



Koneru Lakshmaiah Education Foundation

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Report of A five day FDP

on

RESEARCH AND INDUSTRY ORIENTED PIPELINES FOR CONSTRUCTING ML APPLICATIONS

20th-24th September, 2022.

Organized by Signal Processing Research Group

Department of ECE, KLEF

Signal Processing Research Group has conducted a five days faculty development programme to strengthen the faculty in the deep learning domain. The main focus of this FDP is to provide a hand on sessions for the faculty to educate on futuristic directions of vision computing and biomechanics research area.. Five eminent resource persons were delivered the sessions. We have received a total of 100 registrations for this FDP from all over the country. Among all the registrations we have 49 active participants for this FDP and the certificates were issued to all the active participants (>80% attendance). The detailed report of all the sessions is as follows.

Day-1 Session-1: (20/09/2022)

The session was started at 10AM with inauguration followed by the welcome speech by the conveners. The session was handed over to the resource person Dr. M. Vinod Kumar, Associate Professor, Bapatla Engineering College. The session topic is 'Train Rolling stock examination Assistant: A Computer vision approach to Manual rolling stock examination'.

Hands-on session was taken by the resource person. He guided the participants to install anaconda and the required packages. He explained how to program with tensorflow. He taught how to create a neural network model in python.

Day-1 Session-2: (20/09/2022)

The session-2 was taken again by Dr. M. Vinod Kumar, Associate Professor, Bapatla Engineering College, and the topic is 'The VGG 16 Network'. He explained the basic CNN architecture i.e. VGG 16. A brief introduction to deep learning architectures was given for the 30 minutes and then he taken hand-on. All the participants were actively participated and created their first VGG model for object recognition task.

Day-2 Session-3: (21/09/2022)

The session-3 was taken by the Dr. D. Anil Kumar, on the topic 'Natural Language Processing in Tensorflow'. A brief introduction to NLP was given and the application areas were discussed in depth. Later a Hands-on session was taken by the resource person and he showed how to implement text recognition and text categorization using deep learning techniques.

We recorded the maximum attendance for this session. The participants were very much satisfied with the session. An interactive question and answer session was lasts for 30 minutes. The session was closed at 1:30PM.

Day-2 Session-4: (21/09/2022)

The session 4 was continued by Dr. D. Anil Kumar Assistant Professor,

PACE Institute of Technology & Sciences (Autonomous) and the topic covered is 'The ResNet'. He explained how the residual networks works for specific applications. He implemented the human action recognition and the sign language recognition resnet models to the participants.

Day-3 Session-5: (22/09/2022)

The session 5 was again taken by the resource person Mr. Nanda Kishore Mallapragada, Senior Data Scientist, Gramener and the topic covered is 'Enhance marketing strategies using NLP'.

He showed how to implement YOLO architectures for object detection and human face detection and recognition. He implemented an application called student attendance monitoring system with the help of YOLO architectures. At the end of the session he clarified the participants doubts.

Day-3 Session-6: (22/09/2022)

This session was taken by Mr. Nanda Kishore Mallapragada, Senior Data Scientist, Gramener and he covered the topic 'Machine Learning Vs Deep Learning Experience'.

He explained the basics of machine learning and deep learning. He also explained how the deep learning is differ from machine learning and various application areas of both the concepts. He showed various benefits of implementing deep learning algorithms.

Day-4 Session-7: (23/09/2022)

The session 7 was taken by the industry expert Dr. B. Kranthi Kiran, Professor, JNTUH and the topic chosen by him is ‘Applications of AI & ML’.

He explained the Triplet loss networks and how they perform classification based on distance metrics. The session was very interesting as it is a new concept of deep learning. He also showed some implemented applications in their company.

Day-4 Session-8: (23/09/2022)

The afternoon session was continued ‘Speech Processing Models with deep learning’.

It was a great session by him. In this session he explored various projects done by them in their speech processing research laboratory. He dealt with various problems being faced while capturing and processing the speech signals.

Day-5 Session-9: (24/09/2022)

The session 9 was taken by the industry expert Mr. M. Teja Kiran Kumar from Yantrisiksha Technologies and the topic delivered is ‘Image Captioning Models’.

