

Harshit

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SUMMARY

I am a technology enthusiast, with primary interests in Reinforcement Learning, Time Series Data Analysis, Data Science, Machine Vision and Machine Learning. I have worked on enumeration of projects in the field of Computer Science and have gained adequate research and professional experience. I am looking to pursue higher degree to escalate my skills in my areas of interest.

EDUCATION

Indian Institute of Technology (IIT) Patna

July '13 – May '17

- Bachelor of Technology, Computer Science and Engineering
- CPI – 8.84/10, Senior Year CPI – 9.51/10

PUBLICATIONS

2016

- **Harshit**, Rajbir Singh, Kavitha P. Thomas, K. G. Smitha and A. Prasad Vinod. “**Online Electroencephalogram (EEG) based biometric authentication using visual and audio stimuli.**” *2016 IEEE EMBS Conference on Biomedical Engineering and Sciences (IECBES)*(2016): 454-459.

2015

- Ayush Jain, Saswat Raj, **Harshit**, Rajiv Misra, and B. M. Baveja. 2015. **Road congestion sensing via crowdsourcing and MapReduce.** *In Proceedings of the 14th International Conference on Information Processing in Sensor Networks (IPSN '15).* ACM, New York, NY, USA, 356-357.

WORKSHOP & PRESENTATION

Lecture Assistant: Federated Human Tracking for Multi-angle Videography

Harshit, Don Dennis, Karan Jakhar, Prashant Baghel

- Demo at *International Symposium on Embedded Computing and System Design (ISED), 2016*
- **Runner-up** in *ISED Grand Challenge*

Smart Meter: An IoT based Electricity Meter for Home and Offices

Harshit, Ganesh Mulay, MV Srikanth, Vivek Joshi, Ajit Singh

- **2nd Runner-up (Bronze Medal)** after Presentation and prototype demonstration in *IoT Innovation Challenge, Inter-IIT Tech Meet, 2016*

RESEARCH EXPERIENCE

Copter QL: The Q-Learning Helicopter Game

2018

- Aimed to make agent learn to play copter using deep reinforcement learning techniques. Implemented a Deep Q-Network (DQN) for learning Q-values for approximate state-action pairs.
- Exploiting the visited state-action pairs with proper exploration new state-action pairs. Exploring safety conditions to ensure reasonable system performances.

Deep Learning based model to generate nuclei masks from Microscopic Images

2018

- Aimed to prepare nuclei masks of microscopic images of cells in bunch. A deep convolutional neural network is modeled, where the features of previous layers are used in future layers, developing a U-Net.
- Images are first preprocessed with erosion-dilation, then fed into the network, and the output is again processed with watershed labelling, to produce required results, with accuracy metric to be around 47%.

Centrality Metrics for Dynamic Networks

Advisor: Dr. Joydeep Chandra

Network Science, Python, Bash
IIT Patna, 2017

- Formulated centrality metric for dynamic networks, where nodes join or leave the network over course of time.
- A new hybrid centrality metric is proposed, consisting of PageRank, average importance over time with aging factor also. Citations network is used as the dataset. Metrics obtained for important publications were comparably higher.

Adaptive Object Tracking

Advisor: Dr. Jimson Mathew

Python, OpenCV
IIT Patna, Aug '16 – May '17

- Used descriptor-based object information [HOG] and condensation algorithm to track people through the frames of video. It was tested on PET 2009 dataset for evaluation, with accuracy around 93%.
- It also capable of tracking a person through different cameras in surveillance system. It can also switch the video feed over to another camera whenever a person's face aligns away towards other camera, providing it with the multi viewing angle.

