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A New Model of CNN

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Abstract: Deep learning has given way to a new era of machine learning, apart from computer vision. Convolutional neural networks have been implemented in image classification, segmentation and object detection. Despite recent advancements, we are still in the very early stages and have yet to settle on best practices for network architecture in terms of deep design, small in size and a short training time. A new Model identification convolutional neural network structure is proposed and developed in this paper. Inspired by the tremendous achievements made by convolutional neural networks in the field of computer vision.Keras is a popular API for neural network written in python that can also be used in for users considering deep learning models for real-world applications. Using this model author try to make better accuracy to find out cats and dogs with optimistic way.Using this network build a model layers based on 32,64,128,256 where Kernel-size=3 ,padding='same',activation function is relu at the end we find out the highest accuracy almost (92 percents)

Keywords: Computer vision, Convolutional Neural Network, Image classification

1. Introduction

Due to recent advancements in high-performing computing systems, GPUs and large distributed clusters along with the availability of large public image repositories like ImageNet, Convolutional networks have seen a lot of research and development interest as of late..Since 2012, deep ConvNets have become a focus of the computer vision field with numerous attempts to improve upon the architecture to achieve higher accuracy[1]. Other areas of improvement have been concerned with the training and testing of dense networks over an entire image and on multiple scales addressed depth in ConvNet architectural design by adding additional convolutional layers. We developed a significantly more accurate ConvNet architecture which achieved record-breaking results on own classification and localization tasks and similar achievements on other image recognition datasets and. From cats and dogs found 8005 and 2023 images where it divided 2 classes.

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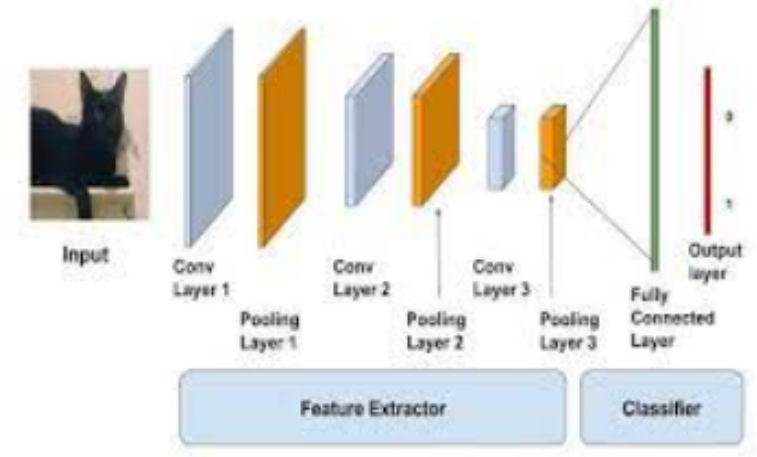

Figure 1. Layer model.

2. Related Works

Recently There are so many works on Convolutional Neural network.In this model perform to get highest amount accuracy using own model.Data sets collected from kaggle where two types of animal exist.Before this model there are soo many model implemented using same dataset where Renet50 give arround 90 percent, LetNet-5 almost same but using this model we achieve more than 92 percent accuracy almost.Where depth should always result in improvedaccuracy,degradation will decay optimization[2]. Moreover, error in deeper convolutional neural networks is regularly higher when compared to results of superficial neural networks.proposed a degradation resolution which allows a portion of stacked layers to approve the current mapping where degradation normally stops layers to fit a required subsidiary mapping. This subsidiary mapping The architecture of proposed.

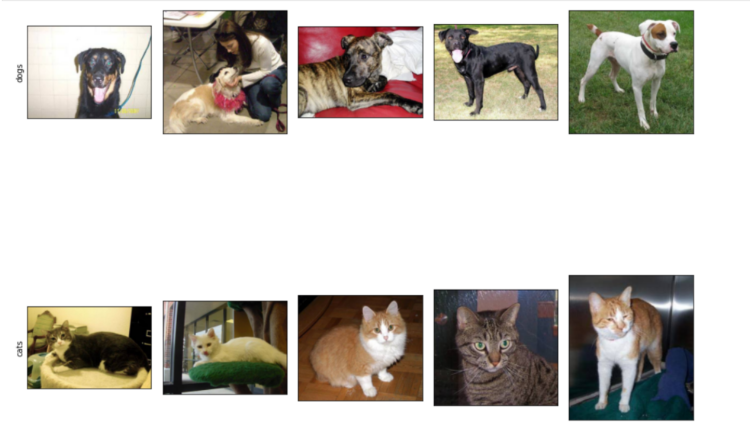

Figure 2. Datasets output image.