He has educated the participants in using AWS services from Amazon for high end applications. He gave a demo on how they are working with cricket bowling and batting analysis. He also gave a demo on how to perform labelling which is a more important task in preparing training data. He explained how to organize the training, testing and validation data sets. He also explained how to fine tune the network parameters / hyper parameters to attain more accuracy.

Day-5 Session-10: (24/09/2022)

This was the last session of the FDP and the session was taken by an academic expert Dr. P V V Kishore. The topic he chosen for this session is ‘Speech processing deep learning model building pipelines’.

He explained some speech processing pipelines for researchers. He continued his session by giving suggestions on how to choose a research topic and how to write a research articles and the essential sections that should be there in one's research article.

Finally the FDP was ended with a valedictory and vote of thanks from the organizers.

Few screen shots were taken during the FDP and are kept here for your reference.

The screenshot shows a Cisco Webex Meeting interface. The main window displays a Jupyter Notebook titled 'CNN_03_DAT1 Last Checkpoint: 05/15/2021 (unsaved changes)'. The code in the notebook is as follows:

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3 #img = tf.keras.preprocessing.image.load_img('horse-or-human/train/horses/horse02-8.png')
4 img = tf.keras.preprocessing.image.load_img('Rock_Sessors_Papers/Train/paper/041518TqdzF9MDHJ.png')
5 img_array = tf.keras.preprocessing.image.img_to_array(img)
6 img_array = np.expand_dims(img_array,axis=0)
7 plt.imshow(img)
```

The output of the code is a plot of the image, showing a hand on a green background. The meeting interface shows a list of participants on the right, including CR048, Poliah B, praveen, Dr. Madhukar Deshmukh, 3452 Kishore, and 1286 Dr.S.Nagendram. The chat window on the right shows a message from CR048 to everyone at 12:21 PM, providing a feedback link.

The screenshot shows a Cisco Webex Meeting interface. The main window displays a presentation slide titled 'Training'. The slide content is as follows:

Training

Sample labeled data (batch) → Forward it through the network, get predictions → Back-propagate the errors → Update the network weights

Optimize (min. or max.) objective/cost function $J(\theta)$
Generate **error signal** that measures difference between predictions and target values

Use error signal to change the **weights** and get more accurate predictions
Subtracting a fraction of the **gradient** moves you towards the **(local) minimum of the cost function**

The slide also includes a 3D surface plot of the cost function and a 2D plot showing a tangent line and the slope of the cost function.

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CR048 Host, me Teja Kiran Kumar Maddala 1286 Dr.S.Nagendram 2812- Dr.MVD Prasad Cohost 2721 Dr Nagesh M

Participants (71)

Search

928 Sri Kavya Korada

AR A.RACHEL ROSELIN

AK Aravind Kilaru

BM BALA KRISHNA MANASH

C CR045

C CR054

C CR160

DS Dr Ernest Ravindran R S

Mute all Unmute all

Chat

to M BALASUBRAHMANYAM (privately): 2:08 PM

Day2-Session3 Feedback link:

https://docs.google.com/forms/d/e/1FAIpQLSfN8i-RXt6iQWlOAJ3yGiyh7uMambUSBoN_Ff2zBgdGcLlg/viewform?usp=sf-link

from M BALASUBRAHMANYAM (privately): 2:11 PM

To: Everyone

Enter chat message here

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ResNet and its Derivatives:

Residual Block

layer name	output size	18-layer	34-layer	50-layer	101-layer	152-layer
conv1	112x112	7x7, stride 2				
conv2.x	56x56	3x3 max pool, stride 2				
conv3.x	28x28	3x3, 64	3x3, 64	3x3, 64	3x3, 64	3x3, 64
