# Himanshu Mittal, Ph.D.

*Computer Vision · Bio-medical Image Analysis ·*
*Machine Learning · Evolutionary Algorithms*

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## WORK EXPERIENCE

**Assistant Professor** — Sept., 2022 - Present
*Indira Gandhi Delhi Technical University for Women* — *Delhi, India*

**Assistant Professor (Sr. Grade)** — March, 2020 - Sept.,2022
*Jaypee Institute of Information Technology* — *Noida, India*

**Assistant Professor (Grade-II)** — April, 2015 - Feb., 2020
*Jaypee Institute of Information Technology* — *Noida, India*

**Assistant Professor (Grade-I)** — Feb., 2013 - March, 2015
*Jaypee Institute of Information Technology* — *Noida, India*

## RESEARCH PROJECTS

**Science and Engineering Research Board (SERB), India** — *Rs. 28,18,178/-*

- *Design and Development of a Cognitive System for Leukocytes Identification in Hematoxylin and Eosin Stained Rat Skin Images.* **Co-Principal Investigator** — *March, 2017 – 2020*

  ○ Automatic quantification and classification of leukocytes in microscopic images are of paramount importance in the perspective of disease identification, its progress and drugs development. Extracting numerical values of leukocytes from microscopic images of blood or tissue sections represents a tricky challenge. Despite the increasing sophistication of modern diagnostic tools, pathological anatomy is still the principal means by which most of the diagnosis proceeds. Therefore, this project focuses on automating the identify of leukocytes, transmigrated into skin, for reducing time consumption and providing quantitative data for biologist/scientist of preclinical drug development. It includes three phases, namely classification of leukocyte image through deep learning models, segmentation of leukocytes through evolutionary algorithms, and quantification of the identified leukocytes.

**Alpha Design Technologies Pvt Ltd., New Delhi**

- *Real-time Objection-Detection Through UAV to cater army operations in War-like Scenarios. Mar., 2022 – Aug.,2022*
  **Computer Vision Consultant**

  ○ Worked on design, development, and testing of an object detection model that run on Nvidia jetson-enabled UAV catered to army operations during war-like scenarios.

## PUBLICATIONS

### **JOURNALS**

- Roop Singh, Mukesh Saraswat, Alaknanda Ashok, **Himanshu Mittal**, Ashish Tripathi, Avinash Chandra Pandey, and Raju Pal, *"From classical to soft computing based watermarking techniques: A comprehensive review"*, Future Generation Computer Systems, Vol. 141, pp. 738-754, 2023. *(IF: 7.30, SCIE)*

- Deepesh Chugh, **Himanshu Mittal**, Amit Saxena, Ritu Chauhan, Eiad Yafi, and Mukesh Prasad, *"Augmentation of Densest Subgraph Finding Unsupervised Feature Selection Using Shared Nearest Neighbor Clustering"*, Algorithms, Vol. 16, pp. 28 - 40, 2023. *(Scopus Indexed)*

- Vivek Sharma, Ashish Kumar Tripathi, **Himanshu Mittal**, Abhishek Parmar, Ashutosh Soni and Rahul Amarwal, *"WeedGan: a novel generative adversarial network for cotton weed identification"*, The Visual Computer, 2022. *(IF: 2.83, SCIE)*

- Avinash Chandra Pandey, Ankur Kulhari, **Himanshu Mittal**, Ashish Kumar Tripathi, Raju Pal, *"Improved exponential cuckoo search method for sentiment analysis"*, Multimedia Tools and Applications, 2022. *(IF: 2.57, SCIE)*

- Vivek Sharma, Ashish Kumar Tripathi, **Himanshu Mittal**, *"Technological revolutions in smart farming: Current trends, challenges & future directions"*, Computers and Electronics in Agriculture, Vol. 201, 2022. *(IF: 6.75, SCIE)*

- Raju Pal, Ashish Kumar Tripathi, Avinash Chandra Pandey, Mohammad Ayoub Khan, Varun G Menon, **Himanshu Mittal**, *"A N2CNN-Based Anomaly Detection Method for Cardiovascular Data in Cyber-Physical System"*, IEEE Transactions on Network Science and Engineering, 2022. *(IF: 5.03, SCIE)*

