

# AN EFFICIENT CNN ARCHITECTURE FOR OBJECT DETECTION AND CLASSIFICATION IN IMAGES USING DEEP LEARNING

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## ABSTRACT

Object Classification has received wide attention due to its real time applications using deep learning technique. It is a process of classifying objects into predefined and semantically meaningful categories. Due to less accuracy, sometimes gives inaccurate result and wouldn't be effective. Object Classification using CNN algorithm is a proposed system in which image is inserted and object is classified and displayed in UI based on trained model. In this, it extracts features from the image, undergoes three architectures and high accuracy output will be considered to overcome existing difficulties.

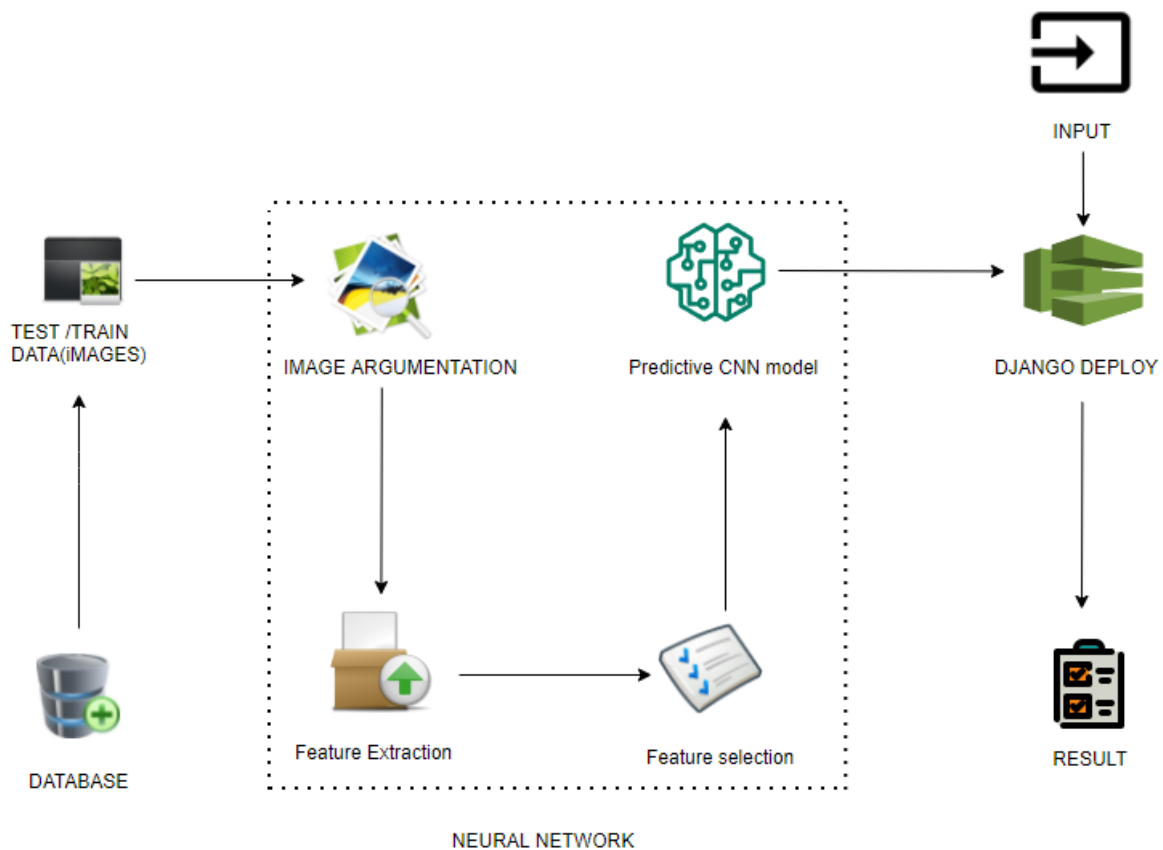
Objects can be easily detected and identified by humans. The visual system of human is very fast and accurate and can perform complex tasks like object identification and detection very easily. Situation like where we have to find from so many things and trying to find that key will take long time and we have to face some difficulties. Object classification is very important for applications in automatic visual surveillance system. The process of classifying objects into predefined and semantically meaningful categories using its features is called object classification. In this paper we propose a new model for detection and classification of objects by taking the features to classify the detected objects using Deep Neural Network (DNN). Deep Neural Networks are capable of handling large higher dimensional data with billions of parameters as like human brain. Simulation results obtained illustrate that the proposed classifier model produces more accurate results for feature extraction and DNN for classification.

