**LITERATURE SURVEY**

**1)Title:** **“SSD: Single Shot MultiBox Detector**

**AUTHORS: Wei Liu et al.,**

We present a method for detecting objects in images using a single deep neural network. Our approach, named SSD, discretizes the output space of bounding boxes into a set of default boxes over different aspect ratios and scales per feature map location. At prediction time, the network generates scores for the presence of each object category in each default box and produces adjustments to the box to better match the object shape. Additionally, the network combines predictions from multiple feature maps with different resolutions to naturally handle objects of various sizes. Our SSD model is simple relative to methods that require object proposals because it completely eliminates proposal generation and subsequent pixel or feature resampling stage and encapsulates all computation in a single network. This makes SSD easy to train and straightforward to integrate into systems that require a detection component. Experimental results on the PASCAL VOC, MS COCO, and ILSVRC datasets confirm that SSD has comparable accuracy to methods that utilize an additional object proposal step and is much faster, while providing a unified framework for both training and inference. Compared to other single stage methods, SSD has much better accuracy, even with a smaller input image size. For 300×300 input, SSD achieves 72.1% mAP on VOC2007 test at 58 FPS on a Nvidia Titan X and for 500×500 input, SSD achieves 75.1% mAP, outperforming a comparable state of the art Faster R-CNN model. Code is available at [this https URL](https://github.com/weiliu89/caffe/tree/ssd) .

# 2) Title: Scalable Object Detection Using Deep Neural Networks,”

# AUTHORS: D. Erhan et al.,

# Deep convolutional neural networks have recently achieved state-of-the-art performance on a number of image recognition benchmarks, including the ImageNet Large-Scale Visual Recognition Challenge (ILSVRC-2012). The winning model on the localization sub-task was a network that predicts a single bounding box and a confidence score for each object category in the image. Such a model captures the whole-image context around the objects but cannot handle multiple instances of the same object in the image without naively replicating the number of outputs for each instance. In this work, we propose a saliency-inspired neural network model for detection, which predicts a set of class-agnostic bounding boxes along with a single score for each box, corresponding to its likelihood of containing any object of interest. The model naturally handles a variable number of instances for each class and allows for cross-class generalization at the highest levels of the network. We are able to obtain competitive recognition performance on VOC2007 and ILSVRC2012, while using only the top few predicted locations in each image and a small number of neural network evaluations.

# 3) Title: “Anomaly Detection in Videos for Video Surveillance Applications Using Neural Networks,”

# AUTHORS : Ruben J Franklin et.al

# Security is always a main concern in every domain, due to a rise in crime rate in the crowded event or suspicious lonely areas. Abnormal detection and monitoring have major applications of computer vision to tackle various problems. Due to growing demand in the protection of safety, security and personal properties, the needs and deployment of video surveillance systems can recognize and interpret the scene and anomaly events play a vital role in intelligence monitoring. Anomaly detection is a technique used to distinguish various patterns and identify unusual patterns with a minimal period, this pattern is called outliers. Surveillance videos can capture a variety of realistic anomalies. Anomaly detection in video surveillance involves breaking down the whole process into three layers, which are video labelers, image processing, and activity detection. Hence, anomaly detection in videos for video surveillance application gives assured results in regards to real-time scenarios. In this paper, we anomaly was detected in images and videos with an accuracy of 98.5 %.

# 4) Title: “A Review of Artificial Intelligence Methods for Data Science and Data Analytics: Applications and Research Challenges,”

**AUTHORS:** **H R Rohit et.al.,**

Artificial intelligence is a field which requires multidisciplinary expertise where the final goal is to automate all the human activities that presently require human intelligence. The major problem is to develop a method which works exactly the way how a human brain works. The architecture of artificial intelligence must emphasize on evaluation and redesign the nature of design process. Data science is also trending now and analytically deals to solve complex problems. Data is divided into smaller parts and its trends, behaviors are understood. The main problem in data science is to handle large quantities of data. Though there is significant increase in terms of research opportunities few challenges like lack of compute power, people power still remains a big challenge.

# 5) Title: “Classification of Objects in Video Records using Neural Network Framework,”

# AUTHORS: Abhiraj Biswas et. al.,

# Object Classification is a principle task in image and video processing. It is exercised over a multitude of applications ranging from test and number classification to traffic surveillance. The primitive machine learning concepts had provided the pedestal for carrying out umber of image processing tasks. Classifier such as Haar cascade which uses Haar like features was primitively used for face detection. Nowadays it's used for tacking and detection purposes also. Moreover, due to the ever-increasing demand and scope of improvement in the existing fields, the primitive methods need a lot of upgradation. Neural Networks have made the tasks quite plain sailing. Right from the vanilla neural networks to Fast R-CNN and then Faster R-CNN, all models have contributed significantly in the domain of computer vision. This paper mainly focuses in detection and classification ranging from single class objects to multi class objects. The Haar cascade classifier was trained on a batch of positive and negative samples which were later stitched together to form a vector file and finally form the xml file. On the other hand, COCO dataset used for implementing R-CNN algorithm due to the presence of pertained model in it.