Hritam Basak

Kolkata, West Bengal, India
| Google Scholar | ResearchGate | Linkedin | GitHub | Email |

About: Being a lifelong learner is a trait that is really important to me, and I know that a good education is not just for the schoolyard. Some lessons were learned in the traditional way, while others I have received from professional mentors, while working and in projects, friends and family.
My area of interests are: Computer Vision , Medical Image Analysis, Deep Learning, and Evolutionary Optimization.

EDUCATION

JADAVPUR UNIVERSITY
B.E. IN ELECTRICAL ENGINEERING
2017 - 2021 | Kolkata, India
GPA: 8.9 / 10
Top 15 in Department

MAHESH SRI RAMKRISHNA ASHRAM VIDYALAYA
HIGH SCHOOL
May 2017 | Kolkata, India
Grade: 95%
Position: 14th in Boards

10TH BOARDS
Feb 2015 | Kolkata, India
Grade: 97%
Position: 7th in Boards

MOOC COURSES

- Machine Learning (Stanford University)
- Neural Networks and Deep Learning (deeplearning.ai)
- Computer Vision Basics (University of Buffalo)
- Image and Video Processing (Duke University)
- Advanced Machine Learning and Signal Processing (IBM)
- Applied AI with Deep Learning (IBM)

SKILLS

MACHINE LEARNING & COMPUTER VISION

Tensorflow • PyTorch • Keras • Weka • Scikit-learn • Numpy • OpenCV • Pillow • SciPy • Pandas

INDUSTRIAL SKILLS

PySpark • Git and version control • Azure • SQL

PROGRAMMING LANGUAGE

Python • MATLAB • JAVA • C/C++ • Latex

INDUSTRIAL EXPERIENCE

TATA DIGITAL |DATA SCIENTIST
May 2021 - Present | Mumbai, India

- Working on India's first and largest SUPER APP project
- Creating microsegments of TATA Cliq and BigBasket users and personalizations.
- Working on image-based fashion parsing from Cliq store

RESEARCH EXPERIENCE

ETH ZURICH |RESEARCH INTERNSHIP
Dec 2020 - May 2021 | India

- Worked under the supervision of Dr. Luc Van Gool at CVL Lab.
- Focused on cross-image context mining for semi-supervised semantic segmentation.

PARIS BRAIN INSTITUTE |UNDERGRADUATE RESEARCH ASSISTANT
Jul 2020 - Nov 2020 | Paris, France

- Analyzing and tracking the migration of Brain-Microglial cells' movement in protein solution.
- Computing the volume of protein clusters in each frame and mapping with their corresponding volume in next frame to obtain global acquisition time.

NATIONAL CHIAO TUNG UNIVERSITY | SUMMER RESEARCH INTERN
April 2020 - Jul 2020 | Hsinchu, Taiwan

- Worked under the guidance of Dr. Janey Ho at CiPAR laboratory at NCTU on UAV automation and led a team of interns.
- The work was focused on self-guided movement and obstacle avoidance system of Unmanned Aerial Vehicle (UAV) in their laboratory.

SORBONNE UNIVERSITY | UNDERGRADUATE RESEARCH INTERN
Oct 2019 - Feb 2020 | Paris, France

- Led a project at ICM Laboratory under Dr. Daniel Racoceanu.
- Used deep learning for clustering and segmentation of densely packed cells.
- Developed an interactive toolbox for cell-tracking.

JADAVPUR UNIVERSITY | UNDERGRADUATE RESEARCH ASSISTANT
March 2020 – Present | Kolkata, India

- Selected as a Research Fellow at CMATER laboratory at CSE dept. of Jadavpur University under Dr. Nibaran Das and Dr. Ram Sarkar.
- Performed independent research on COVID detection, Fuzzy fusion, HCI, Cervical imaging, Dermoscopy and retinal image segmentation.

ACHIEVEMENTS

• Charpak Fellowship Award, 2020 for internship at Paris.

• Gandhi Fellowship Award, 2021

• 17th rank out of 882 participants in Airbus Ship Detection Challenge

• KVPY Fellowship Award, 2016

• NTSE Fellowship, 2015

• Ranked 12th in India in International Mathematics Olympiad, 2014

• 14th position in class 12th Boards examination among around 7 lakh students

• 7th position in class 10th Boards examination among around 10 lakh students

PROJECTS (ONGOING/COMPLETED)

Unified semi-supervised contrastive learning for object detection and segmentation

- Worked on semi-supervised contrastive learning under Dr. Pratosh AP of Indian Institute of Science, Bangalore.
- Manuscript submitted to **CVPR 2022**.

Interpolation-consistent Self-supervised Learning for Medical Image Segmentation

- Proposed a novel consistency regularization method between two perturbed network branches for semi-supervised medical image segmentation.
- Manuscript submitted to **ISBI 2022**.

