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DOG BREED RECOGNIZATION USING DEEP LEARNING

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Abstract

This project uses computer vision and deep machine learning techniques to predict dog breeds from images. First, we identify dog facial key points for each image using a convolutional neural network. These key points are then used to extract features via SIFT descriptors and color histograms. We then compare a variety of classification algorithms, which use these features to predict the breed of the dog shown in the image. Our best classifier is an SVM with a linear kernel and it predicts the correct dog breed on its first guess 52% of the time; 90% of the time the correct dog breed is in the top 10 predictions.

Keywords

Computer Vision, Classification, Deep Learning and Neural Networks, TensorFlow and Keras.

INTRODUCTION

In machine learning, convolutional Neural Network (CNN) is complicated feed forward neural networks and it is used for image classification and computer vision. CNNs are used for image classification and recognition due to its excessive accuracy. The CNN follows a hierarchical model which struggles on constructing a network, form of a funnel, and eventually offers out a definitely related layer the place all the neurons are linked to each and every different and consequently the output is processed A computer learns to classify images. The pc is trained with large image datasets then it changes the pixel value of the image to an indoor

representation, where the classifier can detect patterns on the input image. During this project, a deep learning convolutional neural network supported TensorFlow is deployed using image classification. Convolutional neural networks became universal in computer vision ever meanwhile popularized deep convolutional neural networks by way of prevailing the ImageNet Task the overall tendency has remained to form deeper and greater intricate networks to recognize greater accuracy. In our project, a deep learning convolutional network supported TensorFlow is deployed for binary image classification. MobileNet are modernized building that needs depth wise divisible convolutions to structure thin deep neural networks. We implement different type of layer to classify the Dog breed using image as an input. We present experiments on source and accuracy tradeoffs and exhibit lively achievements in contrast to different appreciated models on Image classification.

I. Literature Survey: against does not involve dee DNA analysis. 50 dogs were volunteered for the study. Blood samples were taken and sent Specifically,wefi to MARS VETERINARYTM laboratory to

[1] Authors Gunter, L.M., Barber, R.T. & Wynne, C.D. conducted a study to report the breed heritages of dogs housed in animal shelters and to compare these objective Zwicker. Animal shelters in San Diego and Phoenix participated. "Reconstructing 3D Shapes from Multiple Sketches Using Direct Shape Opti- The staffs at the animal shelters used the existing protocol of assigning breed based on visualization" inspection. The result found was that breed assigned by shelter staffs didn't match the prevalent breed found through DNA analysis 57% of the time. Although, the authors acknowledge that the sample may be skewed because of only 2 limited admission shelters, yet the study showed that visual breed identification is not considered legitimate identification. neural networks are hard to train and limited to low resolution reconstructions, which leads to a lack of geometric detail and low accuracy. To resolve this issue, we propose to reconstruct

[2] Authors Voith, V.L, Ingram, E., Mitsouras, K., & Irizarry, K conducted a study to3D shapes from mult compare adoption agencies visual breed identifications of 20 mixed- breed dogs be analyzed using The Mars Veterinary Wisdom to translate each Panel MXTM. The accurate breed was determined using a statistical model that infers breeder from a Giv from a pattern of 300 genetic markers. The result showed little agreement between report drew construct the 3 visual breed and actual breed as 90% of dogs identified by agencies did not have they're visually the view angle identified breed as the predominant breed which shows that visual breed identification is unreliable. Although, the authors do acknowledge that there may be a potential bias in this study as it is plausible that participants who disagreed with the breed assigned to their dog were more likely to volunteer their dogs for image identification tests. " Human Palm Geometry Modelling for Biometric Security Systems" Palm print modelling and recognition systems have been extensively studied. Palm shape or palm geometry has had lesser attention paid to its study because of the difficulties associated with shape definitions and modelling. This paper reports on experimental determination of