## 1. Introduction

Object Classification has received wide attention due to its real time applications using deep learning technique. It is a process of classifying objects into predefined and semantically meaningful categories. Due to less accuracy, sometimes gives inaccurate result and wouldn't be effective. Object Classification using CNN algorithm is a proposed system in which image is inserted and object is classified and displayed in UI based on trained model. In this, it extracts features from the image, undergoes three architectures and high accuracy output will be considered to overcome existing difficulties.

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## 2. Methodology



**Fig 1. System Architecture**

System Architecture denotes a holistic solution built on logically related and consistent ideas, concepts, and attributes. The architecture contains features, traits, and characteristics that, to the greatest extent possible, satisfy the issue or opportunity described by a set of system requirements and life cycle ideas, and is implementable using technologies.

The process of the trained model to classify an object are: firstly the datasets are collected from kaggle, Then use train different angles of the images for every object in three architectures namely alexnet, lenet and manualnet. In image augmentation, the image is preprocessed. By using the CNN algorithm, we extract and select features for each image. The predictive cnn model compares the accuracy of each architecture and the model is deployed in Django framework. Finally, we insert an image undergoes three architectures process give high accuracy and the output is deployed in ui.

### 3. Results and Discussion

#### A. DATA COLLECTION:

Datasets are collected from kaggle. For single image, more amount of images are collected. We have to import our data set using keras preprocessing image data generator function also we create size, rescale, range, zoom range, horizontal flip. Then we import our image dataset from folder through the data generator function. Here we set train, test, and validation also we set target size, batch size and class-mode from this function we have to train using our own created network by adding layers of CNN.

#### B. TRAINING DATASET:

Training of dataset is done using classifier and fit generator function. validation and testing is done. 70% of dataset is used for training and 30% is used for testing dataset.

While doing training process, Cnn algorithm is used to extract features and different architectures. Training is done to train the system so that it can extract features and neurons are trained.



#### C. PREPROCESSING DATA:

First, we train and test a particular image using different architectures. Performance of each architecture is evaluated. Alexnet, Lenet and manualnet has different accuracy. By comparing each architecture, lenet architecture has high accuracy.

The architecture is used to extract features and the code part is implemented. The architecture shows high accuracy and loss level is low. So, the deployment is done with the trained model.

#### D. OBJECT CLASSIFICATION:

Classifying objects need more training,so extracting features using cnn algorithm is quite challenging.The training and testing of images required more time. We give input image using keras pre-processing package. That input Image converted into array value using pillow and image to array function package. We have already classified objects in our dataset. It classifies what are the objects are available in our dataset then we have to predict our object.



### E.DEPLOY:

Finally,we deploy a trained model in Djangoframework.In this UI,an image is uploaded in which it undergoes the trained model and based on accuracy,the output is displayed with name of the object.



### CONCLUSION

In this project,classifying an object with high accuracy has been done.We compared the accuracy of three architectures such as alexnet,lenet and manual net.Inthis,lenet architecture has high



accuracy and less loss. So that it can classify object accurately with less time consumption. This model could be better than segmentation process. This project is more effective and less complexity. As we have collected dataset for a particular image with different angles, it predicts more accurately. They have the capability to predict accurately. They wouldn't get confused with inserted images that are trained and deployed. Thus, an efficient CNN architecture for classifying images was successfully implemented using deep learning techniques.

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