Domain-specific Contrastive Learning with Cross-consistency Regularization for Semi-supervised Medical Image Segmentation

- Proposed a domain-specific universal contrastive learning strategy for encoder pretraining
- The network is fine-tuned using a novel cross-consistency regularization method for downstream task
- Manuscript under review at **IEEE Journal of Biomedical and Health Informatics, IF-5.77**

DeepEvo-Net: A Human Action Recognition framework using Deep Learning and Evolutionary Optimization

- Proposed single-channel image encoding from skeleton data and depth concatenation followed by evolutionary optimization.
- Paper under review at **Neural Computing and Application, Springer: IF-5.606**.

UT-Net: Combining Transformer and U-Net for Joint Optic Disc and Cup Segmentation

- Proposed a novel multi-encoder pipeline, combining Transformer and U-Net encoder using novel bilinear fusion mechanism
- Paper under review at **IEEE Transactions on Image Processing: IF-10.856**.

ConDenseNet: A Deep Learning Framework for Supervised Skin Lesion Segmentation

- Proposed a novel DL framework incorporating multiscale context extractor.
- Paper under review at **Pattern Recognition, Elsevier: IF-7.74**.

MFSNet: A Multi Focus Segmentation Network for Skin Lesion Segmentation

- Proposed intelligent utilization of Reverse Attention and self-guided multiscale attention mechanism inside U-Net framework.
- Review submitted to **Pattern Recognition, Elsevier: IF-7.74**.

PUBLICATIONS

[1] Kundu R, **Basak H**, Singh PK, Ahmadian A, Ferrara M, Sarkar R. https://doi.org/10.1038/s41598-021-93658-y. SCIENTIFIC REPORTS, NATURE. 2021 Jul 8;11(1):1-2. **IF- 5.133**

[2] **Basak, H.**, Kundu, R., Chakraborty, S. et al. Cervical Cytology Classification Using PCA and GWO Enhanced Deep Features Selection. SN COMPUTER SCIENCE, Springer. 2, 369 (2021). **IF- 1.55**

[3] **Basak, H.**, Hussain, R. & Rana, A. DFENet: A Novel Dimension Fusion Edge Guided Network for Brain MRI Segmentation. SN COMPUT. SCI. 2, 435 (2021). **IF- 1.55**

[4] **Basak H**, Kundu R, Agarwal A, Giri S. Single Image Super-Resolution using Residual Channel Attention Network. In2020 IEEE 15th International Conference on Industrial and Information Systems (ICIIS) 2020 Nov 26 (pp. 219-224). IEEE.

[5] **Basak H**, Ghosal S, Sarkar M, Das M, Chattopadhyay S. Monocular Depth Estimation Using Encoder-Decoder Architecture and Transfer Learning from Single RGB Image. In2020 IEEE 7th Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON) 2020 Nov 27 (pp. 1-6). IEEE.

[6] **Basak H**, Das M, Modak S. RSO: A Novel Reinforced Swarm Optimization Algorithm for Feature Selection. InIEEE EUROCON 2021-19th International Conference on Smart Technologies 2021 Jul 6 (pp. 203-208). IEEE.

[7] **Basak H.**, Rana A. (2021) F-UNet: A Modified U-Net Architecture for Segmentation of Stroke Lesion. In: Singh S.K., Roy P., Raman B., Nagabhushan P. (eds) Computer Vision and Image Processing. CVIP 2020. Communications in Computer and Information Science, Springer, Singapore, vol 1376.

[8] **Basak H**, Kundu R. Comparative Study of Maturation Profiles of Neural Cells in Different Species with the Help of Computer Vision and Deep Learning. In International Symposium on Signal Processing and Intelligent Recognition Systems, Springer, Singapore. 2020 Oct 14 (pp. 352-366).

[9] Chattopadhyay S, Dey A, **Basak H**, Saha S. Speech Emotion Recognition using Manta Ray Foraging Optimization Based Feature Selection. In Smart Computational Intelligence in Biomedical and Health Informatics (pp. 115-140). CRC Press.

[10] **Basak H**, Kundu R. Detection of Scoliosis 1 from Anteroposterior X-Ray Images. Assistive Technology Intervention in Healthcare. 2021 Dec 31:1.

[11] Kundu R, **Basak H**, Koilada A, Chattopadhyay S, Chakraborty S, Das N. Ensemble of CNN classifiers using Sugeno Fuzzy Integral Technique for Cervical Cytology Image Classification. arXiv preprint arXiv:2108.09460. 2021 Aug 21.

[12] Chattopadhyay S, **Basak H.** Multi-scale Attention U-Net (MsAUNet): A Modified U-Net Architecture for Scene Segmentation. arXiv preprint arXiv:2009.06911. 2020 Sep 15.