Rahul Kumar

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ACADEMIC DETAILS

Education	Institute	Year	CPI / %
B. Tech: Computer Science and Engineering	IIT Kharagpur	2016- Till date	**9.46 / 10**
Intermediate	DAV Kapildev, Ranchi	2014 - 2016	**95.4 %**

RESEARCH EXPERIENCE / PROJECTS

- **University of Washington**
  Research Intern, Personal Robotics Lab — May'18-July'18
  Topic: Learning Sampling Methods for Robot Motion Planning
  Devised non-uniform sampling strategies that favor sampling in bottleneck regions to accelerate the planning process simultaneously maintaining its quality in smoothly changing environment.
  Research Areas: Deep Learning, Variational AutoEncoders, Graph Space Planning, Constrained Space Problems
  Advisor: Prof. Siddhartha Srinivasa

- **Kharagpur RoboSoccer Students' Group,** IIT Kharagpur
  Software Team Member — Feb'17 - Present
  Objective: To build Autonomous Soccer Playing Robots
  Implemented path planning algorithms and Finite State Machines (FSM) Architecture for RoboCup Small Size League Robots, Designed a simulator for robots using PyQt, Worked on Kalman Filter to tackle noisy data from Camera, enhancing World Model of the Game State.
  Research Areas: Multi-agent systems, motion planning, noise filters, robot soccer
  Advisor: Prof. Jayanta Mukhopadhyay

- **Action/Event Recognition for Safety Analytics** — Dec'17 - Feb'18
  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.
  Research Areas: Computer Vision, ConvNets, Encoder Decoder Models
  Advisor: Prof. Pabitra Mitra

- **Question Generation from RDF graphs via Discriminative Ranking** — Aug'18 - Nov'18
  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 tranformations and ranking algorithm to produce a ranked list of questions.
  Advisor: Prof. Plaban Kumar Bhowmik

- **Shopping Mall Management System** (Term Project) — Jan'18 - April'18
  Developed an object orientated system using Java to provide an online platform for different stakeholders, easing their services and requests. Explored various stages of Software Development Life Cycle including SRS preparation, UML Designining, Implementation and Testing.
  Advisor: Prof. Sudip Misra

- **RRT Simulator**
  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.
  Repository: https://github.com/vernwalrahul/RRTSimulator/

- **Medical OCR**
  Worked in a team of 6 to build an OCR for detecting handwriting of medical professionals from prescriptions. Integrated Peter Norvig's spelling corrector algorithm to auto-correct misspelled words.

- **Blockchain Certificates** (IBM Blockchain Hackathon)
  An application on digital certificates using blockchain technology to avoid fraud certificates and speed up the verification process.

RESPONSIBILITIES

- **Instructor** (MIT-IIT Robotics Workshop)
  Guide: Prof. Sudeshna Sarkar — *1st May'17 - 15th May'17*
  Conducted a fortnight long Robotics workshop for higher school students Introduced basics of C, C++, Processing and their applications in the field of robotics

- **Image Processing Mentor** (IEEE Robotics Winter Workshop) *Dec '17*

  Conducted a week-long IP workshop for 1st and 2nd year undergraduates at IIT Kharagpur, teaching basic Image Processing using OpenCV and C++.

- **Mentor, Kharagpur Winter of Code, 2017** (IIT Kharagpur)

  Mentored a couple of students in KWoC (organized by Kharagpur Open Source Society) which is a 5-week long GSoC-styled programme for students who are new to open source software development.

AWARDS AND ACHIEVEMENTS

- **KVPY 2016.**
  Secured All India Rank **9th** in one of the presitigious examination initiated by the Department of Science and Technology, Government of India
- **IIT JEE Advanced 2016.**
  Secured All India Rank **266** in JEE Advanced 2016
- **Robocup 2017.**
  First team from India to qualify for SSL, Robocup 2017 held in Japan, among top 24 teams across the globe
- **Best Fresher, Conquest, Kshitij 2017**
  Participated in an Robotics Event at Kshitij 2017 , Asia's largest techno-management fest. Awarded the best fresher at IIT Kharagpur
- **IBM Blockchain Hackathon, Kshitij 2018**
  Secured 3rd position in the national level hackathon organized at Kshitij, 2018

Relevant Courses

- **Completed :** *Programming and Data Structures, *Algorithms - I, Formal Language and Automata Theory, *Software Engineering, Probability and Statistics.
- **Ongoing :** *Computer Architecture, Knowledge Modelling and Semantic Technologies, Algorithms - II, *Compilers
  ** : Theory + Lab*

TECHNICAL SKILLS

- **Languages** C, C++, Python, Matlab, LaTeX
  Libraries and Tools Tensorflow,OMPL , OpenCV, ROS, PyQt, Octave
  Field of Interest Computer Vision, Path Planning, Machine Learning, Decentralised Systems.

TECHNICAL BLOGS

- *An Introduction to Variational Auto-Encoder* June '18'
  In just three years, Variational Autoencoders (VAEs) have emerged as one of the most popular approaches to unsupervised learning of complicated distributions..
- *Creating Messenger Bot with Python* May '17'
  Today almost every company has a chatbot deployed to engage with the users. Some of the ways in which companies are using chatbots are..