TITLE

AI POWERED NUTRITION ANALYSER FOR FITNESS ENTHUSIASTS

ABSTRACT

- This project describes the deep learning algorithm algorithm for fruit image nutrion analysis quality measurement and food recommendation
- Deep learning based algorithm is implemented for fruit image calorie measurement and nutrion analysis of image
- CNN based algorithm is implemented for train the datasets and make the pretrain model
- Its consists of input layer ,convolution layer ,ReLu(Regression logic unit layer) is used for train the datasets

INTRODUCTION

- Based on the literature we conclude that you can say that on average organic dairy products contain a higher amount of good fatty acids (omega 3 and CLA), organic leaf vegetables have a higher vitamin C content, organic fruit and vegetables contain more antioxidants and that organic products have a higher dry matter content, resulting in relative more nutrients per portion.
- Further, more recent work showed that with respect to mycotoxins and bacteria organic foods were equally good or slightly better than conventional.
- Though some differences between the cultivation systems exist when looking at a mean level, it is also clear that a huge variation in nutrient content exist between the products of the same cultivation system.

Deep learning system

- In deep learning, a **convolutional neural network** (**CNN**, or **ConvNet**) is a class of deep neural networks, most commonly applied to analyzing visual imagery
- **Deep learning** is an AI function that mimics the workings of the human brain in processing data for use in detecting objects, recognizing speech, translating languages, and making decisions. **Deep learning** AI is able to **learn** without human supervision, drawing from data that is both unstructured and unlabeled.

LITERATURE SURVEY

S.NO	TITLE	AUTHOR	DESCRIPTION	MERITS AND DEMERITS
1	Estimation of the moicrobiological quality of meat using rapid and non-invasive spectroscopic sensors	Lemonia Christina fengou, evgenia spyrelli.	Spectroscopic methods in tandem with machine learning methodologies have attracted considerable research interest for the estimation of food quality Svm based algorithm is implemented here	Less accuracy ,less sensitivity
2	DoFP-ML A machine learning approach to food quality monitoring using a DoFP polarization image sensor	Maen takruri, hessa al shehhi	Good nutrition is an important part of leading a healthy lifestyle. This has brought into stark focus the need for efficient and low-cost methods for large scale food quality assessment..	We can identify the food items quality But its high computation cost
3	Food quality monitoring system based on smart contracts and evaluation models	Bin yu, Ping Zhan, ming lei	food quality has become a major concern for the food industry. To efficiently detect food quality problems during the production process, food enterprises must build quality monitoring systems. However, in a traditional quality monitoring system, data tampering and centralized storage have become barriers to reliability	High reliable ,monitoring of food items is possible disadvantages the quality of food items not identified
4	A machine learning approach for lamp meat quality assessment using FTIR spectra	Rocio alaiz rodriguez , Andrew c. parnell	The lamp meat quality is measured ,not its accuracy	Less accuracy ,sensitivity
5	Blockchain driven IoT for food traceability with an integrated consensus mechanism	Yung po tsang, king lun choy	**food traceability**, lightweight and vaporized characteristics are deployed in the **blockchain**, while an **integrated consensus mechanism** that considers shipment transit time,	high computation time Reduced running time

S.NO	TITLE	AUTHOR	DESCRIPTION	MERITS AND DEMERITS
6	Nutritional Quality And Safety Traceability System For China's Leafy Vegetable Supply Chain Based On Fault Tree Analysis And QR Code	Yuhong Dong, Zetian Fu	**Deep Learning-Based Food Quality Estimation Using** Radio ... storage conditions, **using** the self-developed **RF-powered sensor** mote	We can detect the quality food items,RF sensor mode only wrok under some mode
7	Food Safety Supervision System Based On Hiearachical Multi Domain Blockchain Network	QI Tao, Xiaohui Cui		
8	Image Recognition Method Based On An Improved Convolutional Neural Network To Detect Impurities In Wheat	Yin Shen, Yanxin	The neural network algorithm is implemented for extract the features of wheat images	Less accuracy ,less sensitivity
9	Plan For Food Inspection For Inflated-pareto Data Under Uncertainly Environment	Muhammed Aslam, Saminathan Balamurali	The traditional food supervision system has problems such as lack of industry chain and data fragmentation, which has caused the phenomenon of field regulation to be uncomprehensive in the existing regulatory system and the disposal of response lag	▪ can support timely correction ▪ smart contracts combined with the food industry standards.
10	Deep Learning Based Food Quality Estimation Using Radio Frequency Powered Sensor Mode	Minh Binh Lam, Trung Hau Neuyen	Deep learning algorithm implemented for recognized the food items quality at the some frequency range .	Good quality ,some range of detection ,not accuracy

