

Report on

IEEE Technical Talk Series 2021

Expert: Dr. Arnav Bhavsar

July 21, 2021

Title: Applications of Deep Learning in Medical Image Analysis



IEEE Signal Processing Society

Gujarat Section



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IEEE
GCET Student Branch



- POSTER FOR THE TALK



IEEE
GCET Student Branch



IEEE Signal Processing Society Gujarat Chapter

in collaboration with
IEEE SPS GCET SBC

presents

Expert Talk



**Applications of Deep Learning in
Medical Image Analysis**

21 July 2021 | 10:00 AM IST

Scan to Register



Dr. Arnav Bhavsar

Assistant Professor

*School of Computing and Electrical
Engineering, IIT Mandi*

<http://bit.ly/3j0IUa2>

(WebEx link will be sent to registered participants)



ieeespsgs.org/



[ieeespsgs](https://www.facebook.com/ieeespsgs)



- EXPERT PROFILE



Dr. Arnav Bhavsar

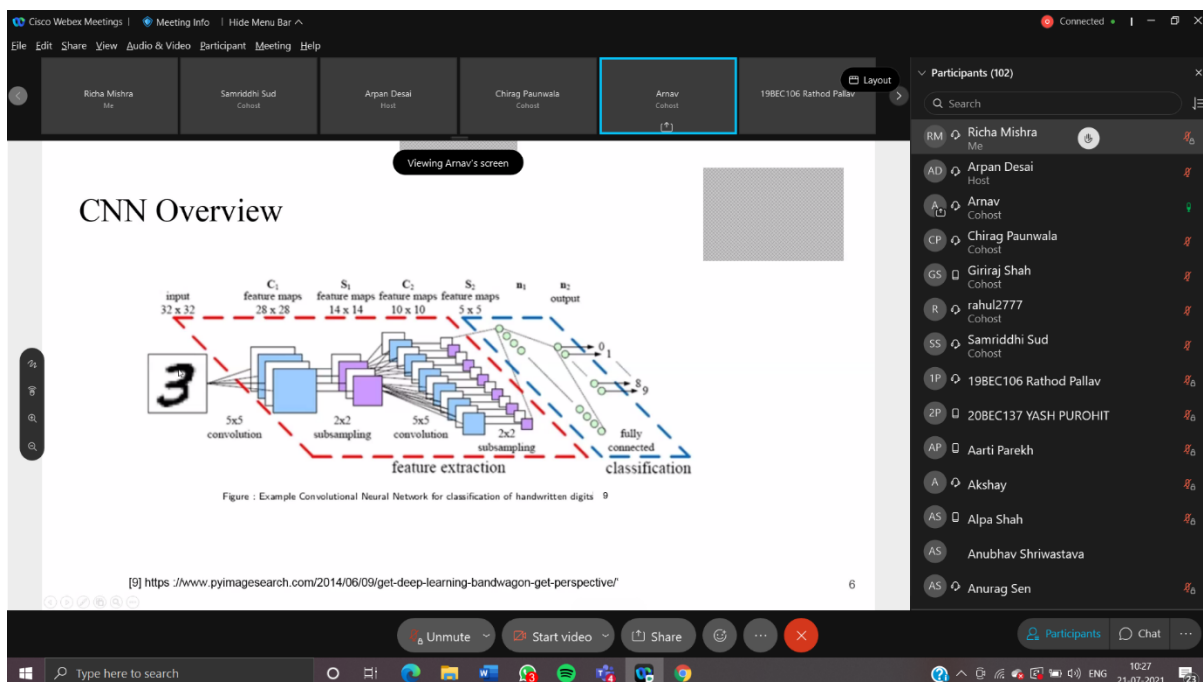
Associate Professor at IIT Mandi

Dr. Arnav Bhavsar is the assistant Professor at Indian Institute of Technology Mandi. He has done his research in Computer Vision, Image and Signal Processing, and Machine Learning. His research work has been published in various international journals(IEEE PAMI, Springer IJCV, Elsevier CVIU) and conferences(e.g. BMVC, ICPR, ICIP, DAGM).He has served as a reviewer for various international journals(IEEE Trans. on Industrial Electronics, Elsevier PRL, Elsevier IVC, Elsevier CVIU, Elsevier Signal Processing, Optical Engineering, Information Fusion).