human palm geometry equations. Experimental determine- nation of human palm geometry was undertaken using measurements of hands of 14 subjects drawn from a mixture of racial and gender backgrounds. By also analyzing scanned images of their hands, characteristic measurements of their palms were de- [3] Authors Voith, V.L., Trevejo, R., Dowling- Guyer, S., Chadick, C., Marder, A., Johnson, V. termined. Characteristic expressions describing the geometry of human hands are & Irizarry, K. conducted a study to examine inter- rater reliability between experienced canine proposed. The equations are based on measurements of various parts of the hand professionals and validity of visual breed identifications compared to DNA profiles. 923 dogs cross a broad spectrum of female and male representatives of various ethnic groups. professionals participated. Participants completed a questionnaire in which they indicated rime- which breed each dog to be. Fewer than half of participants correctly visually identified any que breed in the dog in the subject as reported by the DNA analysis algorithm. Thus, in the sample of canine pros, both inter-rater reliability and validity of visual breed identification were low. The result showed that researchers cannot responsibly conduct experiments nor cite studies that rely on visual identification for determining breed. Thus, concluding that Visual Breed identification" FAST LIFTING FOR hand POSE ESTIMATION IN AR/VR Applicast unreliable. 8 We introduce a simple model for the human hand skeleton that is geared toward Esti- [4] Authors Hoffman, C.L., Harrison, N., Wolff, L., & Westgarth, C. Conducted a study whose purpose mating hand poses from 2D key points. The estimation problem arises in AR/VR was to determine the level of agreement between shelter workers in US and UK regarding dogs they scenarios where low-cost cameras are used to generate 2D views through which labelled "pit bull". 470 dogs (416 from the US, 54 from the UK) were chosen. Participants completed a rich interaction with the world are desired. Starting with a noisy set of 2D hand breed identification survey online in which they viewed and wrote in what breed they assign to each dog. Majority of US and UK participants agreed on the primary breed for 10 of 20 dogs. US were significantly more likely to classify six of ten breeds author considered than the UK. The result shows that there are discrepancies regarding which breed people consider to be "pit bulls". The study concludes how dogs are identified by shelters which in turn affect their probability of being adopted. The authors do note the drawback that there are conflicting definitions of a "pit bull", it is puzzling that they seem to accept the idea that a "bull-breed" group exists when there is no agreement upon a classification for any of the terms. Tip localization servation leads to a look-up table- based formulation that instantaneously determines finger poses without solving constrained trigonometric problems. The result is a fast algorithm running super real-time on a single core. When hand bone-lengths are unknown our technique estimates these and allows smooth AR/VR sessions where a user's hand is automatically estimated in the beginning and the rest of the session seamlessly continued. Our work provides accurate 3D results that are competitive with the state-of-the-art without requiring any 3D training data. [5] Authors Olson, K.R., Levy, J.K., Norby, B., Crandall, M.M., Broadhurst, J.E., Jacks, S., Barton, R.C., & Zimmerman, M.S. conducted a study to explore visual breed "Hand ControlAR : AnAugm identification's consistency among experts and validity when compared to DNA analysis. Try" Participants identified a total of 120 dogs. Dog's breed labels at intake were noted and later compared to rater's response. Blood samples of the Dogs were sent to Wisdom panel Canine Genetic analysis, MARS Veterinary for DNA identification. The DNA analysis revealed that 21% of dogs had a "pit-bull type" heritage. Median agreement between visual identification and DNA analysis in this study varied from 67-78%. In sum, the overall validity even with a broad target for identification did not reach to a good level. Study underscore unreliability of visual breed identification. The drawback of this study is that the authors define classifying any dog with 12.5% terrier sign as pit-bull. e. We design three levels of study to enable students to learn the geometric concepts as well as

an experiment to evaluate the effectiveness of the AR system. Analysis of experimental results showed that the proposed system is easy to use, attractive, and helpful for students 5. Seung-Chan Kim, Member, IEEE, Byung-Kil Han.

II. Problem Statement

1] The aim is to develop DOG BREED RECOGNIZATION USING DEEP MACHINE LEARNING(CNN) that uses the information of the dog breed images.

2] To give higher exactness over past research.

IV Proposed Method and Algorithm:

A. Proposed Methodology:

In a propose system, we are proposed experiment on detecting dog breed by taking image as input and to provide best accuracy we have used limited set of supervised data.