conv4.x	14x14	3x3, 128	3x3, 128	3x3, 128	3x3, 128	3x3, 128
conv5.x	7x7	3x3, 256	3x3, 256	3x3, 256	3x3, 256	3x3, 256
FLOPs		1.8x10 ⁹	3.6x10 ⁹	3.8x10 ⁹	7.6x10 ⁹	11.3x10 ⁹

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Participants (55)

Search

CR048 Host, me

TM Teja Kiran Kumar Maddala

2P 2812- Dr.MVD Prasad Cohost

1Y 190040534 yaswanth

2389 NAMGIRI SURESH

2M 2721 Dr Nagesh M

2S 2993-Dr BADUGU SURESH

Mute all Unmute all

Chat

<https://pipedie.com/darknet/yolo/>

from ushela anusha rani to everyone: 10:16 AM

good morning sir

from Teja Kiran Kumar Maddala to everyone: 10:19 AM

<https://pipedie.com/darknet/yolo/>

To: Everyone

Dear all, Sorry for the inconvenience. There is a network issue at the

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Performance on the COCO Dataset

Model	Train	Test	mAP	FLOPs	FPS	Cfg	Weights
SSD300	COCO trainval	test-dev	41.2	-	46	link	
SSD500	COCO trainval	test-dev	46.5	-	19	link	
YOLOv2 608x608	COCO trainval	test-dev	48.1	62.94 Bn	40	cfg	weights
Tiny YOLO	COCO trainval	test-dev	23.7	5.41 Bn	244	cfg	weights
SSD321	COCO trainval	test-dev	45.4	-	16	link	
DSSD321	COCO trainval	test-dev	46.1	-	12	link	
R-FCN	COCO trainval	test-dev	51.9	-	12	link	
SSD513	COCO trainval	test-dev	50.4	-	8	link	
DSSD513	COCO trainval	test-dev	53.3	-	6	link	
FPN FRON	COCO trainval	test-dev	59.1	-	6	link	
Retinanet-50-500	COCO trainval	test-dev	50.9	-	14	link	
Retinanet-101-600	COCO trainval	test-dev	53.1	-	11	link	
Retinanet-101-800	COCO trainval	test-dev	57.5	-	5	link	
YOLOv3-320	COCO trainval	test-dev	51.5	38.97 Bn	45	cfg	weights
YOLOv3-416	COCO trainval	test-dev	55.3	65.86 Bn	35	cfg	weights
YOLOv3-608	COCO trainval	test-dev	57.9	140.69 Bn	20	cfg	weights
YOLOv3-tiny	COCO trainval	test-dev	33.1	5.56 Bn	220	cfg	weights
YOLOv3-app	COCO trainval	test-dev	60.6	141.45 Bn	20	cfg	weights

How It Works

Prior detection systems repurpose classifiers or localizers to perform detection. They apply the model to an image at multiple locations and scales. High scoring regions of the

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CR048 Host, me Anil 3452 Kishore Co-host 1286 Dr.S.Nagendram 2224 GORLA VENKATA G...

What is research?

Here Important is Search in Re'search'

It is very important to know what is the state of the art approach for the problem you have selected

Research starts after identifying gaps in literature

What to do is important than how to do

Writing research paper/thesis is like making a hit movie

Ultimate job in the world - Research Faculty !!!!

Participants (51)

Search

PS P. Syam Sundar RG Raja Gopal R RamakrishnaThirumuru RK RAVINUTALA KOTESWARARAO S4 Sekar R 4301 S Shivani TB TVA BHANUPRAKASH

Mute all Unmute all

Chat

please share the screen sir from CR048 to everyone: 2:15 PM
sir, your screen is not shared from M BALASUBRAHMANYAM to everyone: 2:21 PM
is any test

To: Everyone

Enter chat message here

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Participants Chat

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Tips for paper writing/thesis writing

Abstract

Introduction

Baseline approaches

Proposed approach

Results and discussion

Summary

References

Viewing Anil's screen

Participants (70)

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CR048 Host, me Anil 1286 Dr.S.Nagendram 2389 NAMGIRI SURESH 2721 Dr Nagesh M 2934 Mr.G.SIVANAGESWARA RAO 2982 SREEVARDHAN CHEERLA

Mute all Unmute all

Chat

is based on attendance from M BALASUBRAHMANYAM (privately): 2:33 PM
r u provide certificate sir from Dr G ch. Satyanarayana to everyone: 3:13 PM
excellent speech Sir.

To: --- Please Select ---

Enter chat message here

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Participants Chat

Dr.M.Suman,

HOD ECE