



Fig1. Check the nutritional information of a product from a photo of a label.

NUTRITIONAL INFORMATION EXTRACTION FROM IMAGES

AUTOMATIC NUTRITIONAL INFORMATION EXTRACTION FROM PHOTOGRAPHIC IMAGES OF LABELS

Motivation

In the past years people showed an increasing interest in improving their diet. Many factors can be pointed to this growth, being one of them the alarming explosion of diet related diseases. This group of diseases is progressively becoming the most common cause of death.

Currently, almost all food products on the market contain nutrition labels, which is any information that appears on the product package referring to the values of the following nutrients: energy, proteins, carbohydrates, fats, dietary fiber, sodium, vitamins and minerals. This information provides a great insight of a product composition and helps the consumers to make healthier food choices.

Problem

Since the labels do not have a regulated or standard format, each product often presents the nutrition information differently, leading to a wide variety of nutrition labels present in the market.

The previous fact, combined with the high amount of information displayed and the difficulty of interpreting the data without the necessary knowledge, makes the extraction of relevant data and its analysis a hard task for consumers.

One of the solutions to simplify this task is to present a summary of nutrition information as a complement to the nutrient-specific information.

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Objective

The main objective of this project is to develop a tool that helps the user to analyze relevant nutritional information from a product, by means of a mobile application.

Features

- Take picture of a food label using a mobile device
- Extract and present the nutritional information of a food product
- Compare nutritional values between two products of the same type



Fig2. Compare two products.

Solution

The main outcome of this project is to overcome this problem and offer the consumer a tool to help in the extraction and interpretation of these values, using an Android application. This application automatically extracts the nutritional declaration and presents it in a single, cross-sectional shape, following the new regulations and with some additional aids, including relative values to the recommended daily doses and simplified schemes. In addition to this feature, it is also possible to compare between two products of the same category.

Implementation

The system developed is composed by two components: a mobile application and a server application.

The mobile application is the main component of the system and it is developed for Android smartphones.

The application allows the user to check the nutritional information on a product and compare two products of the same category.

Besides, all the pre and post operations regarding image processing are performed in the mobile device. The server was developed to complement the Android application. The main objective is to use the server whenever the user has an Internet connection, significantly reducing the time of processing of the conversion of images to text and achieving better Optical Character Recognition (OCR) results.

Conclusions and Results

In the initial planning, the application was designed to be standalone. However, due to the problems found throughout the development of this project, such as the low accuracy of the OCR engine, and also the unsatisfactory results obtained with different pre-processing operations and a high sensitive post-processing, it was necessary to find a better solution. So a server was added and the four frames prior to the actual photo, were included in the processing. These four frames suffer different processing operations, leading to an increase of the accuracy to 55% and a decrease to 8% of 0 matches. An improvement of almost the double of the initial accuracy and a decrease of one third of the labels that return 0 matches was achieved when compared with the standalone solution.