Rohit Kumar

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EDUCATION

Indian Institute of Technology Jammu, India — Aug. 2017 – May 2021
BTech in Computer Science And Engineering — *CGPA: 7.26/10*

EXPERIENCE

Deep Learning & Computer Vision Intern | *Python, C++, Qt, PyTorch | OpenSource* — Oct – Dec'20
The Captury — *Saarland, Germany* ⌂

Fast Background Subtraction
- Developed a neural network model for fast background subtraction & prototype software for testing using Qt
- Proposed and implemented the scope of project from a scene specific model to a general background subtractor
- Proposed and implemented the use of synthetic dataset using Masks from CDNET and frames from COCO

Software Engineer Intern | *Python, OpenCV, DLib, Blender, PyTorch* — May – July'20
The Captury — *Saarland, Germany*

End to End 3D face landmarks annotation — *Results 1 2*
- Developed an end to end pipeline for 3D human face landmarks annotation under setup of cameras at 15° in circle
- Improvised results using blender's ray-tracing rather than point triangulation. Used OpenCV's dnn face detector and DLib's landmarks annotation

Facial expression transfer via shape-key/morph-key prediction — *Results 1*
- Generated Meshes from Character Creator Real 100. Generated image dataset via shape-key mixing over meshes
- Built a classical shape-key predictor using SVD. Analysed the shortcoming of this method and proposed DL Model
- Used the FAN model as base model for shape-key prediction. Trained the model on synthetic dataset.

Machine Learning Research Internship | *C++, Qt, OpenCV, Python, PyTorch* — May – July'19
Prof. Virendra Singh, Indian Institute of Technology, Bombay — *Bombay, India*

Object Detection and Deep Learning Methods for it ⌂
- Developed a Qt based software for monitoring through security camera via object detection using YOLO

PUBLICATIONS

Reinforcement Learning based Smart Data Agent for Location Privacy *H.K, R.K, I.E* Aug'20-Jan'21
AINA'21 (Advanced Information Networking and Applications) — *Accepted*
A self-adaptive, Reinforcement learning based smart data agent to cloak and protect user's location privacy

Smart Data Agent for Preserving Location Privacy *Harkeerat Kaur;Isao Echizen;Rohit Kumar* Jan'20-Aug'20
IEEE-SSCI'20 (Symposium Series on Computational Intelligence) Page(s):2567 - 2575 — *Paper*
A supervised, neural network based approach to cloak and protect user's location privacy

PROJECTS

Mobile Robot Arm(Simulation) | *Dr. Vinit Jakhetiya* | C++, Gazebo, ROS — Feb'21 – Present
- Working on development of a Robotics Arm, as part of Senior Developement Project

Neural Style Transfer | *Dr. Harkeerat Kaur | Python, PyTorch | ⌂* — Dec'20 – Present
- Implemented *A Neural Algorithm of Artistic Style* as part of Computer-Vision Course Project.
- Working on a integration into Image-Editor software for real-time image to artistic-portrait conversion

Home Camera Security | *Dr. Nils Hasler | C++, Qt5, OpenCV | ⌂* — Dec'20 – Jan'21
- Home security software for intrusion detection at home. User will receive any movement's notification
- Currently using background subtraction for change detection. Hard assumption – same background scene all time
- Improvising to remove the hard assumption via making background image model robust to lighting change

Image Editor Software | *Independant | C++, Qt5, OpenCV | ⌂* — Oct-Dec'20

- ImageEditor with functionality of Affine, Cartoon, Erosion, Rotation, Sharepen, Upsampling, Blurring etc
- Interface added for feature addition using plugin mechanism. Image processing done using OpenCV

GANs On Atari | *Independant | Python, PyTorch, Gym | * $\mathbf{\Omega}$ May'20
- Implemented a simple Generative Adversarial Network with BCE loss to generate atari images
- Used Gym's atari framework to supply continuous data. Generated via both wrapper and non-wrapper method

COMPETITIONS

Bosch Route Optimisation | *Team of 5 | Python, Google ORTools | * $\mathbf{\Omega}$ Dec'19
- Silver in Hackathon over Vehicle Route Optimisation during Inter IIT Tech Meet'19 organised by Bosch
- Implemented solutions for optimisation by time and distance metric. Provided solution with visualisation

Innovate For IIT Hackathon | *Team of 3 | Tensorflow, Django, Python | * $\mathbf{\Omega}$ Nov'19
- 3rd among 20 teams in hackathon organised by Prithvi.ai. Lead the team. Built a Django prototype.
- Contributed the deep learning model for star-rating from (text) mess food reviews. Presented with visualization

MazeX: A maze solving bot | *Team of 2 | C++, Arduino | * $\mathbf{\Omega}$ March'19
- 1st in maze solving competition in Tech Fest IIT Jammu organised by Robotics Club,
- Built a bot for solving any type of maze in one traversal via left-hand rule using Arduino

PlutoX Hackathon | *Team of 3 | C++, drone-programming | * $\mathbf{\Omega}$ Dec'18
- 9th among 20 IIT's in PlutoX, a drone programming hackthon in InterIIT Tech'18, organised by drona-aviation.
- Completed 5 milestones of drone programming in 24 hours, toughest being flying drone in narrow corridor

RELEVANT COURSEWORK

Undergraduate Coursework
Artificial Intelligence; Natural Language Processing; Computer Vision; Parallel & Distributed Programming; Engineering Adaptive Softwares; Operating systems; Databases; Programming Languages; Algorithms; Data Structures etc.

Online courses $\mathbf{\Omega}$
- **Robotics**: Pursuing Introduction to Mobile Robotics and Robot Mapping from Autonome Intelligente Systeme.Pursuing Robotics Specilisation from Coursera.
- **Machine Learning**: Audited Stanford's cs229-Machine Learning, and cs230-Deep learning . Completed Fundamentals Of Reinforcement Learning, Sample Based Learning Methods, AI for medical diagnosis, Machine learning, Deep learning specilisation: Convolutional Neural Networks, Improving Deep Neural Networks, Neural Networks and Deep Learning, Sequence Models, Structuring Machine Learning Projects on Coursera
- **Others**: Pursuing OSSU data science track Algorithms Part 1. Completed Learning how to learn

TECHNICAL SKILLS

Languages | **Frameworks**: Python, Java, C/C++, MATLAB, SQL | PyTorch, Tensorflow, Qt, Blender, ROS, Gazebo
Developer Tools:Linux, CMake, Git,VS Code, Visual Studio, PyCharm, IntelliJ, Eclipse, CLion, Qt Creator
Libraries: Pandas, NumPy, Matplotlib, OpenCV, Sklearn, Scipy, etc.

EXTRACURRICULAR

Leadership
- Cultural Secretary, IIT Jammu'19-20. Started SMP(Senior Mentorship Programme) for the first time in college.
- Headed 30 member team for 10 day long Foundation Day Programme, IIT Jammu. Official Post
- Student Coordinator at Training and Placement cell'18-19.

Social Service
- Volunteered at Kritash, Social Club, IIT Jammu for teaching construction worker's children for a year.
- Volunteered for village survey in Jammu under the NSS.

REFERENCES

Prof. Naveen Sharma, Dpt. of Software Engineering, Rochester Institute of Technology, NY ✉ nxsvse@rit.edu
Prof. Harkeerat Kaur, Dpt. of Computer Science, Professor IIT Jammu, ✉ harkeerat.kaur@iitjammu.ac.in
Dr. Nils Hasler, CEO, Researcher, The Captury, Germany, ✉ hasler@thecaptury.com