iJRASET
International Journal For Research in
Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH
IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 Issue: IV Month of publication: April 2019

DOI: https://doi.org/10.22214/ijraset.2019.4506

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue IV, Apr 2019- Available at www.ijraset.com

Improving Video Classification Accuracy using Cloud

Prabin Mandal
Department of Information Science Engineering, New Horizon College of Engineering Outer Ring Road, Marathalli, Bengaluru-560 103

Abstract: The focus of this project is on the frame level features. One of the promising algorithms that can be used for this purpose is Deep Bag of Frame pooling (DBoF). Deep bag of frame model is a convolutional neural network (CNN). The main idea is to design two layers in the convolutional part. The approach enjoys the computational benefits of CNN, while at the same time the weights on the up-projection layer can still provide a strong representation of input features on frame level. The classification is performed at the final layer of the CNN. We will use the Youtube-8M dataset for experimentation. The Youtube-8M dataset is the largest publicly available multi-label video classification dataset, with approximately 8 Million videos annotated with 3862 classes of labels. The videos within the dataset averages 3.01 labels per video, where the number of labels per video ranges from 1 to 23. As this dataset covers over 500,000 hours of video, 2.6 billion audio and visual features have been extracted and pre-processed in advance by the Google Research Team as it would be infeasible for research teams to train hundreds of Terabytes worth of video for their model.
Keywords: Video classification, convulational neural network, machine learning.

I. INTRODUCTION

There is an English idiom: "a picture is worth a thousand words". Such theory has been standing in human society for many years, as this is the way our brain functions. With the development of neural network and deep learning, it can be applied to machine as well. In other words, we human beings are able to teach or train computer to recognize objects from pictures and even describe them in our natural language. Thanks, Google, for organizing this 'Google Cloud & YouTube8M Video Understanding Challenge', which gives us a wonderful opportunity to test new ideas and implement them with the Google cloud platform. Google cloud recently released the datasets and organized 'Google Cloud &YouTube-8M Video Understanding Challenge' on Kaggle. Competitors are challenged to develop classification algorithms that assign video-level labels using the new and improved Youtube-8M V2 dataset. Large-scale datasets have played a significant role in progress of neural network and deep learning areas. YouTube-8M is such a benchmark dataset for general multilabel video classification. It was created from over 7 million YouTube videos (450,000 hours of video) and includes video labels from a vocabulary of 4716 classes (3.4 labels/ video on average). It also comes with pre-extracted audio & visual features from every second of video (3.2 billion feature vectors total).
ImageNet is one of the large Scale of datasets which have been key enablers of recent progress in image understanding.
By supporting the learning process of deep networks with millions of parameters, such datasets have played a crucial role for the rapid progress of image understanding to near-human level accuracy.

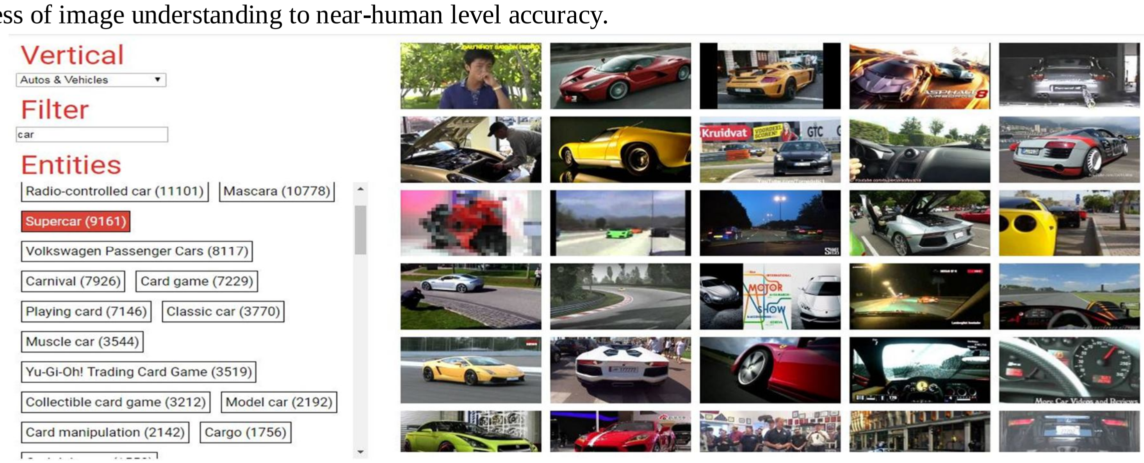


Fig 1: This screenshot of a YouTube-8M dataset (which is a large-scale benchmark for general multi-label video classification) explorer depicts a subset of videos in the dataset annotated with the entity "CAR".