We come through a wide range of different and major algorithms for predicting or classifying the images. CNN (Convolutional Neural Network) is a deep machine learning algorithm and it used for image classification and detection for big dataset, we will be using CNN in our project to detect the Dog breed.

B. Dataset

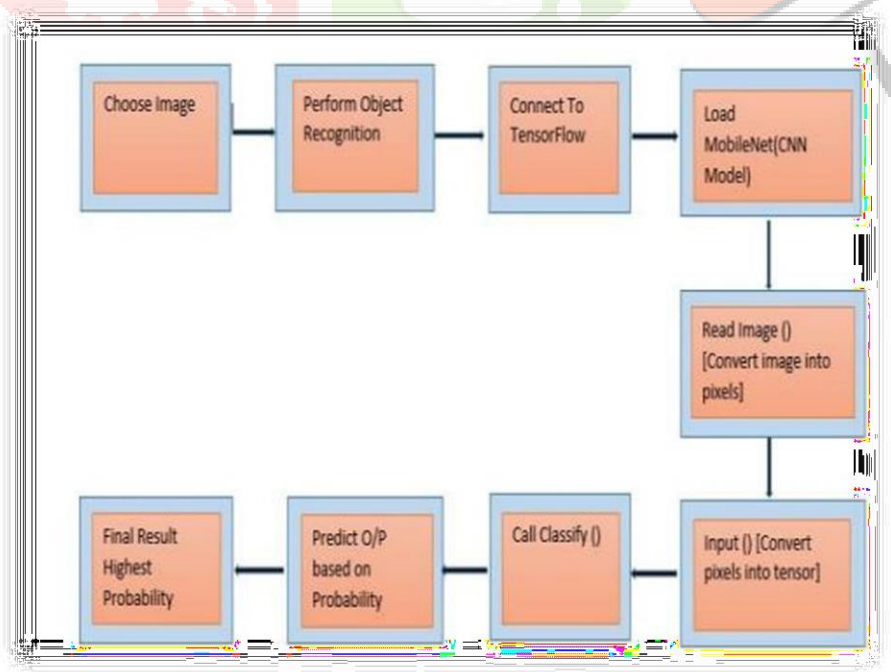


Fig1. Proposed Architecture

In this project we are collecting the data from Kaggle platform. We require dataset dog breed with images of each dog breed in distinguishing proof just as picture order.

Four main operations in the Convolutional Neural Networks are shown as follows:

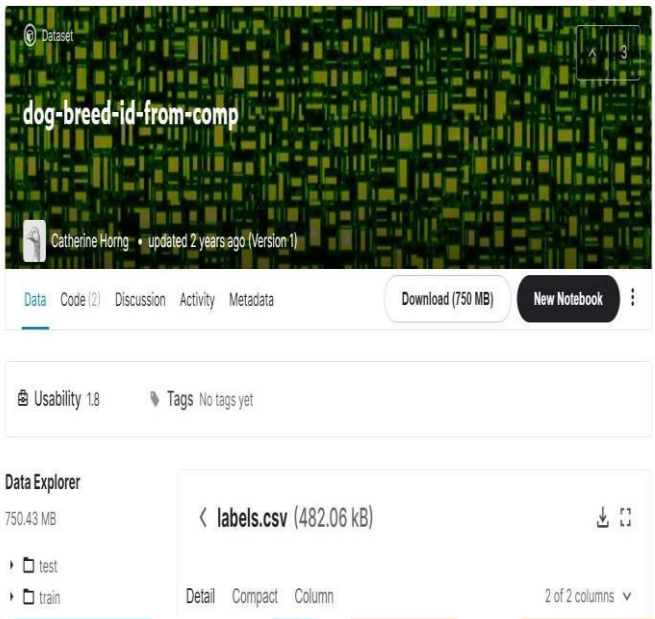


Fig2. Dog breed dataset from kaggle

(i) Convolution

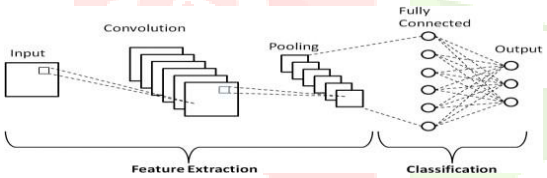


Figure3. Architecture of CNN

C. Algorithm

Convolutional Neural Networks (CNN)

