**LITERATURE SURVEY**

# 1) Application of Deep Learning in Food: A Review

# AUTHORS: [Lei Zhou](https://onlinelibrary.wiley.com/action/doSearch?ContribAuthorRaw=Zhou%2C+Lei),[Chu Zhang](https://onlinelibrary.wiley.com/action/doSearch?ContribAuthorRaw=Zhang%2C+Chu)

Deep learning has been proved to be an advanced technology for big data analysis with a large number of successful cases in image processing, speech recognition, object detection, and so on. Recently, it has also been introduced in food science and engineering. To our knowledge, this review is the first in the food domain. In this paper, we provided a brief introduction of deep learning and detailedly described the structure of some popular architectures of deep neural networks and the approaches for training a model. We surveyed dozens of articles that used deep learning as the data analysis tool to solve the problems and challenges in food domain, including food recognition, calories estimation, quality detection of fruits, vegetables, meat and aquatic products, food supply chain, and food contamination. The specific problems, the datasets, the preprocessing methods, the networks and frameworks used, the performance achieved, and the comparison with other popular solutions of each research were investigated. We also analyzed the potential of deep learning to be used as an advanced data mining tool in food sensory and consume researches. The result of our survey indicates that deep learning outperforms other methods such as manual feature extractors, conventional machine learning algorithms, and deep learning as a promising tool in food quality and safety inspection. The encouraging results in classification and regression problems achieved by deep learning will attract more research efforts to apply deep learning into the field of food in the future..

# 2) Classifying food images represented as Bag of Textons

# AUTHORS: [Giovanni Maria Farinella](https://ieeexplore.ieee.org/author/37567591100); [Marco Moltisanti](https://ieeexplore.ieee.org/author/37085387023); [Sebastiano Battiato](https://ieeexplore.ieee.org/author/37271390200)

# The classification of food images is an interesting and challenging problem since the high variability of the image content which makes the task difficult for current state-of-the-art classification methods. The image representation to be employed in the classification engine plays an important role. We believe that texture features have been not properly considered in this application domain. This paper points out, through a set of experiments, that textures are fundamental to properly recognize different food items. For this purpose the bag of visual words model (BoW) is employed. Images are processed with a bank of rotation and scale invariant filters and then a small codebook of Textons is built for each food class. The learned class-based Textons are hence collected in a single visual dictionary. The food images are represented as visual words distributions (Bag of Textons) and a Support Vector Machine is used for the classification stage. The experiments demonstrate that the image representation based on Bag of Textons is more accurate than existing (and more complex) approaches in classifying the 61 classes of the Pittsburgh Fast-Food Image Dataset.

#### 3) Learning Deep Features for Scene Recognition using Places Database

**AUTHORS** **: Bolei Zhou, Agata Lapedriza, Jianxiong Xiao, Antonio Torralba, Aude Oliva**

Scene recognition is one of the hallmark tasks of computer vision, allowing definition of a context for object recognition. Whereas the tremendous recent progress in object recognition tasks is due to the availability of large datasets like ImageNet and the rise of Convolutional Neural Networks (CNNs) for learning high-level features, performance at scene recognition has not attained the same level of success. This may be because current deep features trained from ImageNet are not competitive enough for such tasks. Here, we introduce a new scene-centric database called Places with over 7 million labeled pictures of scenes. We propose new methods to compare the density and diversity of image datasets and show that Places is as dense as other scene datasets and has more diversity. Using CNN, we learn deep features for scene recognition tasks, and establish new state-of-the-art results on several scene-centric datasets. A visualization of the CNN layers' responses allows us to show differences in the internal representations of object-centric and scene-centric networks.

# 4) Remote Sensing Image Classification Based on the Optimal Support Vector Machine and Modified Binary Coded Ant Colony Optimization Algorithm

**AUTHORS :** [**Mingwei Wang**](https://www.researchgate.net/profile/Mingwei-Wang-8)

# Support vector machine (SVM) is one of the most successful classifiers for remote sensing image classification. However, the performance of SVM is mainly dependent on its parameters; in addition, for remote sensing images with high-dimensional features, feature redundancy will have a major influence on the classification efficiency and accuracy. Feature selection and parameter optimization are two important factors for improving the performance of SVM and are traditionally solved separately. In fact, these two issues are affected by each other, so to obtain the better classification performance, selection of the optimal feature subset and tuning of SVM parameters should be considered simultaneously, as they both belong to the combinatorial optimization problem and could be handled with evolutionary algorithms and swarm intelligence algorithms. In this paper, a remote sensing image classification technique based on the optimal SVM is proposed, in which the parameters of SVM and feature selection are handled integrally by a modified coded ant colony optimization algorithm combined with genetic algorithm. The results are compared with other evolutionary algorithms and swarm intelligence algorithms, such as genetic algorithm (GA), binary-coded particle swarm optimization (BPSO) algorithm, binary-coded ant colony optimization (BACO) algorithm, binary-coded differential evolution (BDE) algorithm, and binary-coded cuckoo search (BCS) algorithm. It is demonstrated that the proposed method is robust, adaptive and exhibits the better performance than the other methods involved in the paper in terms of fitness values, so could be suitable for some practical applications.

# 5) Breast cancer image classification using artificial neural networks

# AUTHORS: [SertanKaymak](https://www.sciencedirect.com/science/article/pii/S1877050917324298" \l "!)[a](https://www.sciencedirect.com/science/article/pii/S1877050917324298" \l "!)[AbdulkaderHelwan](https://www.sciencedirect.com/science/article/pii/S1877050917324298" \l "!)[a](https://www.sciencedirect.com/science/article/pii/S1877050917324298" \l "!)[DilberUzun](https://www.sciencedirect.com/science/article/pii/S1877050917324298" \l "!)[ab](https://www.sciencedirect.com/science/article/pii/S1877050917324298" \l "!)

# Breast cancer (BC) mostly develops on women breast region. Regular check ups are crucial for early detection and treatment of this cancer type. Pathologist performs the diagnosis of the breast cancer. Recent computer-aided methods for breast cancer diagnosis allow another and faster way of breast cancer diagnosis. Therefore, improvement of computer-aided methods has been developing for the breast cancer detection. In this paper, a method for automatic classification of images for breast cancer diagnosis is presented. Classification of the images is achieved using Back Propagation Neural Network (BPPN). The performance of the automatic classification of the breast cancer images is further improved by using radial basis neural networks (RBFN). The accuracies of the BPNN and RBFN are also reported 59.0% and 70.4% respectively.