Deepank Agrawal

Computer Science and Engineering, B.Tech + M.tech(5 year)
Indian Institute of Technology(IIT), Kharagpur

Nehru hall, IIT Kharagpur
West Bengal, India
7384429654
deepank.361998@gmail.com
Deepank308
agrawal-deepank

Education

July 2017– May 2022 *(expected)*

IIT Kharagpur, *B.Tech + M.Tech*, Computer Science and Engineering, *CGPA : 9.41/10.*

Publications

October – December 2018

Traffic Sign Classification using Hybrid HOG-SURF Features and Convolutional Neural Network, *[Link]*.

- Proposed a unique branched architecture for traffic sign detection. Reduces the number of parameters as compared to state of the art model and runs real-time(10 fps). **Achieved test accuracy - 98.47%**.
- Published and presented as the main speaker at 8^{th} ICPRAM 2019, Prague, Czech Republic.

May – June 2019

Real-time lane detection, fitting and navigation for Unstructured Environments, *[Link]*.

- Software stack design and implementation for Auto-nav challenge in the 28^{th} Intelligent Ground Vehicle Competition(IGVC) 2019, Rochester, Michigan. Published at 2^{nd} IVPAI 2019, Shanghai, China.

Experience

May 2020 – Present

Software Verification, *Internship*, Mentor: Dr. Alexander J. Summers, University of British Columbia.

- Adding Flow-based local reasoning verification technique in Separation logic based VIPER language.
- Plugin functionality enables efficient program verification and experimentation for research purposes.
- Domain/Technologies: Software Verification, Compiler, Scala, Java, IntelliJ IDEA.

March 2018 – October 2019

Autonomous Ground Vehicle Group, *Undergraduate Researcher, AGV Lab*, IIT Kharagpur.

- Developing and designing solutions for autonomous driving controls and perception of Mahindra electric car.
- Domain/Technologies: Computer Vision, Deep Learning, Pytorch, Tensorflow, OpenCV, Python, C++.

Projects

February 2020 – Present

Deep Learning Visualization, *Bachelor Thesis*, Advisor: Dr. Parth P. Chakrabarti, IIT Kharagpur.

- Developing interactive web application for Deep learning visualization to ease experimentation in research works.
- Domain/Technologies: Full stack development, Deep Learning, Pytorch, Tensorflow, Django, Python, JS.

August 2018 – May 2019

Autonomous Car, *Mahindra e2o*, Advisor: Dr. Debashish Chakravarty, IIT Kharagpur.

- Design and implementation of real-time traffic sign detection and classification software urban scenario. *[Link]*
- ResNet, InceptionNet, Mobilenet-SSD for detection and classification experimented on GTSRB dataset.
- Object tracking algorithm like Kernelized Correlation Filter Tracker(KCF) for real-time(30 fps) running and enhancing robustness. **Achieved test accuracy 88%**.

February – April 2019

JARVIC, *Software Engineering Lab*, Advisor: Prof. Debasis Samanta, IIT Kharagpur.

- Android App for emotion detection and reply generation using Bayesian classifier and Seq2Seq model. *[Link]*
- Established an UDP-based Python server - Java client communication. Peer reviewed as **Best project**.
- Domain/Technologies: AI, Socket Programming, Software Development, Android Studio, Java, Python.

January 2018

Autonomous Bot Design, *IIT Kharagpur.*

- Developed an autonomous bot for the National level Computer Vision event, *FORTRESS. [Link]*
- Domain/Technologies: Image Processing, Arduino Programming, OpenCV, C++.

Skills

Programming C, C++, Python, Java, JavaScript, HTML5, CSS3, Scala, VIPER, Julia *(Basic)*, R *(Basic)*, LaTeX, Object Oriented Programming, Web development *(Basic)*, Full stack development *(Basic)*

Libraries and tools STL C++, OpenCV, Numpy, Tensorflow, Pytorch, Android Studio, ROS, Django, Flask, JQuery, LINUX

Course Work

University Operating Systems*, Networks*, Algorithms I*, Software Engineering*, Formal Language and Automata Theory, Probability and Statistics, Switching Circuits*, Algorithms II, Machine Learning, Compiler Design*, Computer Organization and Architecture*, Stochastic Processes in Finance, Deep Learning.

Online Deep Learning Specialization by Andrew Ng, Google IT Automation with Python *(ongoing)*.

* *includes lab component*

Co Curricular Activities

December 2018 **IEEE Image Processing Winter Workshop**, *Mentor*, IIT Kharagpur.
Mentored a week long workshop on image processing organized for 1^{st} and 2^{nd} year UG students. Workshop comprised of teaching basic image processing techniques and hands-on experience in using OpenCV and C++.

July 2017 – April 2019 **National Service Scheme**, *Volunteer*, IIT Kharagpur.
Worked as volunteer helping local villagers in tree plantation, road construction. Participated in blood donation camp drive and also assisted in teaching local school children.

Achievements

2020 **Google Code Jam**.
Secured rank **1066** in **Round 1A** and was among top 4500 candidates to qualify for Round 2.

2020 **Google Kick Start**.
Secured rank **165** in **Round B** among approx. **10k** candidates.

2019 **ACM-ICPC**, *Regionals*.
Our team $(2b \mid\mid !2b)$ was ranked **50** at the ICPC Amritapuri Regionals. Secured a rank of **66** among **4401** teams in the nationwide prelims.

2019 **28$^{\text{th}}$ Intelligent Ground Vehicle Competition**, *Rochester*, Michigan.
Part of the team which was **first to qualify** and finished as **runners-up** in the Autonomous Navigation Challenge.

2018 **PIXELATION**, *National Students Space Challenge(NSSC) 2018*.
Our team was awarded the **1$^{\text{st}}$** prize in an image processing event organized at IIT Kharagpur.

2017 **Kishore Vaigyanik Protsahan Yojana Scholar(KVPY)**.
AIR 86 among **0.05** million applicants. Scholarship awarded for scientific research by the Government of India.

2017 **Joint Entrance Examination(Mains)**.
AIR 15 among **1.4** million applicants in the national level screening examination for admissions in IITs, NITs.