Video has become an indispensable form of media in the modern society. According to YouTube company statistics, every minute there are 300 hours of video uploaded to YouTube and every day there are nearly 5 billion videos being watched. Not only the number of videos we are dealing with is immense, but also the themes of the video has become extremely diverse. The types of videos we encounter in daily life range from entertainment use such as music videos, movies and games, educational use of lectures and experiments, to the many newly emerging technologies such as drones and autonomous cars. Under such background, an efficient method to solve large-scale video classification is desired, which could in turn be applied to content discovery and filtering Video classification is an inherently difficult task for various reasons. The dataset for video classification is usually limited to a particular scene and separate for video and audio features. The most well studied video datasets, such as Sports-1M , Activity Net, UCF-101 are all confined to a certain theme of videos. Thus, their models are more suitable in very specific classification task in that theme than generic classification with a large number of classes. We provide several models of using both audio and visual features to classify YouTube videos. We demonstrate that the additional audio information in the training process significantly improves the model performance. The focus of this project is on the frame level features. One of the promising algorithms that can be used for this purpose is Deep Bag of Frame pooling (DBoF). Deep bag of frame model is a convolutional neural network (CNN). The main idea is to design two layers in the convolutional part. In the first layer, the up-projection layer, the weights are still applied on frames, although all selected frames share the same parameter. The second layer is pooling the previous layer into video level. The approach enjoys the computational benefits of CNN, while at the same time the weights on the up-projection layer can still provide a strong representation of input features on frame level. The classification is performed at the final layer of the CNN. We will use the Youtube-8M dataset for experimentation. The Youtube-8M dataset is the largest publicly available multi-label video classification dataset, with approximately 8 Million videos annotated with 3862 classes of labels. The videos within the dataset averages 3.01 labels per video, where the number of labels per video ranges from 1 to 23. As this dataset covers over 500,000 hours of video, 2.6 billion audio and visual features have been extracted and pre-processed in advance by the Google Research Team as it would be infeasible for research teams to train hundreds of Terabytes worth of video for their model.

II. LITERATURE SURVEY

Sl No.	Title of the Paper	Authors	Month & Year	Observations
1	Cloud Based Video Analytics using convolutional networks	Muhammad Usman Yaseen,Ashiq Anjum,Mohsen Farid,Nick Antonopoulos	August 2018	CNN,Learning Rate,SGD,stochastic gradient descent
2	Efficient video Classification Using Fewer Frames	Shweta Bharadwaj,Mukundhan Sriniwasan,Mitesh M.Khapra	Feb 2019	-
3	Cloud Based Video Prepositions With Classification Of Client In Public systems	A.Arjuman Banu, A.K Reshmy		Cloud Storage,online social networks,video recommendation,media cloud andspammer detection
4	A Survey Of Research on Cloud Robotics and Automation	Be3n kehoe, Pieter Abbeel	November 2014	Cloud Automation,Cloud Robotics,Big Data,Cloudsourcing
5	A survey on Object detection and Classification methods from Video stream	Tasnia Bushra, Muhib Hassan Khan		Object detection, learning,training, classification
6	A Survey On Video Classification using action recognition	Caleb Andrew, Rex Fiona	2018	Multiple Instance learning,Conditional Random Field
7	A Review of machine learning techniques used for video classification	Seetha Parameshwaran, Dr. Shelbi Joseph	December 2017	Video classification techniques,video based approach, Deep learning
8	Video classification with Recurrent Neural Network	Bhagyashri P. Lokhande, Sanjay s.Gharde	January 2016	Video Classification, recurrent Neural Network, recurrent Multilayer Perceptron,
9	Semi Supervised and Active Learning in video Scene Classificaion from Statistical Features	Tomas Sabata, Petr Pulc, Martin Holena		Video data,scene classification,semi-supervised learning,colour statistics,feedforward neural networks
10	A survey of content aware video	Huang-Chia Shih	May 2018	Action recognition,content aware

	analysis for sports			system,content based video analysis,semantic analysis, sport video analysis.
11	A survey of the techniques for the identification and classification of human actions from visual data	Shahela saif, Samabia tehseen,Sumaira Kausar	November 2018	Computer vision, action recognition,deep learning
12	Effective news video classification based on audio content:A multiple instance learning approach	Vivek P, Kumar Rajamani,Lajish		Video classification,multiple instance learning,feature extraction,mi-Graph,mi-SVM
13	RGB-D-based human motion recognition with deep learning	Pichao wang, wanqing Li,Philip Ogunbona,Jun Wan,Sergio Escalera	May 2018	Human motion recognition,RGB-D data, Deep learning
14	Automatic Video Classification:A Survey of the Literature	Darin Brezeale and Diane J.cook	2017	Video classification, text based approaches, audio based approaches
15	Video Classification	Pravina Baraiya, Disha Sanghani	March 2018	Video classification, text based approaches, audio based approaches,visual based approach
16	Self Supervised Video Representation Learning With Odd-One-Out networks	Basura Fernando,Hakan Bilen, Efsatratios Gavves,Stephen Gould	2017	Odd-one-out learning,learning video representation with O3N
17	A Survey Paper on :Video Classification techniques	Nirav Bhatt,aspriha R. Das	2015	Audio based,T,video classification Techniques,VisualBased
18	Large scale video classification with Convolutional Neural Networks	Andrej Karpathy,George Toderici, Sanketh Shetty,Thomas Leung,Rahul Sukthankar,Li Fei-Fei		CNN,

1) *Problem Statement:* The objective of the research is be able to develop video level and frame level features for analyzing video contents and a framework for video classification by applying machine learning algorithm. This project focuses on widening the horizon for video classification with use of Youtube8M data set as input, and using CNN for recognizing better features. The ultimate goal is to ascertain the type of actions being performed and use video-level and frame level features to classify the videos with promising accuracy.