SCOPE OF PROJECT

- Scope of the project we design web UI for make website and predict the nutrion content present in the image
- And also detect the how long the food items we can keep and calories measurement ,this will be used for food industry

ALGORITHM

- CNN algorithm is implemented for detect the food quality
- Recurrent neural network is a multilayer perceptron that is the special design for identification of two-dimensional image information .
- CNN is consists of number of layer function of convolution layer integrated with number of Layer function .
- Convolution Neural Networks (RCNN) are a class of artificial neural network which became more popular in the recent years. The RNN is a special network, which has unlike feedforward networks recurrent connections.
- The major benefit is that with these connections the network is able to refer to last states and can therefore process arbitrary sequences of input.

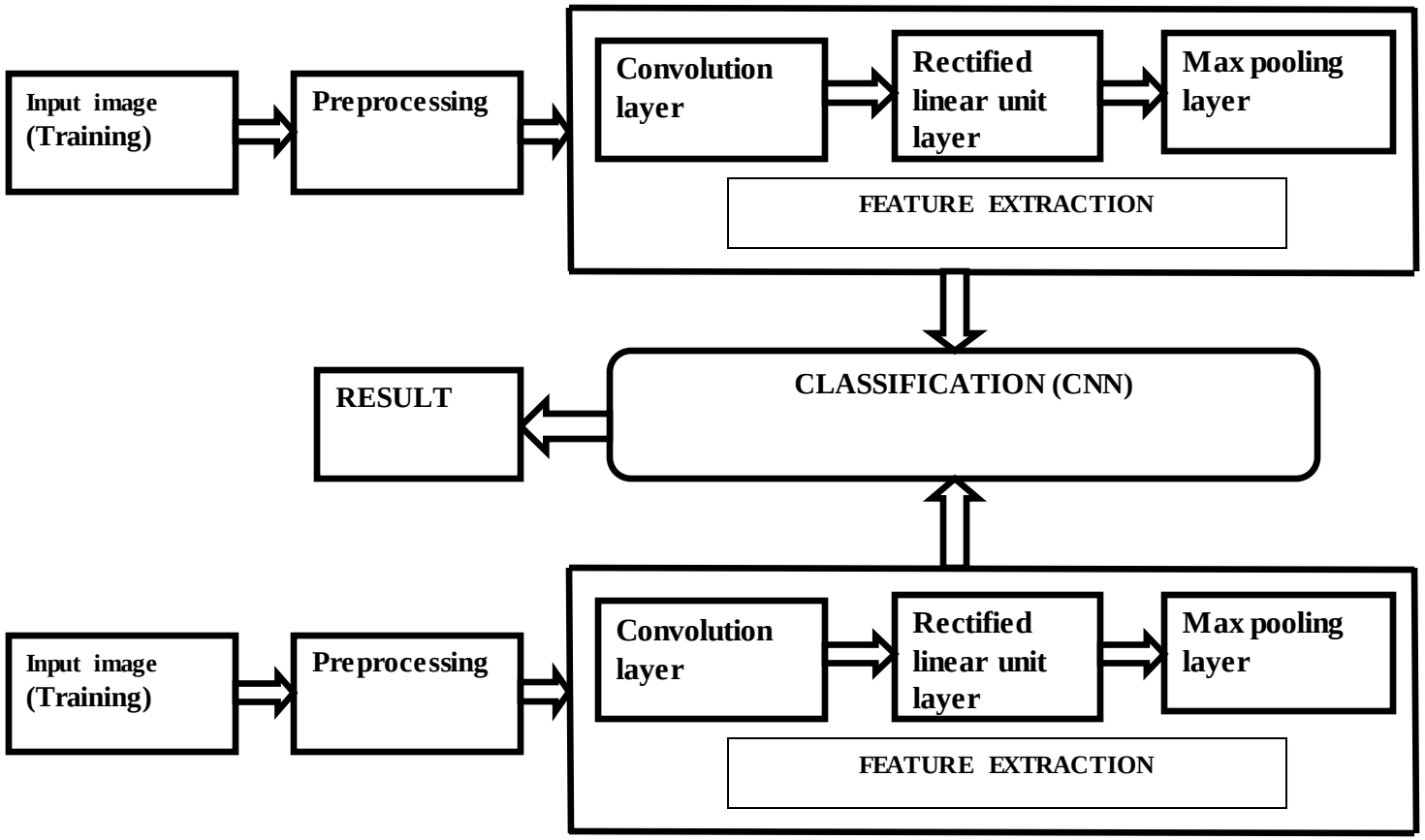
Merits

- CNN algorithm need experience in architecture design, and need to debug unceasingly in the practical application, in order to obtain the most suitable for a particular application architecture of CNN.
