Dr. Himanshu Mittal

Computer Vision · Machine Learning
Jaypee Institute of Information Technology, India

himanshurepo.github.io/Himanshu-Mittal
himanshu.mittal224@gmail.com
Mob. No.: +91-9958687894

RESEARCH & DEVELOPMENT GRANT

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 focus on automating the identify of leukocytes, transmigrated into skin, for reducing time consumption and providing quantitative data for biologist/scientist of preclinical drug development.

EMPLOYMENT

- **Jaypee Institute of Information Technology**   Noida, India
  Assistant Professor (Sr. Grade)   *Feb., 2013 - Present*
- **Galgotias University**   Gr. Noida, India
  Assistant Professor   *Aug., 2012 - Feb., 2013*

EDUCATION

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

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

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

PH.D. THESIS

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

PUBLICATIONS

JOURNALS

- **Himanshu Mittal** and Mukesh Saraswat, *"An automatic nuclei segmentation method using intelligent gravitational search algorithm based superpixel clustering"*, Swarm and Evolutionary Computation, vol. 45, pp. 15-32, 2019.   *(IF: 6.24, 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, vol. 71, pp. 226-235, 2018.   *(IF: 3.65, 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)*

- **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. *(Communicated)*

- **Himanshu Mittal**, Mukesh Saraswat, and Raju Pal, "An automatic clustering based image segmentation framework for vision-based IoT devices", Applied Soft Computing. *(Communicated)*

CONFERENCES

- **Himanshu Mittal**, Mukesh Saraswat, Raju Pal, Ashish Tripathi, and Avinash Pandey, "Feature selection for Fake-Face Image Classification using Improved Quantum-Inspired Evolutionary Algorithm", IEEE CEC 2020. (*Accepted*) *(ERA Rank A)*

- **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. *(ERA Rank B)*

- **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, 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)*

- **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)*

- **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)*

RESEARCH INTERESTS

- Computer Vision, Machine Learning, Deep Learning, Evolutionary Algorithms, Pattern Recognition

PROGRAMMING SKILLS

- Python, MATLAB, Tensorflow, Keras, Flask, Javascript, HTML, Java, C

PROJECTS

- **Sleeve Classification and GradCAM visualization:** Tensorflow code for Sleeve Classification Code along with visualization of Image Regions that effect the classification process using Grad-CAM method. In addition, the filter output after the first layer is also illustrated.

- **Color Segmentation using PSO based Clustering:** The program uses particle swarm optimization (PSO) algorithm to perform clustering based segmentation of colors in an image.

- **Neuroevolution using Evolutionary Algorithm:** The program evolves a simple neural network using an evolutionary algorithm (like gravitational search algorithm (GSA)) to train the network optimally which is further used for classification of IRIS dataset.

- **Clustering using Grey-wolf optimizer:** The program generates optimal clusters using a grey-wolf optimizer (GWO) and perform clustering of IRIS dataset.

- **2D histogram multi-level threshold image segmentation:** The program generates a 2D histogram of a color image using Non-local means which is partitioned according to optimal thresholds which identified through exponential kbest gravitational search algorithm and Renyi Entropy.

- **Classification and feature selection:** To eliminate redundant features in a data, the program selects optimal features using gravitational search algorithm. The optimal feature set is used to train a machine learning model like support vector machine to perform the classification.

- **QR code Generator for Opened Tabs:** This program generates the QR code for all the tabs opened in a browser.

- **Road Detection using Superpixel and Neural Network:** This program uses Superpixel to identify uniform regions in an image which are further analysed for the detection of road using neural network.

- **Codes for Evolutionary Algorithms:** Coded various evolutionary algorithms like gravitational search algorithm, biogeography based optimizer, spider-monkey optimizer in Python.

- **GUI for BibTex Key Extractor:** This GUI extracts the BibTex key for all the list of research papers saved in a file from Google scholar.

- **Shape Classification in an image:** Segmenting objects in an image using differential evolution which are further classified into various shapes using Support Vector Machine.

References

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

- **Dr. Daya Gupta**   d.gupta@dce.ac.in
  Professor, Department of Computer Science, DTU, New Delhi