- Mohammad Sajid, **Himanshu Mittal**, Shreya Pare, and Mukesh Prasad, *"Routing and scheduling optimization for UAV assisted delivery system: A hybrid approach"*, Applied Soft Computing, Vol. 126, 2022. *(IF: 8.26, SCIE)*

- **Himanshu Mittal**, Ashish Kumar Tripathi, Avinash Chandra Pandey, P Venu, Varun G Menon, Raju Pal, *"A novel fuzzy clustering-based method for human activity recognition in cloud-based industrial IoT environment"*, Wireless Networks, Springer, 2022. *(IF: 2.70, SCIE)*

- **Himanshu Mittal**, Ashish Kumar Tripathi, Avinash Chandra Pandey, Mohammad Dahman Alshehri, Mukesh Saraswat, and Raju Pal, *"A new intrusion detection method for cyber-physical system in emerging industrial IoT"*, Computer Communications, Elsevier, Vol. 190, pp. 24-35, 2022. *(IF: 3.16, SCIE)*

- **Himanshu Mittal** and Mukesh Saraswat, *"A new fuzzy cluster validity index for hyper-ellipsoid or hyper-spherical shape close clusters with distant centroids"*, IEEE Transactions on Fuzzy Systems, Vol. 29, pp. 3249 - 3258, 2021. *(IF: 12.02, SCIE)*

- **Himanshu Mittal**, Avinash Chandra Pandey, Raju Pal, and Ashish Kumar Tripathi, *"A new clustering method for the diagnosis of CoVID19 using medical images"*, Applied Intelligence, Springer, Vol. 51, pp. 2988–3011, 2021. *(IF: 5.08, SCIE)*

- **Himanshu Mittal**, Avinash Chandra Pandey, Mukesh Saraswat, Sumit Kumar, Raju Pal, and Garv Modwel, *"A comprehensive survey of image segmentation: clustering methods, performance parameters, and benchmark datasets"*, Multimedia Tools and Applications, Springer, 2021. (10.1007/s11042-021-10594-9) *(IF: 2.75, SCIE)*

- Roop Singh, **Himanshu Mittal**, and Raju Pal, *"Optimal keyframe selection-based lossless video-watermarking technique using IGSA in LWT domain for copyright protection"*, Complex & Intelligent Systems, Springer, Vol. 8, pp. 1047–1070, 2021. *(IF: 4.92, SCIE)*

- Raju Pal, Mukesh Saraswat, and **Himanshu Mittal**, *"Improved Bag-of-Features using Grey Relational Analysis for Classification of Histology Images"*, Complex & Intelligent Systems, Springer, Vol. 7, pp. 1429–1443, 2021. *(IF: 4.92, SCIE)*

- Shreya Pare, **Himanshu Mittal**, Mohammad Sajid, Jagdish Chand Bansal, Amit Saxena, Tony Jan, Witold Pedrycz, Mukesh Prasad, *"Remote Sensing Imagery Segmentation: A Hybrid Approach"*, Remote Sensing, Mdpi, Vol. , 13, pp. 1-36, 2021. *(IF: 4.84, SCIE)*

- Ashish Kumar Tripathi, **Himanshu Mittal**, Pranav Saxena, and Siddharth Gupta, *"A new recommendation system using map-reduce-based tournament empowered Whale optimization algorithm"*, Complex & Intelligent Systems, Springer, Vol. 7, pp. 297–309, 2020. *(IF: 4.92, SCIE)*

- **Himanshu Mittal**, Ashish Tripathi, Avinash Chandra Pandey, and Raju Pal, *"Gravitational search algorithm: a comprehensive analysis of recent variants"*, Multimedia Tools and Applications, Springer, Vol. 80, pp. 7581–7608, 2020. *(IF: 2.75, SCIE)*

- **Himanshu Mittal** and Mukesh Saraswat, *"An automatic nuclei segmentation method using intelligent gravitational search algorithm based superpixel clustering"*, Swarm and Evolutionary Computation, Elsevier, vol. 45, pp. 15-32, 2019. *(IF: 6.91, SCIE)*