III. METHODOLOGY

A. Feature Extractor

A deep model, namely an Inception network, trained on ImageNet was used to preprocess the videos and extract frame-level features. An Inception Network is like a Convolutional Neural Network except it has been heavily modified to boost results and performance. The following points are the procedures and specifications of the feature extraction process of this dataset:

1) Each video was decoded at 1 frame-per-second up to the first 360 seconds (6 minutes). This cap was implemented for storage and computation reasons.
2) Decoded frames are fed into the Inception Network.
3) The Rectified Linear Unit (ReLU) activation function of the last hidden layer before the classification layer is fetched.
4) The feature vector is 2048-dimensional per second of video
5) Principal Component Analysis (PCA) along with whitening was applied to scale down the feature dimensions to 1024, followed by quantization (1 byte per coefficient)
6) PCA and Quantization down samples the size of the data by the factor of 8
7) The mean vector and covariance matrix for PCA was computed on all frames from the training partition
8) Each 32-bit float was quantized into 256 distinct values (8 bits) using optimally computed (non-uniform) quantization bin boundaries
9) The dataset is then broken into 3844 shares each for the training, validation, and testing partitions
10) The dataset is separated into the Frame-level features dataset, which is approximately 1.53 Terabytes, and the Video-level features dataset, which is approximately 31 Gigabytes

B. Multilabel Classifier

This step involves selection of the most significant features for classification. We use Knowledge Graph entities to succinctly describe the main themes of a video. Biking, not Dirt, Road, Person, Sky, and so on. Therefore, the aim of the dataset is not only to understand what is present in each frame of the video, but also to identify the few key topics that best describe what the video is about. Note that this is different than typical event or scene recognition tasks, where each item belongs to a single event or scene. This would produce thousands of labels on each video but without answering what the video is really about. The goal of this benchmark is to understand what is in the video and to summarize that into a few key topics. In the following subsections, we describe our vocabulary and video selection scheme, followed by a brief summary of dataset statistics. We followed two main tenets when designing the vocabulary for the dataset; namely 1) every label in the dataset should be distinguishable using visual information alone, and 2) each label should have sufficient number of videos for training models and for computing reliable metrics on the test set.

C. Code & Implementation

```
import os
import sys
import tarfile
import numpy
from six.moves import urllib
import tensorflow as tf
INC_TF_GRAPH = 'http://download.tensorflow.org/models/image/imagenet/inception-2015-12-05.tgz'
PCA_MAT = 'http://data.yt8m.org/yt8m_pca.tgz'
MOD_DIR = 'yt8m'
class FeatureExtractor(object):
# Extracts YouTube8M features for RGB frames.
  def __init__(self, mod_dir=MOD_DIR):
    # Create model directory if not created.
    self._mod_dir = mod_dir
    if not os.path.exists(mod_dir):
      os.makedirs(mod_dir)
    # Load PCA Matrix.
    dw_path = self._download(PCA_MAT)
    pca_mean = os.path.join(self._mod_dir, 'mean.npy')
    if not os.path.exists(pca_mean):
      tarfile.open(dw_path, 'r:gz').extractall(mod_dir)
    self._load_pca()
    # Load Inception Network
    dw_path = self._download(INC_TF_GRAPH)
    inc_proto_file = os.path.join(
        self._mod_dir, 'classify_image_graph_def.pb')
    if not os.path.exists(inc_proto_file):
      tarfile.open(dw_path, 'r:gz').extractall(mod_dir)
    self._load_mod(inc_proto_file)
  def extract_rgb_frame_features(self, frame_rgb, apply_pca=True):
    # Applies feature extraction on an RGB frame.
    with self._inc_graph.as_default():
        frame_features = self.session.run('pca_final_feature:0', feed_dict={'DecodeJpeg:0': frame_rgb})
    return frame_features
  def apply_pca(self, frame_features):
    # Applies the PCA Transformation over the given frame
    # Subtract mean
```

```
    feats = frame_features - self.pca_mean
    # Multiply by eigenvectors.
    feats = feats.reshape((1, 2048)).dot(self.pca_eigenvecs).reshape((1024,))
    # Whiten
    feats /= numpy.sqrt(self.pca_eigenvals + 1e-4)
    return feats
  def _download(self, url):
    """Downloads `url` if not in `_mod_dir`."""
    filename = os.path.basename(url)
    dw_path = os.path.join(self._mod_dir, filename)
    if os.path.exists(dw_path):
      return dw_path
  def _load_mod(self, proto_file):
    graph_def = tf.GraphDef.FromString(open(proto_file, 'rb').read())
    self._inc_graph = tf.Graph()
    with self._inc_graph.as_default():
      _ = tf.import_graph_def(graph_def, name='')
      self.session = tf.Session()
      Frame_Features = self.session.graph.get_tensor_by_name('pool_3/_reshape:0')
      Pca_Mean = tf.constant(value=self.pca_mean, dtype=tf.float32)
      Pca_Eigenvecs = tf.constant(value=self.pca_eigenvecs, dtype=tf.float32)
      Pca_Eigenvals = tf.constant(value=self.pca_eigenvals, dtype=tf.float32)
      Feats = Frame_Features[0] - Pca_Mean
      Feats = tf.reshape(tf.matmul(tf.reshape(Feats, [1, 2048]), Pca_Eigenvecs), [1024, ])
      tf.divide(Feats, tf.sqrt(Pca_Eigenvals + 1e-4), name='pca_final_feature')
  def _load_pca(self):
    self.pca_mean = numpy.load(os.path.join(self._mod_dir, 'mean.npy'))[:, 0]
    self.pca_eigenvals = numpy.load(os.path.join(self._mod_dir, 'eigenvals.npy'))[:1024, 0]
    self.pca_eigenvecs = numpy.load(os.path.join(self._mod_dir, 'eigenvecs.npy')).T[:, :1024]
```