- Based on gray image as the input of 96 □ 96, in the preprocess stage, turning it into 32 □ 32 of the size of the image. Design depth of the layer 7 convolution model: input layer, convolution layer C1, sub sampling layer S1, convolution layer C2, sampling layer S2, hidden layer H and output layer F

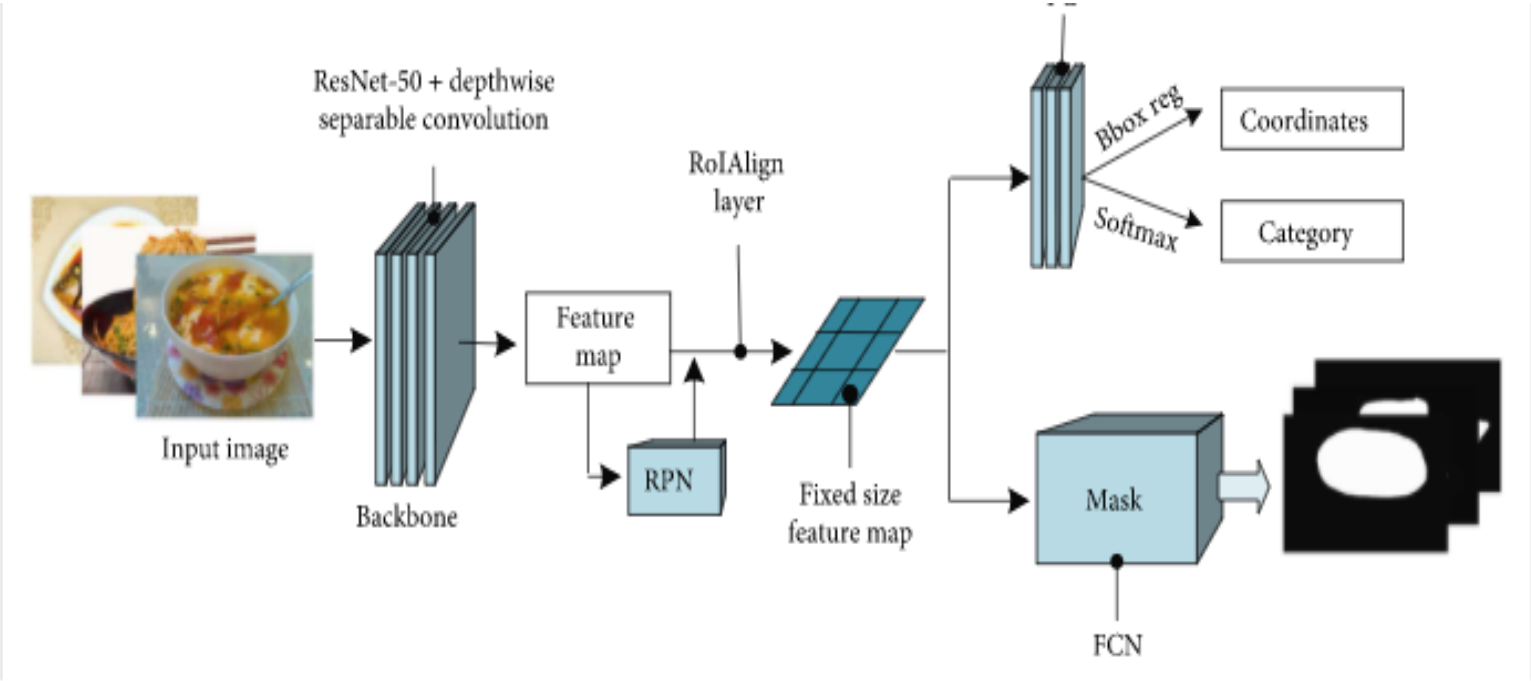
Disadvantages

- Less accuracy
- Less sensitivity
- Less specificity
- High computation time

architecture



R -C NN net layer function



MODULES

1.DATA SET COLLECTION

2.DATA PROCESSING

3.CNN LAYERS TRAINING

4.FEATURE EXTRACTION

5.CLASSFICATION

- Convolutional neural network is a class of deep learning methods which has become dominant in various computer vision tasks and is attracting interest across a variety of domains, including radiology
- Convolutional neural network is composed of multiple building blocks, such as convolution layers, pooling layers, and fully connected layers, and is designed to automatically and adaptively learn spatial hierarchies of features through a backpropagation algorithm.

