**Literature Survey**

Hossain et. al[1]. proposes a deep learning model for fruit classification as it is an important task in many industrial applications. A fruit classification system may be used to help a supermarket cashier identify the fruit species and prices. It may also be used to help people decide whether specific fruit species meet their dietary requirements. Hossain et. al. proposes an efficient framework for fruit classification using deep learning. The framework is based on two different deep learning architectures. The first is a proposed light model of six convolutional neural network layers, whereas the second is a fine-tuned visual geometry group-16 pre-trained deep learning model. Two color image datasets, one of which is publicly available, are used to evaluate the proposed framework. The first dataset (dataset 1) consists of clear fruit images, whereas the second dataset (dataset 2) contains fruit images that are challenging to classify. Classification accuracies of 99.49% and 99.75% were achieved on dataset 1 for the first and second models, respectively. On dataset 2, the first and second models obtained accuracies of 85.43% and 96.75%, respectively.

Chithra PL et al[2]. have proposed a new method for classifying fruits using image processing. The data set contains 70 apple images and 70 banana images for training and 25 images of apples and 25 images of bananas for testing. RGB images were first converted into HSI images. Then by using Otsu’s thresholding method the region of interest was segmented by taking into account only the HUE component image of the HSI image. Later, after background subtraction, a total of 36 statistical and texture features were extracted with the help of the coefficients obtained by applying wavelet transformation on the segmented image using Haar filter. The extracted features were given as inputs to a SVM classifier to classify the test images as apples and bananas. As KNN classification method did not give 100% accuracy while classification SVM classification method was used. 140 sample images of apples and bananas were used for training and 25 images of bananas and 25 images of apples were used for testing the proposed algorithm. The proposed algorithm gave a 100% accuracy rate.

Ormsbee et al[3]. tries to optimize pre-exercise nutritional strategies for endurance performance in his paper. They found out that timing and composition of the pre-exercise meal is a significant consideration for optimizing metabolism and subsequent endurance performance. Consuming a CHO-rich meal in the hours prior to endurance exercise had improved performance. Performance was also seen to be improved by ingesting CHO within 60 min of exercise. High fat meals may enhance fat oxidation during subsequent exercise, although the performance effects are unclear, most studies report that there is no benefit or decrement *versus* a CHO meal. Finally, caffeine and beetroot juice (dietary nitrates) appeared to enhance performance, although these effects may be modulated by genetic factors and/or training status.

Convolutional neural networks can automatically extract features by directly processing original images, which has attracted wide interest from researchers in fruit classification terms. However, it is difficult to obtain more accurate identification due to the complexity of class similarity. VGG16 has been used to recognize different types of fruit images. Next, the fruit data set which includes 6 classes also created for network model training and evaluation performance. Images of a group of fruits were collected and a deep convolutional neural network was built to identify six types of fruits. Indicating the feasibility of this model, the ratio reached 100%. Inclusive the approach to training real learning models on large, publicly available image data sets offers a clear path toward easy fruit classification. In this paper, Abu-Jamie et. al[4]. proposes a machine learning based approach for classifying and identifying 6 different fruits with a dataset that contains 2677 images

Mureşan et. al[5]. introduces a new, high-quality, dataset of images containing fruits. They also present the results of some numerical experiments for training a neural network to detect fruits.

**References:**

[1] Hossain, M. Shamim, Muneer Al-Hammadi, and Ghulam Muhammad. "Automatic fruit classification using deep learning for industrial applications." *IEEE transactions on industrial informatics* 15.2 (2018): 1027-1034.

[2] Chithra PL, Henila M. Fruits classification using image processing techniques. International Journal of Computer Sciences and Engineering. 2019 Mar;7(5).

[3] Ormsbee, Michael J., Christopher W. Bach, and Daniel A. Baur. "Pre-exercise nutrition: the role of macronutrients, modified starches and supplements on metabolism and endurance performance." *Nutrients* 6.5 (2014): 1782-1808.

[4] Abu-Jamie, Tanseem N., et al. "Six Fruits Classification Using Deep Learning." (2022).

[5] Mureşan, Horea, and Mihai Oltean. "Fruit recognition from images using deep learning." *arXiv preprint arXiv:1712.00580* (2017).