- **Himanshu Mittal** and Mukesh Saraswat, *"An optimum multi-level image thresholding segmentation using non-local means 2D histogram and exponential Kbest gravitational search algorithm"*, Engineering Applications of Artificial Intelligence, Elsevier, vol. 71, pp. 226-235, 2018. *(IF: 4.20, SCIE)*

- **Himanshu Mittal** and Mukesh Saraswat, *"An image segmentation method using logarithmic kbest gravitational search algorithm based superpixel clustering"*, Evolutionary Intelligence, vol. 12, pp. 1-13, 2018. *(Scopus Indexed)*

# CONFERENCES

- Vivek Sharma, Ashish Kumar Tripathi, and **Himanshu Mittal**, *"Technological Advancements in Automated Crop Pest and Disease Detection: A Review & Ongoing Research"*, in Proc. of IEEE International Conference on Computing, Communication, Security and Intelligent Systems, India, pp. 1-6, 2022. *(Scopus Indexed)*

- Mukesh Saraswat, Raju Pal, Roop Singh, **Himanshu Mittal**, Avinash Pandey, and Jagdish Chand Bansal, *"An optimal feature selection approach using IBBO for histopathological image classification"*, in Lecture Notes of Springer Congress on Intelligent Systems, pp. 31-40, 2020. *(Scopus Indexed)*

- **Himanshu Mittal**, Mukesh Saraswat, Jagdish Bansal and Atulya Nagar, *"Fake-Face Image Classification using Improved Quantum-Inspired Evolutionary-based Feature Selection Method"*, in Proc. of IEEE Symposium Series on Computational Intelligence, Australia, pp. 989-995, 2020. *(Scopus Indexed)*

- **Himanshu Mittal**, Raju Pal and Mukesh Saraswat, *"Histopathological Image Classification by Optimized Neural Network using IGSA"*, in Lecture Notes of Springer International Conference on Distributed Computing and Internet Technology, pp. 429-436, 2020. *(Scopus Indexed)*

- Avinash Chandra Pandey, Ashish Kumar Tripathi, Raju Pal, **Himanshu Mittal**, and Mukesh Saraswat, *"Spiral Salp Swarm Optimization Algorithm"*, in Proc. of IEEE International Conference on Information Systems and Computer Networks, India, pp. 722-727, 2019. *(Scopus Indexed)*

- Raju Pal, **Himanshu Mittal**, and Mukesh Saraswat, *"Optimal Fuzzy Clustering by Improved Biogeography-based Optimization for Leukocytes Segmentation"*, in Proc. of IEEE International Conference on Image Information Processing, India, pp. 74-79, 2019. *(Scopus Indexed)*

- Tejasv Agarwal and **Himanshu Mittal**, *"Performance Comparison of Deep Neural Networks on Image Datasets"*, in Proc. of IEEE International Conference on Contemporary Computing, India, pp. 1-6, 2019. *(Scopus Indexed)*

- Yajurv Bhatia, Aman Bajpayee, Deepanshu Raghuvanshi, and **Himanshu Mittal**, *"Image Captioning using Google's Inception-resnet-v2 and Recurrent Neural Network"*, in Proc. of IEEE International Conference on Contemporary Computing, India, pp. 1-6, 2019. *(Scopus Indexed)*

- **Himanshu Mittal** and Mukesh Saraswat, *"Classification of histopathological images through bag-of-visual-words and gravitational search algorithm"*, in Lecture Notes of Springer International Conference on Soft Computing for Problem Solving, India, pp. 231-241, 2019. *(Scopus Indexed)*

- Shruti Pachaury, Nilesh Kumar, Ayush Khanduri, and **Himanshu Mittal**, *"Link prediction method using topological features and ensemble model"*, in Proc. of IEEE International Conference on Contemporary Computing, India, pp. 1-6, 2018. *(Scopus Indexed)*

- **Himanshu Mittal** and Mukesh Saraswat, *"cKGSA based fuzzy clustering method for image segmentation of RGB-D images"*, in Proc. of IEEE International Conference on Contemporary Computing, India, pp. 1-6, 2018. *(Scopus Indexed)*

- Vibhor Gupta, Avneet Singh, Kapil Sharma, and **Himanshu Mittal**, *"A Novel Differential Evolution Test Case Optimisation (DETCO) Technique for Branch Coverage Fault Detection"*, in Lecture Notes of Springer International Conference on Smart Computing and Informatics, India, pp. 245-254, 2018. *(Scopus Indexed)*