D. Structure and Data Flow Diagram

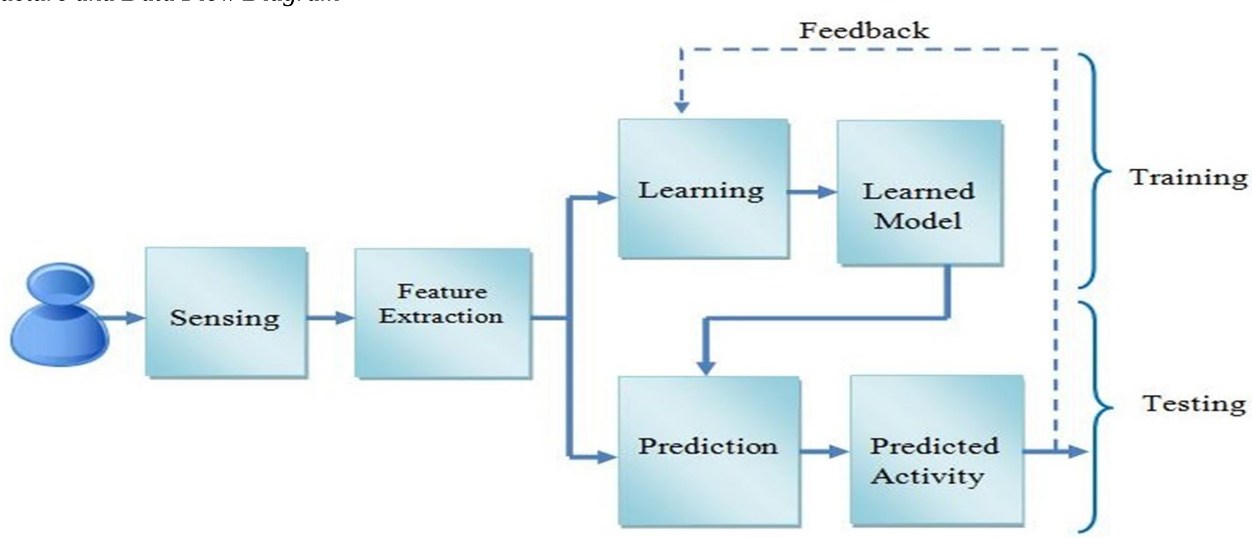


Fig 2: General Structure

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue IV, Apr 2019- Available at www.ijraset.com

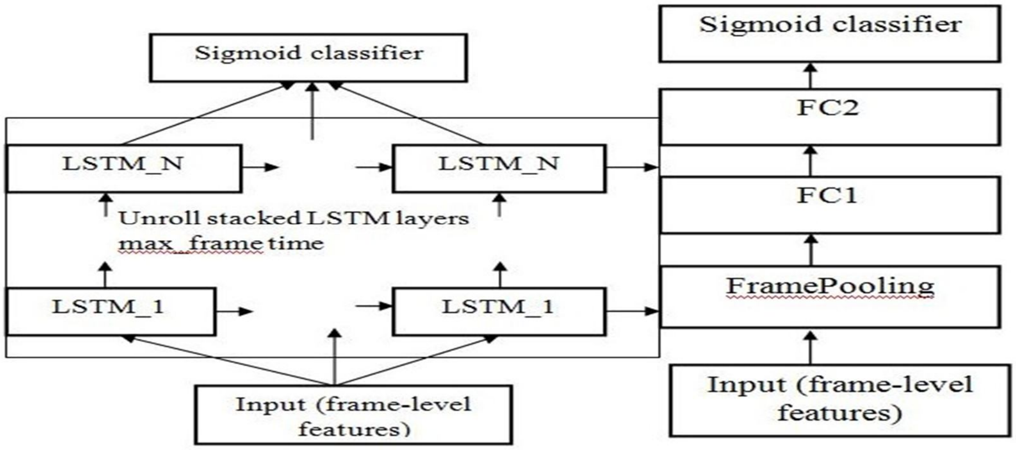
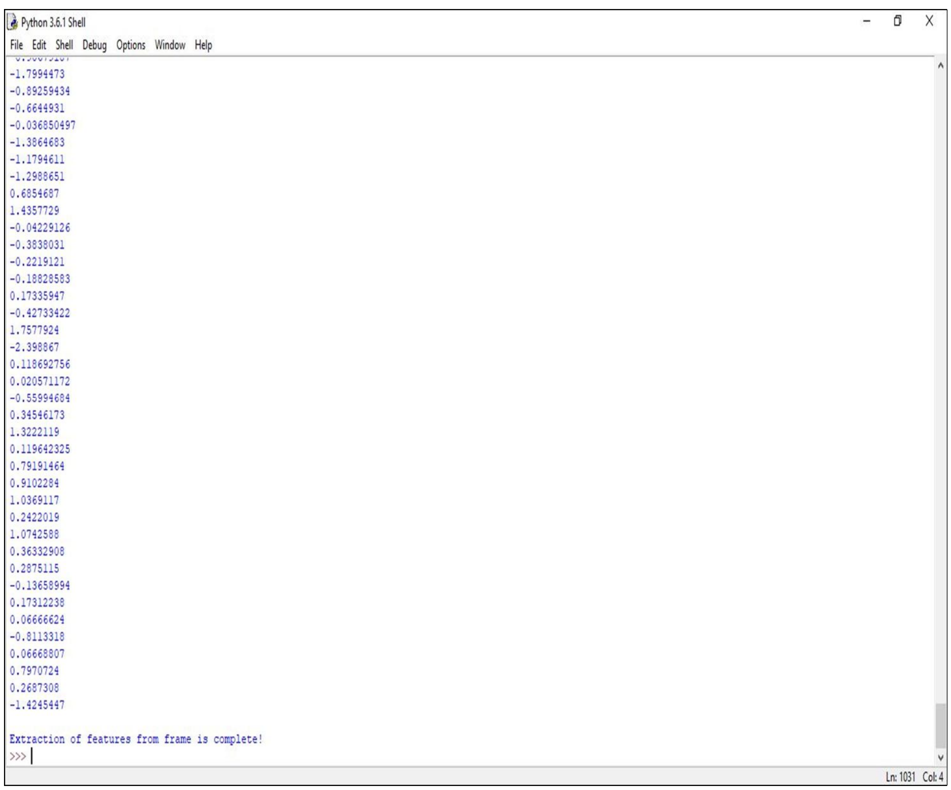