INTRODUCTION:

SPS Chapter of IEEE GCET SB in collaboration with IEEE SPS Gujarat Section conducted and Expert Talk in the Technical Talk Series which focused on the topic “**Applications of Deep learning in Medical Image Analysis**”.

The speaker for this event was Dr. Arnav Bhavsar, who is an associate professor at IIT Mandi. Dr. Arnav Bhavsar discussed about the various applications of Deep learning in Medical Image Analysis.



The screenshot shows a Cisco Webex Meeting interface. The main content area displays a slide titled "CNN Overview" with a diagram of a convolutional neural network architecture. The diagram illustrates the flow from an input image of the digit '3' through several stages: a 5x5 convolution layer, a 2x2 subsampling layer, a 5x5 convolution layer, and another 2x2 subsampling layer. This is followed by a fully connected layer for classification. The diagram is labeled with "feature extraction" and "classification". Below the diagram, the text reads: "Figure : Example Convolutional Neural Network for classification of handwritten digits". A citation is provided at the bottom: "[9] <https://www.pyimagesearch.com/2014/06/09/get-deep-learning-bandwagon-get-perspective/>".

The meeting interface includes a top bar with "Cisco Webex Meetings | Meeting Info | Hide Menu Bar ^", a menu with "File Edit Share View Audio & Video Participant Meeting Help", and a participant list on the right. The participant list shows 102 participants, including Richa Mishra (Me), Arpan Desai (Host), Arnav (Cohost), Chirag Paunwala (Cohost), Giriraj Shah (Cohost), rahul2777 (Cohost), Samridhhi Sud (Cohost), 19BEC106 Rathod Pallav, 20BEC137 YASH PUROHIT, Aarti Parekh, Akshay, Alpa Shah, Anubhav Shrivastava, and Anurag Sen.



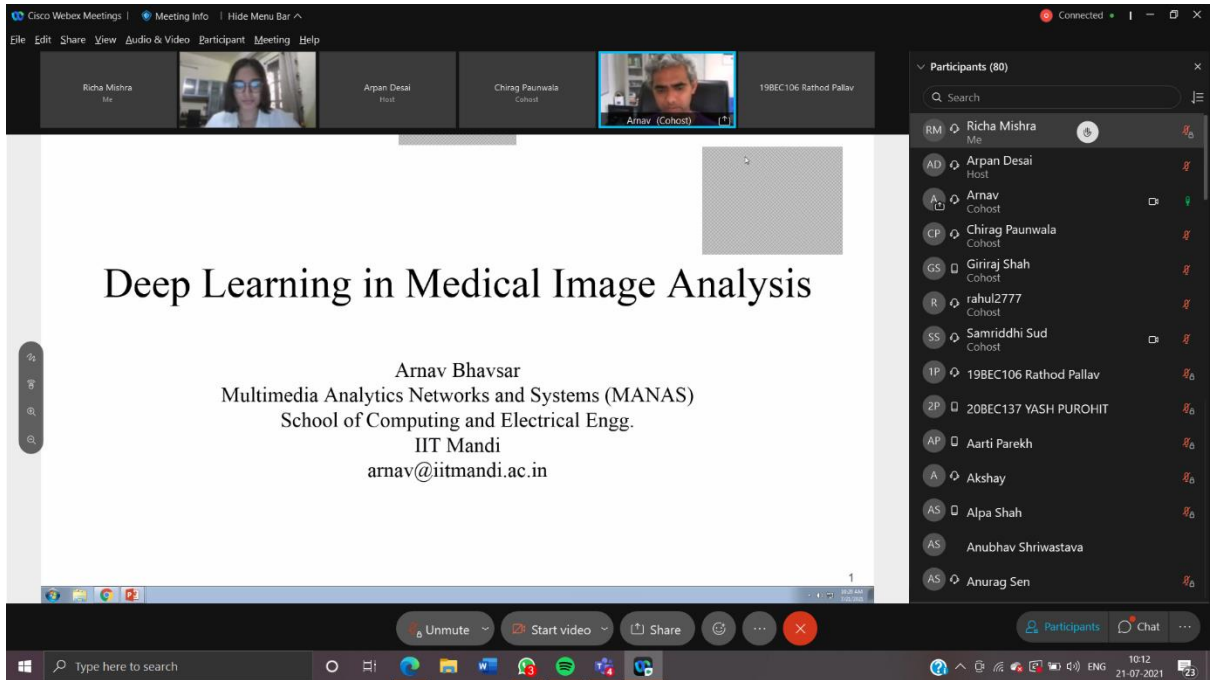
ABOUT THE EVENT:

The talk started with the introduction of the Image analysis and some basics of deep learning in that. Then participants were presented what are the types of Medical Imaging by showing them real images with example. Then after sir discussed about convolutional Neural Networks and their use.

The session continued with the topic of Machine learning architectures and what is Supervised learning Models.

After the completion of the topics, there was an interactive QnA session with intriguing questions and sir answered all the questions which made the session more engaging and fruitful. All the participants gained very useful knowledge of Deep learning in Image Analysis and were thankful to the speaker for sharing his knowledge with them.

- GLIMPSES OF THE TALK



Cisco Webex Meetings | Meeting Info | Hide Menu Bar

Richa Mishra Me | Arpan Desai Host | Chirag Paunwala Cohost | Arnav (Cohost) | 19BEC106 Rathod Pallav

Deep Learning in Medical Image Analysis

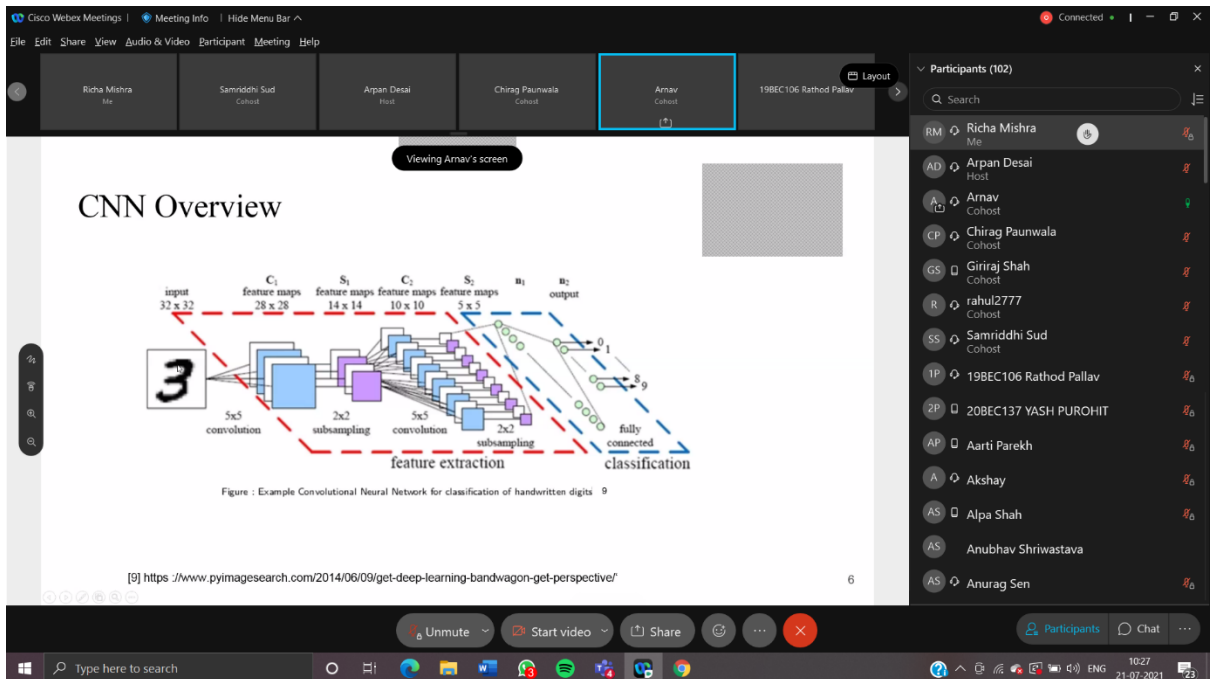
Arnav Bhavsar
Multimedia Analytics Networks and Systems (MANAS)
School of Computing and Electrical Engg.
IIT Mandi
arnav@iitmandi.ac.in

