

ABHISHEK SINGH SAMBYAL

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RESEARCH INTERESTS

Medical Image Analysis, Computer Vision, Machine Learning, Deep Learning

EDUCATION

Indian Institute of Technology Ropar

Ph.D. Computer Science and Engineering

Advisors: Dr. Deepti R. Bathula & Dr. Narayanan C. Krishnan

GPI: 8.26 / 10

Courses taken: Computer Vision, Digital Image Processing, Machine Learning, Artificial Neural Networks

Rupnagar

July 2019 - present

Bangalore Institute of Technology

Master of Technology (M.Tech.) Computer Science and Engineering

First Class with Distinction

Bangalore

2012 - 2014

EXPERIENCE

Central University of Jammu

Assistant Professor, Department of Computer Science & IT

Jammu

Jan 2017 - June 2018

Kudos Knowledge - Syncordia

Software Engineer

Bangalore

Aug 2014 - Jul 2016

PROJECTS

1. **Self-supervised learning by context prediction** [Pytorch] [Code]
Pre-training from the dataset itself using context prediction. In this approach, we train the model without the given labels, instead we use pseudo labels based on the pre-text task. This is an implementation of *Unsupervised Visual Representation Learning by Context Prediction (ICCV)* paper.
2. **Autoencoder** [Pytorch] [Code]
In this project, nuances of the autoencoder training were looked over.
 - Autoencoder end-to-end training for classifying MNIST dataset.
 - Autoencoder Layer Wise Pre-training (Stacking) for Fashion-MNIST.
 - DRIVE (Digital Retinal Images for Vessel Extractions) dataset patchwise segmentation using Autoencoder.
 - Sparse Denoising Autoencoder (SDAE) for classification of MNIST dataset.
3. **Style Transfer** [Pytorch] [Code]
Style of one image is transferred to the other. Used gram matrix to extract the style of the image calculated from the convolution layers of the VGG19 network. This is an implementation of *Image Style Transfer Using Convolutional Neural Networks Gatys (CVPR)* paper.
4. **Class Activation Maps** [Pytorch] [Code]
A class activation maps for a particular category indicates the discriminative image regions used by the CNN to identify that category. They are generated using the global average pooling (GAP) in CNNs to interpret the model whereas Grad-CAM uses the gradient information to understand each neuron for a decision of interest. This is an implementation of *Learning Deep Features for Discriminative Localization (CVPR)* and *Grad-CAM (ICCV)* paper.
5. **Visualize-CNN** [Pytorch] [Code]
Visualization of CNN layers activations and weights on CIFAR-10 dataset.
6. **Knowledge Discovery from Brain MRI Images using Statistical Techniques and Associative Classification** [MATLAB] [Code]
M. Tech. project designed and implemented for finding tumors in the brain. We used supervised learning where different textural features were taken and among those, important features were selected using cut points. Those features with their corresponding classes were fed to classifier predicting the correct class.

MACHINE LEARNING SUMMER SCHOOL

Attended Oxford Machine Learning Summer School 2020

17-25 Aug, 2020

ADD-ON COURSES

Deep Learning for Visual Computing	IIT-Kgp
Pytorch Scholarship Challenge from Facebook	Udacity (2018)
<i>Deep Learning with Pytorch - Recipient of the Facebook Pytorch Scholarship Program</i>	
Deep Learning with Python and PyTorch	edx (2018)
Practical Deep Learning for Coders	Fasi.ai (2018)
Machine Learning - Stanford	Coursera (2016)
Image and video processing: From Mars to Hollywood with a stop at the hospital - Duke University	Coursera (2014)

PROFESSIONAL SKILLS

Languages/Frameworks:	Python, Pytorch, Tensorflow, Fastai, C
Libraries:	Numpy, Pandas, Matplotlib, Seaborn, Scikit-learn
Softwares/Tools:	WandB, Git, MongoDB, MATLAB, Vim, L ^A T _E X
Familiar:	DIGITS, JavaScript, CasperJS, C++, nodejs

PUBLICATIONS/CONFERENCES/WORKSHOPS

Advances in Deep Learning Techniques for Medical Image Analysis	
<i>Usma Niyaz, Abhishek Singh Sambyal, Devanand</i>	
2018 Fifth International Conference on Parallel, Distributed and Grid Computing (PDGC)	
Special Session on Recent Advance in Biometrics, Deep Learning	IEEE
and Wireless Sensor Networks.	Dec 20 - 22, 2018
Evaluation of Deep Learning model with Optimizing and Satisficing metrics for Lung Segmentation	
<i>Usma Niyaz, Abhishek Singh Sambyal, Devanand</i>	
8th International Conference on Soft Computing for Problem Solving - SocProS 2018	Springer
<i>Proceedings in Advances in Intelligent Systems and Computing (AISC), Springer.</i>	Dec 17 - 19, 2018
NVIDIA Deep Learning Institute (DLI) Workshop	IIT Jammu
Topics: Classification, Object Detection Techniques & DIGITS framework	Jan 25 - 26, 2018
Knowledge Abstraction from Textural Features of Brain MRI Images for Diagnosing Brain Tumor using Statistical Techniques and Associative Classification	
<i>Abhishek Singh Sambyal, Dr. Asha T.</i>	
IEEE ISBN 978-1-4673-7666-5	IIT Kharagpur
2016 International Conference on Systems in Medicine and Biology (ICSMB)	Jan 4 - 7, 2016

COMPETITION/EXTRA-CURRICULAR

Child Rights & You - CRY
Volunteer with CRY for the upliftment of children.

REFEREES

- Dr. Deepti R. Bathula**
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