Fig 3: Data Flow Daigram

The above diagram shows us the flow of the program. The data is first collected from youtube8M data set and then the raw data is filtered and then it is segmented and then data is sent for feature extraction where the process of extraction begins. After that the Regression algorithms like LSTM, DboF and logistic regression is being applied and the classification is done with the help of machine learning algorithms.

IV. RESULT AND CONCLUSION



V. CONCLUSIONS

From survey on melanoma detection through image processing techniques results showed that the features used where able to differentiate between normal and cancerous lesions and also we are able to compare between ostus's and modifier ostus method. Modified ostus method works the best for image segmentation purpose and takes the least amount of time. Future work may include increasing the dataset size and trying this technique on a greater number of images. Different machine learning algorithm will be investigated in order to improve the accuracy.

REFRENCES

[1] Dr. Mohan Kumar S & Dr. Balakrishnan, Classification Of Breast Mass Classification – CAD System And Performance Evaluation Using SSNE, IJISET – International Journal of Innovative Science, Engineering & Technology, Vol. 2, Issue 9, 417-425, ISSN 2348 – 7968

[2] Dr. Mohan Kumar S, Dr. Balakrishnan, Classification Of Breast Mass Classification – CAD System With Performance Evaluation, International Journal of Engineering And Computer Science, Volume 4, Issue 09, 14187-14193, ISSN 2319-7242, September, 2015

[3] Dr. Mohan Kumar S, Dr. Balakrishnan, Classification Of Breast Microcalcification- CAD System And Performance Evaluation Using SSNE, International Journal of Advanced Research in Computer Science and S

[4] oftware Engineering, Volume 5 , Issue 9, 824-830, ISSN: 2277 128X, Sep- 2015

[5] Dr. Mohan Kumar S, Karthikayini, Essential Best Practices And Processes In Higher Educational Technical Institutions, International Journal Of Engineering Research And General Science, Volume 3, Issue 6, 231-236, ISSN 2091-2730 231, December, 2015

[6] Dr. Mohan Kumar S, Karthikayini, LNW-A System Model For A High Quality Effective E-Learning Using Cloud Environs, International Journal of Current Research and Review, Volume 7, Issue 23, 21-25, ISSN: 0975-5241, December, 2015

[7] Dr. Mohan Kumar S, Ayurveda Medicine Roles In Healthcare Medicine, And Ayurveda Towards Ayurinformatics, International Journal of Computer Science and Mobile Computing, Volume 4, Issue 12, 35-43, ISSN 2320-088X, December, 2015

[8] Dr. Mohan Kumar S, Muralidhara, Importance Of Accreditation And Autonomous Status In HEI – An Assessment With Special Orientation To Karnataka State, International Journal of Engineering Sciences & Research Technology, Volume 5, , Issue 1, 472-479, ISSN : 2277-9655, January, 2016

[9] Dr. Mohan Kumar S , Interrelated Research Works And Importance Of Object Oriented Analysis And Modeling, International Journal of Engineering Sciences & Research Technology, Volume 5, Issue 1, Page Numbers:59-62, ISSN : 2277-9655, January, 2016

[10] Dr.S Mohan Kumar, R.Jaya, A Survey On Medical Data Mining – Health Care Related Research And Challenges, International Journal of Current Research, Volume 8, Issue 01, Page Numbers; 25170-25173, ISSN:0975-833X, January, 2016

[11] R.Jaya, Dr S Mohan Kumar, A Study On Data Mining Techniques, Methods, Tools And Applications In Various Industries, International Journal of Current Research & Review, Volume 8, Issue 04, Page Numbers:35-43, ISSN:0975-5241, January, 2016

[12] Clara K, Dr S Mohan Kumar, Cyber Crime Varient Activities And Network Forensic Investigation, International Journal of Emerging Technology and Advanced Engineering, Volume 6, Issue 04, Page Numbers: April 2016, ISSN:2250-2459, March, 2016,

[13] Clara.K, Dr S Mohan Kumar,Exploratory Study Of Cyber Crimes, Digital Forensics And Its Tools, International Journal of Emerging Technology and Advanced Engineering, Volume 6, Issue 04, Page Numbers: April 2016, ISSN:2250-2459, March, 2016