- Kartikeya Jaiswal, **Himanshu Mittal**, and Sonia Kukreja, *"Randomized grey wolf optimizer (RGWO) with randomly weighted coefficients"*, in Proc. of IEEE International Conference on Contemporary Computing, India, pp. 1-3, 2017. *(Scopus Indexed)*

- Pavit Singh Sapra and **Himanshu Mittal**, *"Secured LSB Modification using Dual Randomness"*, in Proc. of IEEE International Conference on Recent Advances and Innovations in Engineering, India, pp. 1-4, 2016. *(Scopus Indexed)*

- **Himanshu Mittal**, Raju Pal, Ankur Kulhari, and Mukesh Saraswat, *"Chaotic Kbest gravitational search algorithm (CKGSA)"*, in Proc. of IEEE International Conference on Contemporary Computing, India, pp. 1-6, 2016. *(Scopus Indexed)*

- Raju Pal, **Himanshu Mittal**, Avinash Pandey, and Mukesh Saraswat, *"BEECP: Biogeography optimization-based energy efficient clustering protocol for HWSNs"*, in Proc. of IEEE International Conference on Contemporary Computing, India, pp. 1-6, 2016. *(Scopus Indexed)*

- Ankur Kulhari, Avinash Pandey, Raju Pal, and **Himanshu Mittal**, *"Unsupervised data classification using modified cuckoo search method"*, in Proc. of IEEE International Conference on Contemporary Computing, India, pp. 1-6, 2016. *(Scopus Indexed)*

- **Himanshu Mittal**, *"Diffie-Hellman Based Smart-Card Multi-server Authentication Scheme"*, in Proc. of IEEE International Conference on Computational Intelligence and Communication Networks, India, pp. 14-16, 2014. *(Scopus Indexed)*

  ## Book Chapter

- Raju Pal, **Himanshu Mittal**, Avinash Pandey, Mukesh Saraswat, *"An Efficient Bag-of-Features for Diseased Plant Identification"*, Computer Vision and Machine Learning in Agriculture, pp. 159-172, 2021. *(Scopus Indexed)*

## EDITED BOOK

- Aarti, Raju Pal, **Himanshu Mittal**, Mukesh Saraswat, *"Applied Intelligence for Medical Image Analysis"*, Apple Academic Press Inc. and CRC Press, Taylor & Francis, 2023. *(Scopus Indexed)*

## EDUCATION

- **Ph.D. in Computer Science**                     Aug., 2014 – Feb., 2020
  *Jaypee institute of Information Technology*                     *Noida, India*
    - Supervisor: Dr. Mukesh Saraswat [mukesh.saraswat@jiit.ac.in]

- **M. Tech. in Software Engineering**                     Aug., 2010 – July, 2012
  *Delhi Technological University (DTU)*                     *New Delhi, India*
    - Supervisor: Dr. Daya Gupta [d.gupta@dce.ac.in]

- **B.Tech. in Information Technology**                     Aug., 2006 – July, 2010
  *Gautam Buddh Technical University*                     *Gr. Noida, India*

## PH.D. THESIS

- **Design and Development of Efficient Clustering Methods for Image Segmentation.**
    - A novel cluster validity index is proposed to identify the optimal cluster number.
    - A meta-heuristic based superpixel clustering method is developed to perform segmentation.
    - A new non-local means 2D histogram is proposed for multi-level image segmentation.

## RESEARCH INTERESTS

- Computer Vision, Image Analysis, Machine Learning, Deep Learning, Evolutionary Algorithms, Clustering

## PROGRAMMING SKILLS

- Python, MATLAB, PyTorch, Tensorflow, Keras, OpenCV, Flask, NodeJs, Java, C, C++.

## REFERENCES

- **Dr. Mukesh Saraswat**                     mukesh.saraswat@jiit.ac.in
  *Associate Professor, Department of Computer Science*
  Jaypee Institute of Information Technology, Noida, India

- **Dr. Jagdish Chand Bansal**                     jcbansal@sau.ac.in
  *Associate Professor, Department of Mathematics*
  South Asian University, New Delhi, India