Participants (80)

Richa Mishra Me
Arpan Desai Host
Arnav Cohost
Chirag Paunwala Cohost
Giriraj Shah Cohost
rahul2777 Cohost
Samridhhi Sud Cohost
19BEC106 Rathod Pallav
20BEC137 YASH PUROHIT
Aarti Parekh
Akshay
Alpa Shah
Anubhav Shrivastava
Anurag Sen

Unmute | Start video | Share

Type here to search | 10:12 21-07-2021



Cisco Webex Meetings | Meeting Info | Hide Menu Bar

Richa Mishra Me | Samridhhi Sud Cohost | Arpan Desai Host | Chirag Paunwala Cohost | Arnav Cohost | 19BEC106 Rathod Pallav

CNN Overview

Viewing Arnav's screen

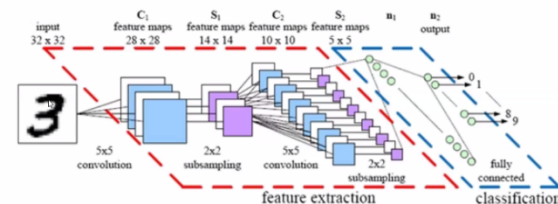


Figure : Example Convolutional Neural Network for classification of handwritten digits 9

[9] <https://www.pyimagesearch.com/2014/06/09/get-deep-learning-bandwagon-get-perspective/>

Participants (102)

Richa Mishra Me
Arpan Desai Host
Arnav Cohost
Chirag Paunwala Cohost
Giriraj Shah Cohost
rahul2777 Cohost
Samridhhi Sud Cohost
19BEC106 Rathod Pallav
20BEC137 YASH PUROHIT
Aarti Parekh
Akshay
Alpa Shah
Anubhav Shrivastava
Anurag Sen

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Richa Mishra (Me), Samridhii Sud (Cohost), Arpan Desai (Host), Chirag Paunwala (Cohost), Arnab (Cohost), 19BEC106 Rathod Pallav

Participants (110)

First Part: Calculation of patient scores for each magnification

Second Part: Estimates multiplying weights (w_1, w_2, w_3, w_4) using least square method and calculate

Final scores: $(w_1 * P_1) + (w_2 * P_2) + (w_3 * P_3) + (w_4 * P_4)$

Classification framework: Quadratic Support Vector Machine (SVM)

Decision fusion of selected layers using majority voting

Selected layers from proposed layer selection method (feature Extraction)

Basic unit

Fig 6. Multi-scale model

38

Unmute, Start video, Share, Participants, Chat

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Cisco Webex Meetings | Meeting Info | Hide Menu Bar

Richa Mishra (Me), Arnab (Cohost), 189999913008_DHEERAJ-K..., 19BEC106 Rathod Pallav, 20BEC137 YASH PUROHIT, Aarti Parekh, Adarsh Mishra, Akshay

Results: Qualitative (Voxel level)

Patient 1

(a) Ground-truth and Predicted for CC (b) Ground-truth and Predicted for CST

Patient 2

(c) Ground-truth and Predicted for CC (d) Ground-truth and Predicted for CST

Voxel level visualization of SH coefficients of Corpus Callosum and Cortico-Spinal Tracts at $b = 2000$

65

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- MOMENTO FORMAT





- NUMBER OF PARTICIPANTS

Total: 119

IEEE Members: 43

Non IEEE Members: 76

Report Prepared by: Richa Mishra

Vice-Chairperson | IEEE SPS GCET Chapter