[14] Revathi Y, Dr S Mohan Kumar, Efficient Implementation Using RM Method For Detecting Sensitive Data Leakage In Public Network International Journal of Modern Trends in Engineering and Research, Volume 3, Issue 04, Page Numbers: 515-518, ISSN (Online):2349–9745 ISSN (Print):2393-8161 , April, 2016

[15] Revathi Y , Dr S Mohan Kumar, Review On Importance And Advancement In Detecting Sensitive Data Leakage In Public Network, International Journal Of Engineering Research And General Science, Volume 4, Issue 02, Page Numbers:263-265, ISSN:2091-2730, April, 2016

[16] Revathi Y, Dr S Mohan Kumar, A Survey On Detecting The Leakage Of Sensitive Data In Public Network International Journal of Emerging Technology and Advanced Engineering, Volume 6, Issue 03, Page Numbers:234-236, January, 2016

[17] Vandana CP, "Security improvement in IoT based on Software Defined Networking (SDN)",International Journal of Science, Engineering and Technology Research (IJSETR)

[18] Volume 5, Issue 1 ,Pages 291-295

[19] Vandana cp,"Internet of Things and Security",International Journal of Computer Science and Mobile Computing ,Volume 5 ,Issue 1

[20] Pages 133-139 ,IJCSMC, Vol. 5, Issue. 1, January 2016

[21] Vandana cp,Study of Resource Discovery trends in Internet of Things (IoT) ,Journal Int. J. Advanced Networking and Applications ,Volume 8,Issue 3

[22] Pages 3084-3089

[23] Vandana cp,IOT future in edge computing ,Journal International Journal of Advanced Engineering Research and Science

[24] Volume 3 ,Issue 12 , AI Publications

[25] Sujithra ks,Baswaraju Swathi, sonia singh,Inclusive analysis of incomplete data sets using IkNN search, International Journal of Innovative Research in Computer and Communication Engineering,

[26] Subathra Muthuraman, Mrs Swathi Baswaraju, Mrs B Mounica, LARGE SCALE IMAGE RETRIEVAL USING DESCRIPTORS AND DISTANCE MEASURE, International Journal of Computer Science and Mobile Computing, Vol.4 Issue.5

[27] Swathi Baswaraju, Balani Somesh, Shrestha Niza Barun-SURVEY ON HOME SECURITY SURVEILLANCE SYSTEM BASED ON WI-FI CONNECTIVITY USING RASPBERRY PI AND IOT MODULE, International Journal of Advanced Research in Computer Science . Mar/Apr2018, Vol. 9 Issue 2.

[28] Mr.Dilish Babu.J, Dr.S Mohan Kumar, A Survey On Secure Communication In Public Network During Disaster , IJESRT -International Journal Of Engineering Sciences & Research Technology, Volume 5, Issue 3, Page Numbers:430-434, ISSN: 2277-9655, March 2016

[29] Mr.Dilish Babu.J, Dr.S Mohan Kumar, Survey On Routing Algorithms During Emergency Crisis Based On MANET, IJETAE, International Journal of Emerging Technology and Advanced Engineering, Volume 6, Issue 3, Page Numbers: 278-281, ISSN: 2250–2459, Mar-16

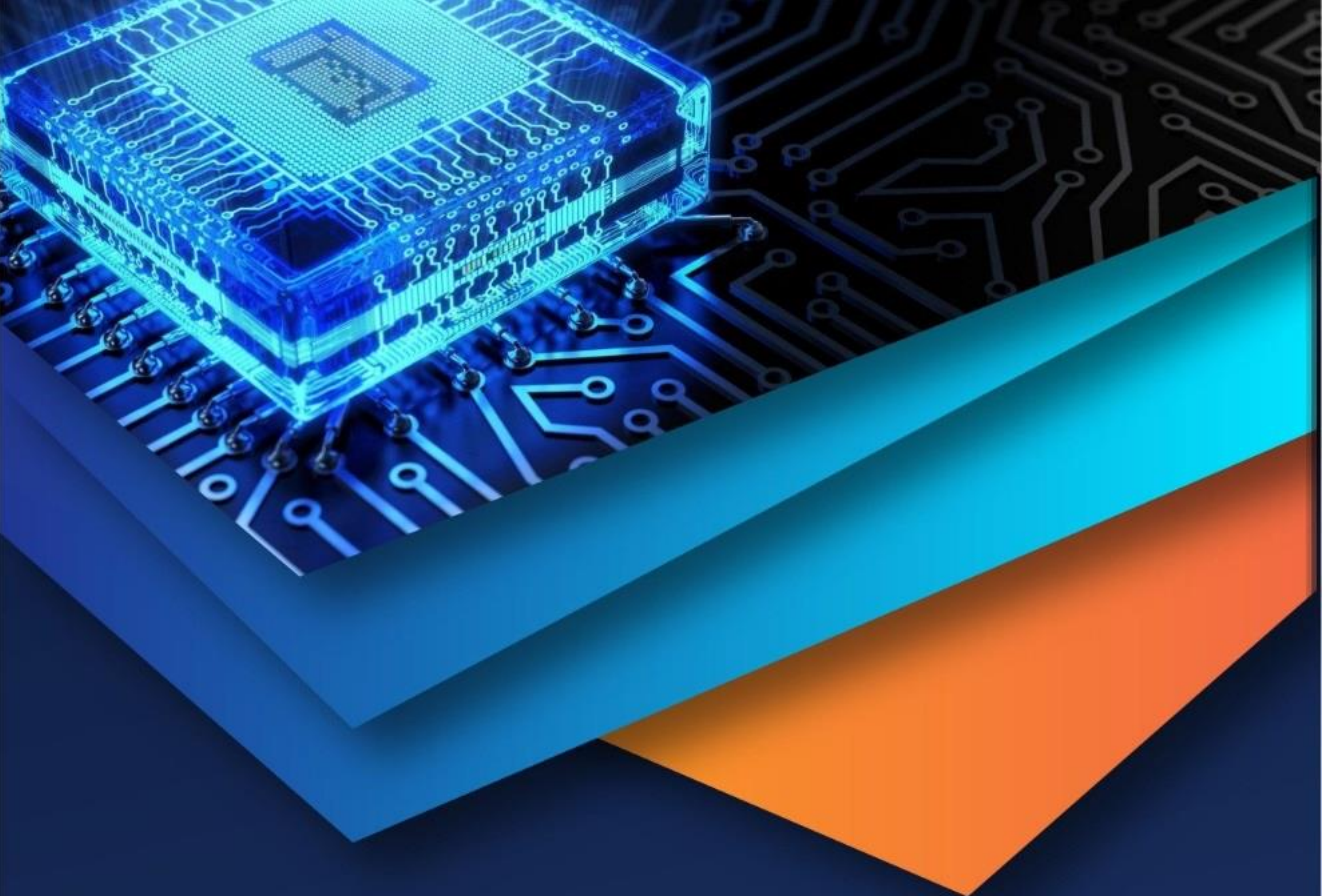
[30] Mr.Dilish Babu.J, Dr.S Mohan Kumar, Emergency Communication Sysytem For Natural Disaster Using MANET, IJRDO, International Journal of Research and Development Organization, Volume 2, Issue 5, Page Numbers:01 to 10, ISSN:2456-1843, May, 2016

