# Shyam Nandan Rai

shyam.nandan@research.iiit.ac.in
+91 9963131134
https://github.com/shyam671

## Research Interests

> Generative Adversarial Network

> Real-Time Semantic Segmentation

## Courses

> Statistical Methods in AI

> Artificial Intelligence and Machine Learning

> Convex Optimization

> Computer Vision

> Natural Language Processing

> Digital Image Processing

## ML Frameworks

> Deep Learning: PyTorch, Keras and Matconvnet

> Small Experiments: OpenCV, SciPy, and Scikit-Learn

> Languages: Python, MATLAB, and Lua

> Development: Qt

## Academic Activities

### Achievements

> Dean's List - Monsoon '15
> Dean's Research Award - Spring '17

### Organizing Committee

> Presented a tutorial on basics of GANs at Summer School on Computer Vision, 2019, IIIT Hyderabad

> Tutorial on Multi-agent GAN at Summer School on Machine Learning, 2019, IIIT Hyderabad

### Teaching Assistance

Deep Learning, Monsoon'20

### Selection Committee

Summer School on Computer Vision and Machine learning 2018, 2019 IIIT Hyderabad

## Education

**2017 - Present** M.S. (Research) in Computer Science
International Institute of Information Technology, Hyd. CGPA: 8.83/10

**2013 - 2017** B.Tech (Hons.) in Electronics and Communication Engineering
Indian Institute of Information Technology, Sri City CGPA: 8.71/10

## Publications

**TIP 2020** "Removing Atmospheric Turbulence via Deep Adversarial Learning" *Shyam Nandan Rai*, CV Jawahar, *IEEE Transactions on Image Processing (TIP) 2020, (Under Review).*

**WACV 2020** "Munich to Dubai: How far is it for Semantic Segmentation?" Shyam Nandan Rai, V N Balasubramanian, Anbumani Subramniam, CV Jawahar, *IEEE Winter Conference on Applications of Computer Vision (WACV) 2020.*[Project Page]

**NCVPRIPG 2019** "Learning To Generate Atmospheric Turbulent Images" Shyam Nandan Rai, CV Jawahar, *National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG) 2019.*[Paper]

**ECCVW 2016** "IIITCFW: A Benchmark Database of Cartoon Faces in the Wild" (Oral), Ashutosh Mishra, *Shyam Nandan Rai*, Anand Mishra and CV Jawahar, Workshop on Visual Analysis and Sketches, *ECCVW.* [Project Page][Paper]

## Work Experience

**AI/ML Mentor** MLL Lab-IIITH|Talentsprint October 2018 - Present

- Mentoring of industrial professionals during the lab sessions on the concepts of machine learning & deep learning.

**Vision Intern** RTC, Robert Bosch, Bangalore, India May 2016 – July 2016

- Benchmarking of person detection and tracking algorithm.
- Implementation of improved KLT tracker on PNNL Parking Lot and Pizza sequences.

## Research Projects

**Jan'18 - Ongoing** Atmospheric turbulence restoration & application| Intel & CVIT

- Developed models to restore images from atmospheric turbulence. Submitted a journal in TIP as a result of this work.
- Improved accuracy of semantic segmentation models in turbulence. This work has been accepted in WACV 2020.
- Proposed a feedback framework along with iterative Focal Loss(iFL) specifically designed for feedback networks which further improved the performance of semantic segmentation models in turbulent environment. Work submitted in BMVC 2020.
- Efficiently generated atmospheric turbulent images via a noval loss function. This work has been accepted at NCVPRIPG 2019.

**Jan'16 - Apr'17** Cartoon Image Understanding| IIIT-S & CVIT

- Created a cartoon image dataset for understanding the problem spectrum in cartoon domain.
- Studied the challenging problem of photo2cartoon retrieval using different fusion methods.

**June'17 - Dec'18** Detecting misalignment in CAD images|Altair & CVIT

- Developed an interactive computer vision application using Qt and Opencv, to detect misalignment in CAD Images.
- Internally the application uses RANSAC (for image alignment) along with the handcrafted thresholding techniques.

# Personal Projects

> Pytorch tutorial for Multi Agent Diverse Generative Adversarial Networks. [Project Page]

> Implementation of Twin Auxiliary Classifier GAN. [Project Page]

> Image quality assessment. [Project Page]

## ML Projects

Spring'18 LRR Network for Semantic Segmentation [Project Page]

Used multi-scale architecture based on a laplacian pyramid approach to improve semantic segmentation.The approach gave better results over fully convolutional network.

Monsoon'18 Relationship between Music & Personality [Report]

The main objective of this project is to find a strong correlation between personality of an individual and their music preferences. By using this correlation, we predict the personality of person by his/her preferred genre or recommend personalised music with the help of machine learning techniques.

Monsoon'17 Reading Comprehension [Project Page]

Posed reading comprehension as a sentence classification task which consists of two classes: entailment and contradictory. Instead of sequential models, we used CNN models for classification and extended to a siamese variation using contrastive loss.

Monsoon'17 Gender Identification from Facial Images [Project Page]

Implemented different feature based methods to identify gender from facial images. We used PCA for dimensionality reduction followed by KNN, Logistic Regression and SVM as classifiers to classify the features. Extended the method to cross modal gender identification between the real face and its cartoon and caricature modalities.

Spring'17 Facial Expression Recognition [Project Page]

We used pre-trained model VGG Face for extracting features and used SVM for classification with different kernels. In addition, we used a unified model which fuses the CNN features and HOG feature giving higher accuracy than other models. All the experiments were conducted on FER-2013 dataset.