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Performance Evaluation on Category Classification of an Images Using Convnet

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Abstract:

To category, unknown things sometimes a very difficult task for a human and also machine in required commercial purposes. Unknown things like flowers, food, animals, medical modalities, and items that are not very known are unable to identify by us. The main objective of this work is helping the people who very poor in identifying things can do better with this system. Even for kids, we can train them from childhood as a PlayStation to make them master in their knowledge by using this system. This is a pre-trained deep learning system with more than 500 images as a database in each specific category. When a test image has been loaded it can give us test data belong to which category. This makes people know about unknown things with the highest efficiency. This system classified all the test data with efficiency above 97 %. The pre-trained deep learning system evolves with convolutional neural networks. It can convolve with all the features of the training image and forming the layers to provide an efficient classifier system for commercial purposes.

Keywords: CNN, ResNet 50

Introduction:

Human has very great functioning of system which is capable of categories the thing which we have come across in day to day life. But in the case of people in reserve places or very poor in identifying the things which are not familiar like medical image modalities were suffering to categories he things in general. Image modalities mostly categorized as CT, MRI, Ultrasound, PET, X-Ray, etc.. but these modalities not fixed for particular human organs. For example, consider the ultrasound image, it can be used to scan some parts of a body. But most of the time it can be used for the purpose of scanning to monitor the womb in women. This system is a more powerful system, to identify the test report and also to get which belong to a particular organs report.In context to above, this system can also support to find and category of living and non-living things in the universe based on our pre-training to the system through convolution

neural network. This system can identify the category of the test image even if the test data may have 50% of the information with the test data. Image features play a vital role in this system to classify the test data.

Experimental Methods:

Deep learning architecture:

This system structured with the help of deep learning architecture. Deep learning architectures are based on the number of layers that we have taken to process test data. A neural network is a layered structure with more no of the hidden layer. Apart from this, it has an activation layer that makes the transform the test data into multiple representations of split data. Each split data will be assigned by a weight. These weights of test data make the representation as a perfect feature for classifications. The backprobagation is born of a neural network, this is based on the number of hidden layers and the ReLu layer appears in the networks. Deep learning, a prevailing set of procedures for learning in neural networks. Current scenario based on Neural networks and deep learning for image classification and image categorization fields. In medical fields also this domain used for assisting the doctor through developers. Nearly all the networks we have worked with have just a single hidden layer of :

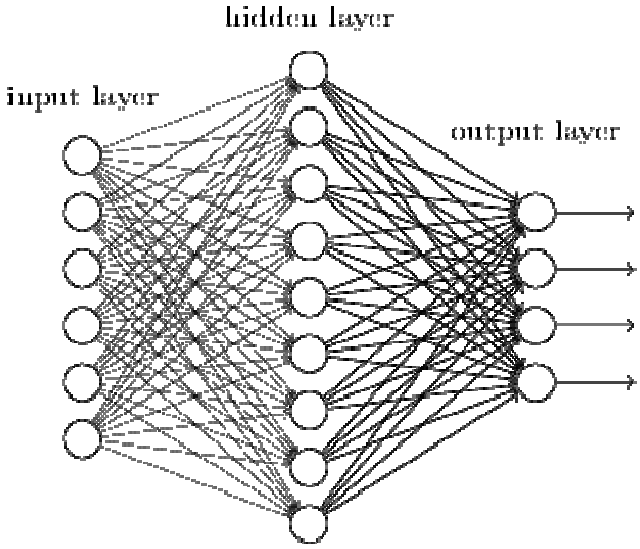

Fig:1 Simple Neural Network

Single hidden layer neural networks have popularized initial days the complexity level of a real-time classification makes the number of hidden layers with some activation functions for further improving the accuracy in the classification area. we used networks like this to categorize handwritten digits with better than 92 percent accuracy with the single hidden layer. Networks

with many more hidden layers to be more powerful:

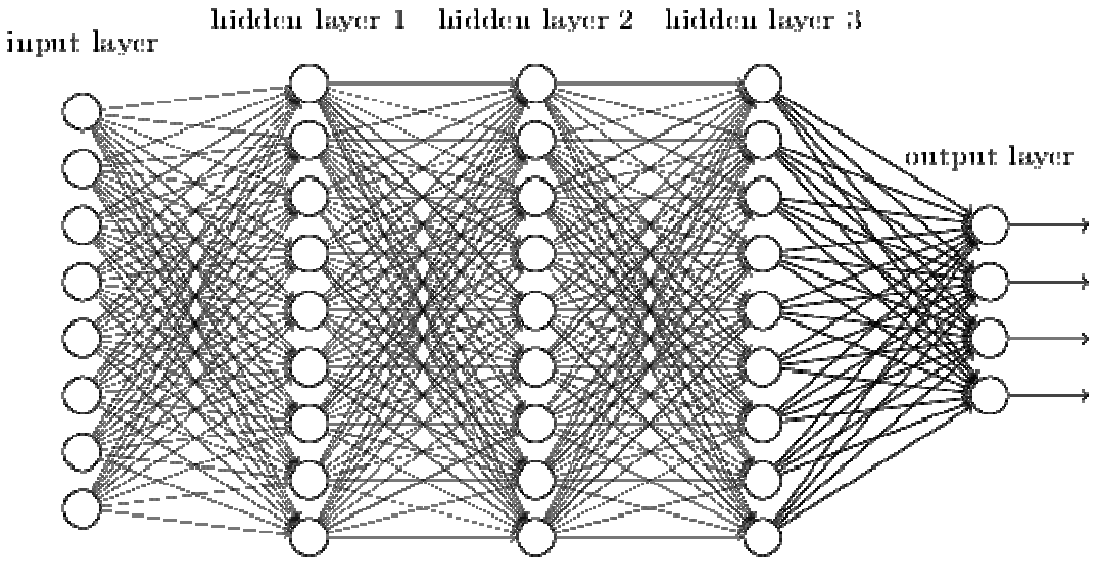

Fig:2 Deep Neural Network

These systems could utilize the liaison layers to build up different layers of an idea. For instance, on the off chance that we are doing visual image acknowledgment, at that point the neurons in the primary layer may figure out how to perceive edges, the neurons in the subsequent layer could figure out how to perceive progressively complex shapes, state triangle or square shapes, developed from edges. The third layer would then perceive still increasingly complex shapes. These different layers of deliberation appear to probably give profound systems a persuading improvement in figuring out how to take care of complex picture acknowledgment issues. In addition, similarly, as on account of circuits, there are hypothetical outcomes recommending that profound systems are naturally more dominant than shallow systems.

Convolutional neural network:

Convolutional Neural Network (ConvNet/CNN) is under the division of Deep Learning techniques, it will consider the test image and allocate consequence of trained weights with bias to different characteristic/things in the image and be able to make a distinction one from the other. ConvNets have the ability to learn with predefined knowledge. The architecture of a ConvNet is like to be a human nerve and neuron systems and functions seems to like the human brain system. Individual neurons will work as a response to motivation through a constrained region of the visual field known as the Receptive Field.

The structural design performs an enhanced fitting to the image dataset, suitable to the fall in the number of limitations concerned and the reusability of weights. In further terms, the

network can be trained to understand the difficulty of the image better.

Classification of Fully Connected Layer (FC Layer)

It was identified as there are different architectures of ConvNet available to utilize and develop the new set of algorithms and techniques. This makes more scope in the field of Artificial Intelliiigence and also image classification. Some of them have been listed below:

- LeNet
- AlexNet
- GoogLeNet
- ResNet

In this system, we preferred to use ResNet 50 as the fully connected layer architecture. ResNet 50 provides us a very nominate level of accuracy more than 97% with tested among five categories of the image database.

Experimental results:

Fig.3: Input test image

Fig.4: sample Labled image database

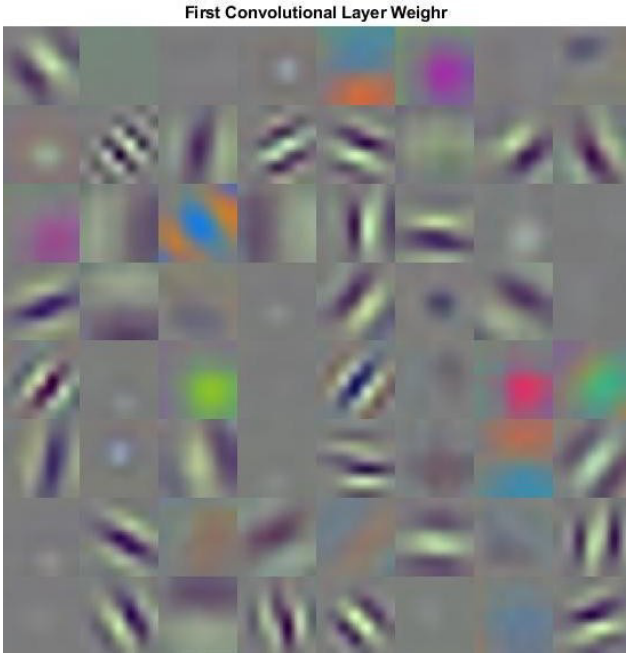

Fig.5: CNN layer weights

Fig.6: Output Image

Conclusion:

To test an image we have taken a set of images with defining its categories like human, sunflower, laptop, brain, pizza. Once all this database was collected as the sum of 1000 images and stored in a system. When we pre-trained all the images in a random manner with different angles by using the convolutional neural network and ResNet 50, we can test any images as a test image. The test image can be any image that can living or non-living things from any source. The net result will be exactly categorized with efficiency and accuracy above 97%.

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