[31] Ms.Sulochana Panigrahi, Dr S Mohan Kumar, Social Data Analysis Using Big-Data Analytic Technologies- Apache Flume, HDFS, HIVE, IJRDO, International Journal of Research and Development Organization, Volume 2, Issue 5, Page Numbers:16 to 21, ISSN:2456-1843, May, 2016

[32] Ms.Sulochana Panigrahi, Dr S Mohan Kumar, Social Media Analysis Using Apache Flume, Hdfs, Hive, International Journal of Current Trends in Engineering & Technology, Volume 2, , Issue 2, Page Numbers:282 to 285, ISSN:2395-3152, March, 2016

[33] Dr. V. ILANGO and Dr. S. Mohan Kumar, Factors For Improving The Research Publicatons And Quality Metrics International Journal of Civil Engineering & Technology (IJCIET) ISSN 0976-6308 and 0976-6316(Print&Online) Volume 8, Issue 4, 04-17,

[34] Naga Raju Hari Manikyam and Dr. S .Mohan Kumar, Methods And Techniques To Deal With Big Data Analytics And Challenges In Cloud Computing Environment, International Journal of Civil Engineering & Technology (IJCIET), ISSN 0976-6308 and 0976-6316(Print&Online), Volume 8, Issue 4, 04-17,
[35] V Karthik, Dr.S . Mohan Kumar and Ms. Karthikayini, A Novel Survey On Location Based Node Detection And Identifying The Malicious Activity Of Nodes In Sensor Networks International Journal of Civil Engineering & Technology, (IJCIET), ISSN 0976-6367 and 0976-6375(Print & Online), Volume 8,
[36] Karthik V, Ms.Karthikayini, Dr S Mohan Kumar, Ms Gayathri T, Geocentric Based Node Detection And Revoking Malicious Node In WSN, International Journal for Science and Advance Research in Technology (IJSART), ISSN 2395-1052 (Print&Online), Volume 3, Issue 4, 04-17
[37] Dr.S. Mohan Kumar and Dr G. Balakrishnan, Wavelet And Symmetric Stochastic Neighbor Embedding Based Computer Aided Analysis For Breast Cancer, Indian Journal of Science and Technology ISSN 0974-6846 and 0974-5645(Print&Online), Volume 9, Issue 47, 12-16
[38] Sruthi Hiremath, Sheba Pari N and Dr.S. Mohan Kumar, Booster in High Dimensional Data Classification, (DOI: 10.15680/IJIRCCE.2017. 0503349), International Journal of Innovative Research in Computer and Communication Engineering, Vol. 5, Issue 3, March 2017, 5984-5989.
[39] Dr S. Mohan Kumar & Dr.T.Kumanan, Skin Lesion Classification System and Dermoscopic Feature Analysis for Melanoma Recognition and Prevention, IJETAE, International Journal of Emerging Technology and Advanced Engineering, ISSN: 2250–2459 and Volume 7, Issue 7, July 2017,
[40] Dr S. Mohan Kumar & DrJitendranathMungara, J. Karthikayini, Design and implementation of CNN for detecting Melanoma through image processing, International Journal for Research in Applied Science and Engineering Technology, ISSN : 2321 – 9653, Volume 6, Issue - 3, March – 2018 in (DOI : 10.22214) pp. No.: 2249-2253
[41] Dr S. Mohan Kumar & J. Karthikayini, Surveys on Detection of Melanoma through image processing Techniques, International Journal for Research in applied science and Engineering Technology (IJRASET), ISSN : 2321 – 9653, volume 6, Issue III, March 2018 in IJRASET, DOI: 10.22214, pp. no.: 1699-1704
[42] Dr S. Mohan Kumar, Automated Segmentation of retinal images, International Journal of Engineering and Technology, UAE, July 2018, International Journal of Engineering and Technology, UAE
[43] Dr. S. Mohan Kumar & Anisha Rebinth, Automated detection of Retinal Defects using image mining, A review, European Journal of Biomedical and Pharmatical Sciences, European ISSN : 2349 – 8870, Volume 5 , Issue : 01 year : 2018, pp No.: 189 – 194
[44] Dr. S. Mohan Kumar& Dr.T.Kumanan, Analysis on skin Lesion classification systems and Dermoscopic Feature Analysis for Melanoma International Journal for Research in Applied Science and Engineering Technology (IJRASET), ISSN : 2321 – 9653, Volume 6, Issue - 3, March – 2018 in (DOI : 10.22214), pp. no.:1971-78
