Gaurav Mittal

251 Kadamba Nivas
IIIT Hyderabad, Gachibowli-500032
Contact: (+91)9642522539(M) — email: gaurav.mittal@research.iiit.ac.in, mittal.gaurav943@gmail.com

OBJECTIVE

I am a masters student working in medical image processing domain with my thesis focused on human retina fundus images. I have worked on landmark detection(i.e. Optic disk and fovea) and vessel segmentation on retina images. I am looking for exiting and challenging research opportunities in corporates starting from November 2015.

EDUCATION

Degree	*University/School*	*Year*	*Percentage/CGPA*
MS By Research	IIIT Hyderabad	2012-Present	7.17
B.Tech(ECE)	LNMIIT Jaipur	2008-2012	6.45
Senior Secondary(Raj. Board)	Govt School Rajgarh	2007-2008	78.8 %
Secondary(Raj. Board)	M.I.P.S. Rajgarh	2005-2006	84.4 %

EXPERIENCE

Research Assistant (RA)
CVIT Lab link August 2012 - July 2014
Role: Worked on problems related to Medical image processing. Work was focused on retina fundus images for landmark detection and blood microscopic images for cancer cell detection.

Enhance Edu link July 2014 - Present
Role: Domain Expert Nominee (DEN) for the course DSD Using Verilog. I created content for DSD using Verilog course for an online learning platform which will be aiding the students of Tier 2-3 colleges of India. The project is funded by MHRD.

Internships
IIT Jodhpur May 2012 - July 2012
Role: The internship was on general image processing. I worked on a specific problem "bit depth expansion in natural images".

TATA Docomo, Jaipur May 2011 - July 2011
Role: Learned about the communication system and router network used at control centers.

TECHNOLOGY SKILL SET

Languages	Matlab, Python, C, bash scripts, R basic
Domains	Image Processing, Machine Learning, Data Science
Operating Systems	Unix/Linux, Windows, MAC
Other Technologies	HTML, CSS, Verilog, Latex, Git, Scikit-learn

International Publications (* represents first author)

- ***Optic Disk and Macula Detection using GMP in Retina fundus images****
  Generalized moment pattern is an image transform which preserves global information while suppressing local noise. We used median GMP in retina images to detect optic disk and fovea. Abstract
  Currently under review at NCVPRIPG, 2015
- ***Bit-Depth Expansion Using Minimum Risk Based Classification****
  In this work we used minimum risk based classifiers for improving the performance of bit-depth expansion. The focus was on the conversion of 5-6 bit images to 8 bit images. PDF Codes
  Published at IEEE VCIP 2012, San Diego. **Got 100K INR travel grant from Microsoft Research for this work**.
- ***Efficient 2 Pass Lossless Invisible Watermarking for natural Images***
  Lossless watermarking is a way to losslessly hide information in natural images without

effecting visual appearance of it. Here we generalized the existing method to achieve higher embedding capacity while getting better PSNR. PDF Codes
Published at IEEE Conf on Systems, Signals and Image Proc, Vienna, Austria 2012.

- ***Symmetrical Predictor Structure Based Integrated Lossy, Near Lossless/Lossless Coding of Images***
  In this work we proposed a two-stage algorithm for lossy, near lossless/lossless compression using a symmetrical predictor structure. PDF
  Published in International Symposium on circuits and systems (ISCAS 2014).
- ***(Review paper) Evaluation of vessel segmentation methods in high resolution retina fundus images****
  Currently writing this, to be submitted soon.

PROJECTS

- ***Amazon employee access challenge (kaggle challenge)***
  Participated in this kaggle challenge where the aim was to learn an algorithm for automatic authentication/reject of resource request for Amazon employee. Data was categorical and main challenge was feature engineering. Achieved kappa score of 0.88 and winning entry was with 0.92 score.

- ***Sub-pixel based image processing (Image processing course project)***
  Sub pixel rendering uses sub-pixel information to make small texts and font characters clear and sharp. Its applications are character kerning, font emboldening and font italicizing. It is used in all major current OS. Project report Presentation slides

- ***Brain MRI Segmentation (Medical image processing course project)***
  In this work we used Graph cuts and energy minimization in brain MRI segmentation. The brain images were 3D images with basic elements as voxels instead of pixels. Project report Presentation slides

- ***Automated Attendance System (as a part of pattern recognition course)***
  Face Detection and Recognition System for Automated Attendance at IIIT to identify faces of 150 students in the class and mark attendance based on photographs taken in each class.
- ***Ground truth marking tool for retina images (GUI using matlab)***
  The tool was created to annotate landmark data on retina images. Optic disk, macula and vessel arcades were marked as ellipse, point and curve respectively. Refer this link for codes.
- ***Blood vessel segmentation using Neaural network based classification***
  In this work a paper was implemented locally, which used gray level and moment inverient based features for training Neaural network to detect blood vessel. PDF Codes

Achievements and Awards

Selected in talent search program	ISRO	2006
Winner in badminton tournaments	LNMIIT, IIIT	2011, 2014
Received travel grant of 100K INR	Microsoft research	2013
Organized a 2 week workshop Weblink	LNMIIT	2012
Technical organizer of annual fest Vivacity	LNMIIT	2010

References

1. Prof. Jayanthi Sivaswamy (Research supervisor) More information
   Professor, International Institute of Information Technology, Hyderabad
2. Dr. Anil Kumar Tiwari More information
   Assistant Professor, Indian Institute of Technology, Rajasthan