

Rahul Kumar

vernwalrahul@gmail.com | +91 9627074699

EDUCATION

IIT KHARAGPUR

B.TECH IN COMPUTER SCIENCE

2016 - 2020

CGPA: 9.16 / 10.0

DAV KAPILDEV

Grad. May 2016 | Ranchi, India

Grade : 95.4%

SKILLS

Languages

• C • C++ • Python • SQL • TypeScript

Libraries and Tools:

• Pytorch • OpenCV • ROS

• Docker • Flask

Cloud and DevOps AWS

• CDK, Cloudformation • Lambda, S3,

Sagemaker, SNS, SQS, Kinesis

LINKS

Github:// [vernwalrahul](#)

LinkedIn:// [vernwalrahul](#)

Medium:// [@rahulvernwal](#)

COURSEWORK

Programming and Data Structures

Algorithms

Software Engineering

Database Management System

Compilers + Operating Systems

Artificial Intelligence (AI)

Machine Learning

Reinforcement Learning

Information Retrieval

Image Processing

RESPONSIBILITIES

• Software Lead: Manual Annotation Cell

Deployment in 3 FCs over multiple countries - Amazon, Berlin

• 6 months SDE intern mentor '22 - Amazon, Berlin

• MIT-IIT Robotics Workshop

• IEEE Robotics Winter Workshop

• Kharagpur Winter of Code 2017

Executive Head

• Code Club, IIT Kharagpur

• Kharagpur Open Source Society

PUBLICATIONS

[1] R. Kumar, A. Mandalika, S. Choudhury, and S. Srinivasa. Lego: Leveraging experience in roadmap generation for sampling-based planning. *Intelligent Robots and Systems, IROS, IEEE/RSJ International Conference*, 2019.

EXPERIENCE

AMAZON ROBOTICS | SOFTWARE ENGINEER - II

Oct 2022 - Till date | Berlin, Germany

- Designed and implemented AWS services linking ground truth retrieval and automated annotations for Damage Detection Cell live system
- Worked on integrating gallery storage with live inference system to retrieve items' reference images and dimensions for damage detection models

AMAZON ROBOTICS | SOFTWARE ENGINEER - I

Jan 2021 - Sept 2022 | Berlin, Germany

- Worked on edge services for detecting tray items Virtual Physical Mismatches (VPMs) at Amazon FCs
- Alpha launched in Oct'21 processing **1 million+ items per month**. Supported in beta deployment (launched Oct'22) increasing number of cells **8 folds**
- Setup CI/CD pipeline, integration test infrastructure for all the edge services
- Integrated cross team services reducing Cell setup time by order of magnitude and making system prod ready
- Led deployment of **3 Manual Annotation Cells in different countries** collecting **60k+ labelled captures in 2022** for damage detection

AMAZON ROBOTICS | SOFTWARE ENGINEER - ROBOTICS INTERN

May 2019 - July 2019 | Seattle, USA

- Built end to end Stack for hands free automation of box picking using UR10 (6DoF Robotic Arm).
- Designed perception module to identify boxes from time of flight image.
- Integrated controller, motion planning and calibration modules.
- Deployed entire stack to AWS code pipeline.

PERSONAL ROBOTICS LAB | UNIVERSITY OF WASHINGTON

Research Intern

Advisor: Prof. Siddhartha Srinivasa

May 2018 - July 2018 | Seattle, USA

Topic : Learning Sampling Methods for constrained space motion planning

- Devised non uniform sampling strategies to bias sampling in bottleneck regions.
- Devised algorithms to increase robustness of the generated graph.
- Our algorithm outperformed state of the art method on a wide range of problems | Accepted at IROS'19

Working Areas - **Deep Learning, AutoEncoders, Constrained Space Problems**

AWARDS

2019 Final Round Worldwide

2019 Final Round National

2018 3rd in National

2017 Worldwide

2016 All India Rank 9th

2016 top 0.03% (AIR 266)

Game of Drones | **NIPS'19** with Microsoft

Smart India Hackathon

IBM Blockchain Hackathon

RoboCup SSL | First Indian Team

KVPY Fellowship

JEE Advanced

OTHER PROJECTS

LEARNING A ROBUST WALK ENGINE FOR NAO ROBOTS

JUL'19 - APR'20

ADVISOR : PROF. JAYANTA MUKHOPADHYAY

One of the major challenge in RoboCup Humanoid League is to enhance the speed and robustness of Nao walk engine. Together with my advisor, I worked to build a walk engine for Nao Robots through Reinforcement Learning. We evaluated various different algorithms like evolution strategies, PPO, DDPG, and Soft Actor Critic Method. Working Areas: **Reinforcement Learning, Evolution Strategies, Imitation Learning.**

ACTION/EVENT RECOGNITION FOR SAFETY ANALYTICS

DEC'17 - FEB'18

ADVISOR : PROF. PABITRA MITRA

Recognising actions in video clips by extending CNN in the time domain. The model developed to be most suited for an industrial setting like detecting accidents in a factory. Working Areas: **Computer Vision, ConvNets, Encoder Decoder Models**

QUESTION GENERATION FROM RDF GRAPH VIA DISCRIMINATIVE RANKING

AUG'18 - NOV'18

ADVISOR : PROF. PLABAN BHOWMICK

Developed an application to automatically generate Q/A pairs from RDF graphs. It involves identification of popular-entities, extraction of their relation with other entities using hop distance. Extracted tokens are then fed to transformations and ranking algorithm to produce a ranked list of questions. Working Areas / Libraries: Knowledge Graph, Ranking Algorithm, SPARQL

MEDICAL OCR

JAN'18 - MAR'18

Worked in a team of 6 to build an OCR for detecting of medical professionals from prescriptions. Integrated Peter Norvig's spelling corrector algorithm to auto-correct misspelled words. Working Areas: Computer Vision, Character Recognition, Spelling Correction

RRT SIMULATOR

REPOSITORY: **RRTSIMULATOR**

Developed an interactive GUI interface to simulate a path generated by RRTs avoiding obstacles using Python and Qt. Added Features for low level skill testing of individual robots. Tools and Libraries: OMPL, PyQt, ROS.

BLOCKCHAIN CERTIFICATES

An application on digital certificates using blockchain technology to avoid fraud certificates and speed up the verification process. Won 3rd prize at National Level Hackathon.

TECHNICAL BLOGS

- | | |
|---|------------|
| • Creating Your Messenger Bot with Python | 21k views |
| • How Should I Start with CNN | 2.5k views |
| • An Introduction to Variational Auto-Encoder | 1.1k views |