Convolutional Neural Networks (which are additionally called CNN/ConvNets) are a kind of Artificial Neural Networks that are known to be tremendously strong in the field of The principle utilization of the Convolution activity if there should be an occurrence of a CNN is to recognize fitting highlights from the picture which goes about as a contribution to the primary layer. Convolution keeps up the spatial interrelation of the pixels This is finished by fulfillment of picture highlights utilizing miniscule squares of the picture.

Convolution equation. Every picture is seen as a network of pixels, each having its own worth. Pixel is the littlest unit in this picture grid. Allow us to take a 5 by 5(5*5) framework whose qualities are just in twofold (for example 0 or 1), for better agreement. It is to be noticed that pictures are by and large RGB with upsides of the pixels going from 0 - 255 i.e., 256 pixels.

(ii). ReLU

ReLU follows up on a rudimentary level. All in all, it is an activity which is applied per pixel and overrides every one of the non-positive upsides of every pixel in the component map by nothing.

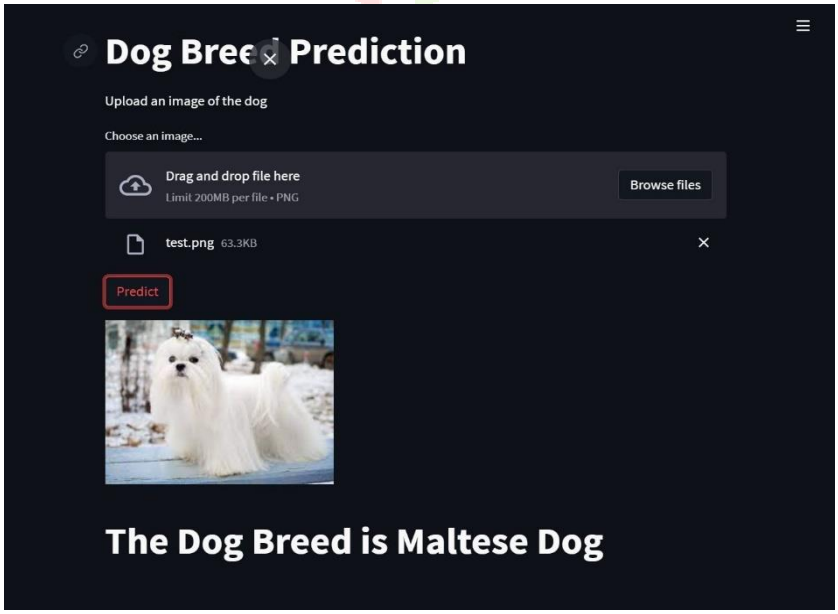
(iii). Pooling or sub-sampling

Spatial Pooling which is likewise called sub-sampling or down sampling helps in lessening the elements of each element map yet even at the same time, holds the most
important data of the guide. Subsequent to pooling is done, in the long run our 3D element map is changed over to one dimensional component vector.

V. Results & Discussion

In our experimental setup, the total numbers of 120 of trained images for each three Dog breed such as Scottish Deerhound, Maltese Dog and Bernese Mountain Dog. These images go through CNN framework by following feature extraction using our image processing module. Then our trained model of classification of diseases get classifies the image into specifies disease. We get the accuracy 73.45% at 100 epochs.

TEST-1 FOR MALTESE DOG



TEST-2 FOR SCOTTISH DEERHOUND

TEST-3 BERNESE MOUNTAIN DOG

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VI. Conclusion

In the paper, Overall, we consider our results to be a success given the number of breeds in this fine-grained classification problem. We are able to effectively predict the correct breed over 73.45% of the accuracy in one guess using CNN, a result that very few humans could match given the high variability both between and within the different breeds contained in the dataset.

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