Lecture Assistant: Federated Human Tracking for Multi-angle Videography

Advisor: Dr. Jimson Mathew & Dr Arijit Mondal

Python, OpenCV, R-Pi
IIT Patna, Winter '16

- Aimed to assist the lecturer and students in classrooms. An IoT bot was designed having multi angle broad view to track the lecturer and record the lecture in the classrooms using multiple Raspberry Pi.
- The multi-angle camera is operated by the Raspberry Pi and video is streamed over the server on other Raspberry Pi where students can discuss doubts without interrupting the class. The server also had a quizzing module.
- This project was demonstrated at *ISED Grand Challenge '16* and stood runner up amongst others.

Road Traffic Congestion Sensing

Advisor: Dr. Rajiv Misra

JAVA, PHP, MySQL
IIT Patna, 2014

- Aimed to ease the measurement of road traffic using cheap technology and feasible implementation
- Framework has a client end app/senor to send data to server at trigger locations on road. At the server end, after data processing, proposed Map-Reduce engine is used to obtain required road traffic measurements such as average speed, peak hours for each segment of road.
- This work was accepted for publication at *Information Processing in Sensor Networks (IPSN '15)*.

WORK EXPERIENCE

Samsung R&D Institute Delhi, India

Product Intelligence, System S/W

Engineer
July '17 – Present

- I work in Product Intelligence, responsible for commercialization of Samsung Televisions.
- I am responsible for developing software for analyzing product performances, memory profiling, system performances tasks and automation of routine tasks.
- For intelligence part, I work on Big Data, produce analytics influencing proactive product decisions and monitoring timelines of different product models via Machine Learning models.

Nanyang Technological University, Singapore

Advisor: Dr. Vinod A. Prasad, Dr Kavitha P Thomas

Research Internship
May '16 – July '16

- I worked at the HESL lab, on the topic brain computer interface, tasked was to propose an authentication system using brain EEG signals as passwords.
- I used brain EEG signals (collected via EMOTIV EPOC headset using C# interface) in response to visual and audio stimuli as the password for a subject and obtained deterministic features via signal filters on EEG signals and used correlation metrics on power spectrum of signals.
- Experiments provided an acceptance rate of around 80%. This was published at *2016 IEEE EMBS Conference on Biomedical Engineering and Sciences (IECBES)*.

- I worked at the CNeRG lab, with Dr Abir, to work on EPS graphs generated via MATLAB.
- My task to develop software to format these EPS graphs (each graph consists of 1500 – 2000 lines) using file I/O.
- Developed a module capable of resizing, shifting legends, scaling, changing dimensions using python and bash.

OTHER EXPERIENCES/ACHIEVEMENTS

- Bronze medal at Kaggle [TalkingData AdTracking Fraud Detection Challenge 2018].
- General Secretary, Cultural Affairs, IIT Patna (2016 – 17), overall student head of institute for cultural affairs.
- General Secretary, IIT Patna (2016 – 17), overall batch representative for Senior year.
- Task Manager, Web Master at Entrepreneurship Club, IIT Patna (2014 – 15)
- Creatives and Web Design Sub-coordinator at Anwasha, IIT Patna, annual techno-cultural festival (2014 – 15)
- Member of National Youth Council, Ministry of Youth Affairs and Sports, Government of India (2014).

SKILLS

PROGRAMMING LANGUAGES: C, JAVA, C++, Python, Javascript
MACHINE LEARNING TOOLKITS: Keras, PyTorch, Pandas, OpenCV, SciKit
DATABASES: MySQL, Oracle, MongoDB
FRAMEWORKS: Spring, Hibernate, Django, AngularJS
OTHERS: MATLAB, Splunk, Linux, Eclipse, Vim.

REFERENCES

- Dr Jimson Mathew, Associate Professor and Head of Dept., Computer Science and Engineering, IIT Patna
- Dr Vinod A Prasad, Professor, Dept. of Electrical Engineering, IIT Pallakad
- Dr Joydeep Chandra, Assistant Professor, Dept. of Computer Science and Engineering, IIT Patna
- Hemanshu Srivastava, Senior Director and Head of Dept., Samsung R&D Institute, Delhi