Categorization of Thai Fast Food Based on Image Classification

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***Abstract*: This survey uses the prediction model for classification of Thai Fast Food images. The model uses a deep learning process that was trained on natural images using dataset and was fine-tuned to generate the predictive Thai fast food model. We are taking images from the dataset called Thai Fast Food which is publically available. The dataset contain images and is divided into eleven groups of food images comprised of omelet on rice, rice topped with stir-fried chicken and basil, barbecued red pork in sauce with rice, stewed pork leg on rice, Thai fried noodle, rice with curried chicken, steamed chicken with rice, shrimp-paste fried rice, fried noodle with pork in soy sauce and vegetables, wide rice noodles with vegetables and meat. The final group comprised dishes which are not members of the other ten groups listed (non ten- types), but which exist among Thai fast food. The process contains feature extraction of food and then classification. After prediction of food the calorie related to that food will be shown by the system.**

***Keywords*: Thai fast food images; deep learning; classification**

Introduction:

Image recognition research had been advancing very rapidly, with new applications being proposed in various domains. One of these domains is the image recognition of foods, which is potentially very useful for monitoring of diets or estimating the amount of calories consumed. Food image recognition is one of the capable applications of object recognition technology, since it will help estimate food calories and analyze people's eating habits for healthcare. This paper provides a prediction model for classification of Thai fast food images. The model uses a deep learning process that was trained on natural images and was fine-tuned to generate the predictive Thai fast food model. This paper presents a prediction model for classifying Thai fast food images and detecting the calorie related to TFF. The model uses a deep learning process that was trained on natural images and was fine-tuned to generate the predictive Thai fast food model. To perform classification the CNN algorithm is used.

Literature Survey:

A lot of studies are performed on the food image recognition. The work in [1] use the Overfeat [2] deep convolutional neural networkfor extraction of features from images of food from the UEC-FOOD100 dataset by removing the last softmax layer and using the output of there maining network as features. They also combine these features with those extracted from hand-crafted color patches and RootHOG patches, coded into Fisher vector [3]. Two separate classifiers were used: SVM for the features extracted from the Overfeat network and AROW [4] for the hand-crafted features. The outputs of the classifiers were combined in the late fusion manner [5]. The report accuracies were 72.26% as the top-1 accuracy and 92.00% as the top-5 accuracy. The authors improved upon their own work in [6] by pre-training a deep convolutional neural network based on the AlexNet architecture [7] on the ImageNet2000 dataset and then fine-tuning on the UEC-FOOD100 and the UEC-FOOD256 datasets. They also combine the features extracted by the convolutional neural network with hand-crafted feature based on color patches and RootHOG patches like in their previous work. The reported accuracies were 77.35% top-1 and 94.58% top 5 for the UECFOOD10 dataset and 63.77% top-1 and 85.82% top-5 for the UEC-FOOD256 dataset. The work in [8] used the inception deep convolutional network architecture [9] to address the problem of food classification. The authors also pre-trained the network on the ImageNet dataset and then fine-tune the network with UECFOOD100 food dataset. They reported accuracies of 76.3% top- 1 and 94.6% top-5. However, unlike in [1, 6] they did not use any hand-crafted features. Similar approach was used in [10], but the authors used a newer version of the inception architecture call Inception V3 [11]. They also pre-train the network on the ImageNet dataset before fine tuning on the food database. The reported accuracies for the UEC-FOOD100 were 81.45% top-1 and 97.25% top-5, for the UEC-FOOD256 they reported accuracies of 76.17% top-1 and 92.58% top-5. In [12] the author focused on Thai foods in the THFOOD-50 dataset. They used an architecture proposed in their own work called Nu-InNet which is based on the inception architecture. The key difference between Nu InNet and inception is that all large convolutions are replaced by 3×3 convolutions in order to bring the computational cost down enough to run well on a smart phone. Like in other work they pre-train their network on the ImageNet dataset and then fine-tune on the actual food database. They only reported top-1 accuracy which was 80.34% for the THFOOD-50 dataset.

Problem Statement:

To implement and design the system to identify and classify the Thai Fast Food into the eleven categories and estimate the calorie related to that predicted food. To implement the deep learning algorithms in order to address the problem of TFF classification. To make a use of trained dataset based on deep learning. To estimate the calories based on the predicted image.

Design Goals:

The goal of the system is to predict the Thai Fast Food and estimate calorie related to that predicted food.

Proposed Work:

In the proposed system, Thai fast food is an dataset used in the system for prediction of food. To predict, which Thai food it is, image processing technique is used. Dataset which is used in the paper has eleven food category images. So the classification will be into the eleven classes. First of all the user will register themselves to the system. After registration for authentication of user OTP has been send to the user's mail id. Then only user can login into the system. User then uploads the image which is related to Thai fast food into the system, the convolutional neural network algorithm is used for the classification. As a result will get predicted image and system will estimate the calorie of that image.

System Design:

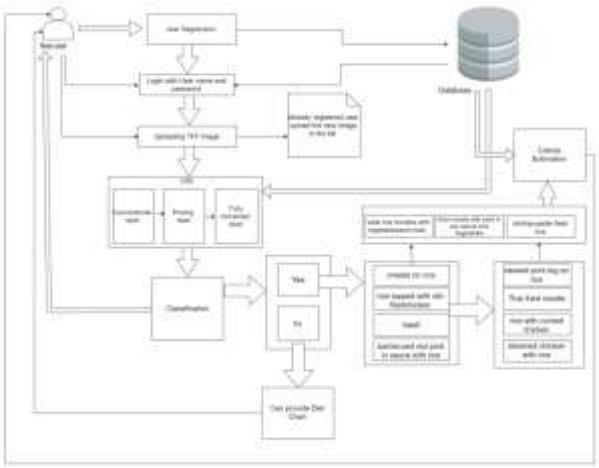

Fig. System Design

Conclusion:

This research study examined the use of deep learning algorithm in order to address the problem of TFF classification. The system classified the TFF into eleven categories. The TFF dataset consisted of differing dishes i.e eleven category. The initial analysis of the TFF images for these foods could then be conducted using the results as test images. System identifies the calories related to the image predicted.

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