifying various fruits, demonstrating its utility in preventing the tedious process of diet tracking by hand and delivering personalized nutrition information. Potential applications vary to intelligent farming for sorting/quality checking and food processing for computerized evaluation, illustrating the versatility of advanced image classification techniques in health and manufacturing applications.