3. Proposed Model

In this model 1st layer was conv2D where outputshape is 148,148(Height and width) 32 was kernel size param was 896.Then comes 2nd layer here Maxpooling2d and Height and width slightly decressed from 1st one and karnel size remained same and param was 0 the next layer of this model is conv2D where Height and width exactly as like as previous layer with 64 kernel size here param list was 18496.In maxpooling layer 2 where Height and width got shrink from previous one.In Conv2D layer Height and width remain same and kernel size increased 128 from 64 and also param was 73856. Next maxpooling layer and conv2d layer 3 Height and width was rapid decrease almost 18,18 and

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dramatically increased kernel size.In all dense layer param size was 2654336 and 258 respectively.So total param was 3,043,010,Trainable params was 3,043,010 and Non-trainable params was 0.

```
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 148, 148, 32)      896
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 74, 74, 32)        0
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 74, 74, 64)        18496
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 37, 37, 64)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 37, 37, 128)       73856
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 18, 18, 128)       0
_________________________________________________________________
conv2d_3 (Conv2D)            (None, 18, 18, 256)       295168
_________________________________________________________________
max_pooling2d_3 (MaxPooling2 (None, 9, 9, 256)         0
_________________________________________________________________
flatten (Flatten)            (None, 20736)             0
_________________________________________________________________
dense (Dense)                (None, 128)               2654336
_________________________________________________________________
dense_1 (Dense)              (None, 2)                 258
=================================================================
Total params: 3,043,010
Trainable params: 3,043,010
Non-trainable params: 0
```

Figure 3. This is a figure; Where depicted all the Layer description.

4. Results and Discussion

This paper ensembles approaches from three popular methods: VGG16 , residual learning and the Squeeze technique . We set out to examine whether effectiveness and simultaneously making the network smaller and faster. We modify resnet50 ,VGG16 and added residual connections at places in the network where they would be most effective. Since the residual connections are parameter free, the network does not see an increase in complexity except for a small amount of computation for the collection process[3]. Furthermore, our network size, training time and complexity was reduced with the help. From the very first epoch val-accuracy is 49 percent almost then it increased every epoch gradually and loss decreased. However, At the last epoch val-accuracy was 0.9160 which is almost 92 percent. Compering other result it is like optimistic and sound. Analyzing the graph from Accuracy Validation accuracy increased and touch near 100 and from the Loss epoch decreased from 0.7 to near 0.2.It should need powerful GPU for accurate result and time optimizing. In this model try to increase the layer and seeking the best optimizing result from the model. This is excellent saving in terms of space and time with minimal impact on accuracy.

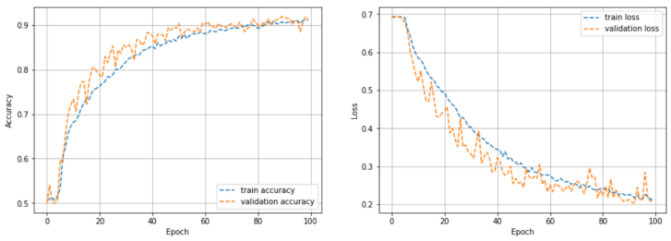

Figure 4. Result.

5. Conclusions

This paper proposed a New model of the network to address the issue of speed and size. Proposed models compresses the earlier very successful VGG16 network and further improves on following aspects: small model size; faster speed; uses residual learning for faster convergence, better generalization, and solves the issue of degradation; matches the recognition accuracy. Future work

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will focus on the application of the techniques we have outlined in this paper to compress other highly-regarded networks including but not limited to ResNet and Densely Connected Convolutional Networks . We hope to achieve similar reductions in size and complexity and match the recognition accuracy.

References

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