MODULES DECRIPTION

- An image processing based approach to measure the calorie content present in the food image. In the food category, we can take fruits images as the input dataset.
- We going to collected data set we collected jpg ,png are collected set the images values

Data processing

- Input food images are in RGB format. The input image was converted into different channels i.e, Red band, Green band and Blue band separately.
- The input RGB image was further converted into grayscale using RGB to gray conversion process
- Based on RGB image we need choose values after RGB we need to separated the color image from the RGB image. All the image preprocessed and resized into the size [256,256]

CNN layers training

- **Convolution layer**
- A convolution layer is a fundamental component of the CNN architecture that performs feature extraction, which typically consists of a combination of linear and nonlinear operations, i.e., convolution operation and activation function.

- Convolution is a specialized type of linear operation used for feature extraction, where a small array of numbers, called a kernel, is applied across the input, which is an array of numbers, called a tensor.
- An element-wise product between each element of the kernel and the input tensor is calculated at each location of the tensor and summed to obtain the output value in the corresponding position of the output tensor, called a feature map.
- This procedure is repeated applying multiple kernels to form an arbitrary number of feature maps, which represent different characteristics of the input tensors; different kernels can, thus, be considered as different feature extractors.
- Two key hyperparameters that define the convolution operation are size and number of kernels. The former is typically 3×3, but sometimes 5×5 or 7×7. The latter is arbitrary, and determines the depth of output feature maps.

- The convolution operation described above does not allow the center of each kernel to overlap the outermost element of the input tensor, and reduces the height and width of the output feature map compared to the input tensor.
- Padding, typically zero padding, is a technique to address this issue, where rows and columns of zeros are added on each side of the input tensor, so as to fit the center of a kernel on the outermost element and keep the same in-plane dimension through the convolution operation

Max pooling

- The most popular form of pooling operation is max pooling, which extracts patches from the input feature maps, outputs the maximum value in each patch, and discards all the other values.

Global average pooling

- Another pooling operation worth noting is a global average pooling.
- A global average pooling performs an extreme type of downsampling, where a feature map with size of height $\times$ width is downsampled into a 1×1 array by simply taking the average of all the elements in each feature map, whereas the depth of feature maps is retained.
- This operation is typically applied only once before the fully connected layers.
- The advantages of applying global average pooling are as follows: (1) reduces the number of learnable parameters and (2) enables the CNN to accept inputs of variable size

Fully connected

- **Fully connected layer**

The output feature maps of the final convolution or pooling layer is typically flattened, i.e., transformed into a one-dimensional (1D) array of numbers (or vector), and connected to one or more fully connected layers, also known as dense layers, in which every input is connected to every output by a learnable weight.

Once the features extracted by the convolution layers and downsampled by the pooling layers are created, they are mapped by a subset of fully connected layers to the final outputs of the network, such as the probabilities for each class in classification tasks.

The final fully connected layer typically has the same number of output nodes as the number of classes. Each fully connected layer is followed by a nonlinear function, such as ReLU, as described above.

Training network

- Training a network is a process of finding kernels in convolution layers and weights in fully connected layers which minimize differences between output predictions and given ground truth labels on a training dataset.
- Backpropagation algorithm is the method commonly used for training neural networks where loss function and gradient descent optimization algorithm play essential roles.
- A model performance under particular kernels and weights is calculated by a loss function through forward propagation on a training dataset, and learnable parameters, namely kernels and weights, are updated according to the loss value through an optimization algorithm called backpropagation and gradient descent, among others

CONCLUSION

- we accomplish food quality recognition by using deep learning algorithm.
- We mainly apply the algorithm of convolution neural network to excavate the deep information of multi-layer network in the process of food quality and food calories recognition .
- And we also utilize the algorithm to make parallel computing on the cloud platform for accelerating the process of face recognition

SYSTEM REQUIREMENT

- Front end :HTML,CSS
- Back end :python
- Frame work: Django

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