[45] Dr. S. Mohan Kumar & Dr.T.Kumanan, Study on skin Lesion Classifications system and Dermoscopic Feature Analysis for Melanoma, International journal of Creative Research Thoughts (IJCRT), IJCRT1802680, ISSN : 2320 – 2882, Volume 6, issue-1, March 2018, Page No . 1863 – 1873
[46] Dr. S. Mohan Kumar & Dr.T.Kumanan, Classification System and Dermoscopic Features Analysis for Melanoma recognition and Prevention, International journal of Creative Research Thoughts (IJCRT), IJCRT1802680, ISSN : 2250 – 2459 , Volume 7 , Issue 8, August 2017 , pp no: 351 – 357
[47] Dr. S. Mohan Kumar& Darpan Majumder, Healthcare Solution based on Machine Learning Applications in IOT and Edge Computing, International Journal of Pure and Applied Mathematics, ISSN: 1311-8080 (printed version) ISSN: 1314-3395 (on-line version) Jul 2018 issue.
[48] Dr. S. Mohan Kumar, Ashika.A, A Survey on Big Data Analysis, Approaches and its Applications in the real World, Journal of Emerging Technologies and Innovative Research, ISSN: 2349-5162, May 2018 , Volume 5, Issue 5, pp. no.: 93-100
[49] Shreya R, Sri Lakshmi Chandru, Vivek Kumar, Shwetha M, Dr. S. Mohan Kumar, Classification of Skin Cancer through image processing and implementating CAD System International journal of Creative Research Thoughts (IJCRT)IJCRT1802680m, ISSN : 2320 – 2882, Volume 6, issue-2 , April 2018 Page No . 1863 – 1873
[50] S Mohan Kumar & Dr. Balakrishnan, Statistical Features Based Classification of Micro calcification in Digital Mammogram using Stocastic Neighbour Embedding, International Journal of Advanced Information Science and Technology, 2012, ISSN:2319-2682 Volume 07, Issue 07 , November 2012, Page Numbers: 20-26
[51] S Mohan Kumar & Dr. Balakrishnan ,Breast Cancer Diagnostic system based on Discrete Wavelet Transformation and stochastic neighbour Embedding, European Journal of Scientific Research, 2012, ISSN:1450-216X ,Volume 87, Issue 03 , October 2012, Page Numbers: 301-310
[52] S Mohan Kumar & Dr. Balakrishnan, Classification of Microclacification in digital mammogram using SNE and KNN classifier, International Journal of Computer Applications - Conference Proceedings published in IJCA, 2013 ISBN: 973-93-80872-00-6, ICETT proceedings with IJCA on January 03,2013, Page Numbers: 05-09
[53] S Mohan Kumar & Dr. Balakrishnan, Mutiresolution analysis for mass classification in Digital Mammogram using SNE, IEEE international Conference-ICCSP-13 organized by Athiparasakthi Engineering College, Chennai , 2013, ISBN:978-1-4673-4864-5, Page Numbers: 2041-2045.
[54] S Mohan Kumar & Dr. Balakrishnan, Categorization of Benign And Malignant Digital Mammograms Using Mass Classification – SNE and DWT, Karpagam Journal of Computer Science, 2013, ISSN No: 0973-2926, Volume-07, Issue-04, June-July-2013, Numbers: 237-243.
[55] S Mohan Kumar & Dr. Balakrishnan, Classification of Micro Calcification And Categorization Of Breast Abnormalities - Benign and Malignant In Digital Mammograms Using SNE And DWT, Karpagam Journal of Computer Science 2013, ISSN No: 0973-2926, Volume-07, Issue-05, July-Aug, 2013. Page Numbers: 253 to 259
[56] S Mohan Kumar & Dr. Balakrishnan, The Performance Evaluation of the Breast Mass classification CAD System Based on DWT, SNE AND SVM , International Journal of Emerging Technology and Advanced Engineering, 2013, ISSN 2250–2459, Volume 3, Issue 10, October 2013, Page Numbers: 581-587
[57] S Mohan Kumar & Dr. Balakrishnan ,The Performance Evaluation of the Breast Microcalcification CAD System Based on DWT, SNE AND SVM, CiiT International Journal of Digital Image Processing, 2013, Print: ISSN 0974 – 9691 & Online: ISSN 0974 – 9586, Issue-November 2013, Page Numbers / DOI: DIP112013005.



10.22214/IJRASET

INDEX COPERNICUS 45.98

ISRA JIF IMPACT FACTOR: 7.129

TOGETHER WE REACH THE GOAL
IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY