Rohan **Karnawat**

2658 Menlo Ave, Los Angeles, CA - 90007

rohankarnawat.netlify.com | karnawat.rohan18@gmail.com | hensden | rohan-karnawat

Education

University of Southern California — *Los Angeles, CA*

MS in Computer Science — *August 2019 - Expected May 2021*

CGPA 3.7

International Institute of Information Technology — *Hyderabad, India*

B.Tech. with Honours in Computer Science and Engineering — *August 2014 - May 2018*

CGPA - 9.13

Indian School Muscat — *Muscat, Oman*

CBSE Board — *July 2000 - March 2014*

Senior Secondary Final Average - 96.4%, Secondary Final GPA - 10.0

Honors & Achievements

2014-2018	**Dean's List,** Spring '15 (8.9), Spring '16 (9.5), Monsoon '16 (9.17), Spring '17 (9.2), Monsoon '17 (9)	*IIIT, Hyderabad*
2016	**ACM ICPC India Qualifiers,** Team dopplereffect; stood 40th from college among 3000 national teams	*IIIT Hyderabad*
2014	**Scholastic Award for Academic Excellence,** Grade XII Boards	*ISM, Muscat*
2013	**Bronze Award,** Duke of Edinburgh International Award for Volunteering	*ISM, Muscat*
2013	**Silver Medallist,** Grade XI Academic Award for Excellence	*ISM, Muscat*

Work Experience

IRIS, Information Sciences Institute — *Los Angeles, CA*

Graduate Student Researcher — *March 2020 - Current*

- Currently researching on methods to learn robust representations of images that can be defended against adversarially attacked / perturbed traffic sign and satellite images.

SAMSUNG Research Institute — *Bangalore, India*

Research Engineer — *July 2018 - August 2019*

- Member of the CTO's Advanced Technology Lab at the Biometrics & Authentication group. helped my team in the completion of the IRIS project for the government, which involved building an Android application for accurate and rapid verification of Indian citizens by scanning their irises with IR sensors. Researched new authentication methods using face liveliness for IoT environments, and on-device continuous authentication for intruder detection.

SAMSUNG Research Institute — *Bangalore, India*

Software Developer Intern — *May 2017 - August 2017*

- Worked in the Intelligent Services department and was tasked with testing and comparative study of various Deep Learning Libraries feasible for advanced speech recognition to substitute existing models on Kaldi.

Digitant Consulting — *Hyderabad, India*

Web Developer — *August 2015 - November 2015*

- Designed an algorithm to rank pages on general content publishing sites (Wordpress based). Successfully enabled tracking of a publishing website using an Open Source analytics tool Piwik. Hence, successfully built a content recommendation system.
- Also developed a tracking engine and traffic analyzer (Datapub) for content publishing sites which displayed the traffic on said site with various filters and features

IIIT Hyderabad — *Hyderabad, India*

Teaching Assistant — *January 2017 - May 2018*

- Digital Signals Analysis and Applications - Spring '17 - Under Dr Vineet Gandhi
- Statistical Methods in Artificial Intelligence - Monsoon '17 - Under Dr Vineet Gandhi
- Computer Vision - Spring '18 - Under Dr Anoop Namboodiri

Center for Visual Information Technology, IIIT

Hyderabad, India

Honors Student - Research under Dr Anoop Namboodiri

May 2016 - May 2018

- Worked on speaker recognition from long panel discussions (comic-con). Extended it to recorded meetings of the AMI dataset.
- Expressiveness and attention level detection (classification) of meeting participants from tonal nuances and facial expressions, lip movement and gestures. Hence, created video summaries and hotspots for activity level identification.

Major Projects

Comic Strip Generation

USC Viterbi

Deep Learning and Computer Vision

Fall 2019

- : Designed an end-to-end model using Pix2Pix based C-GAN along with fine-tuned LSTM and experiments with VQA based joint embedding and InfoGAN to generate alternate endings to Garfield comic strips.

Multimedia Synopsis

USC Viterbi

Multimedia and Full Stack

Spring 2020

- Created an interactive video synopsis player of a large media directory enabling synchronized browsing and viewing of raw videos and images using Python-QT.

Music Genre Detection and Mood Mapping

IIIT Hyderabad

Machine Learning

2017-2018

- Built an unsupervised learner (Kmeans + KL Divergence) and a supervised classification ensemble (Random Forest, DNN and DAG-SVM). With 87.8% accuracy, classified songs into 5 genres. Extended scope to a mood based music recommendation engine.
- Performed unsupervised clustering within song genres to create a mapping based on energies and correlated model with surveys of over 1000 songs. Made a dashboard for suggesting songs based on mood and favourite pieces.

Content Aware Image Resizing

IIIT Hyderabad

Digital Image Processing

August 2016 - November 2016

- Implemented the algorithm for resizing images and their features without introduction of artifacts using the Patch-matching approach based on an Approximate Nearest Neighbor Algorithm. Also built a user interface for this purpose.

Ultimate Tic Tac Toe Bot

IIIT Hyderabad

Artificial Intelligence

March 2016

- Developed a game bot for a variation of Ultimate Tic Tac Toe and created a heuristic for scoring states selected by an alpha-beta pruned minimax tree. Stood 8th in a battle of eighty bots.

Contrast Based Filtering for Salient Region Detection

IIIT Hyderabad

Computer Vision

April 2017

- Produced a pixel-accurate saliency map which uniformly covers the objects of interest and consistently separates foreground and background. Implemented two applicative tasks: Number Plate Extraction: Detected the number plate on cars based on contrasted coloring. Image Blending: Obtained a binary mask from the salient region for merging using pyramids.

Basic Room description Application

IIIT Hyderabad

Honours Project

June 2016 - July 2016

- Worked on a Blind Assistance application that creates a caption describing common objects in a room, on capturing its photograph. Used a backend of *neuraltalk2* and *torch*: VGG16 for features + object recognition, annotated caption sequence for LSTM training and positional coherence of objects.

Extractive Summarization

IIIT Hyderabad

Natural Language Processing

August 2017 - November 2017

- Extracted sentences of importance from CNN news articles to create a summary, using optimized unsupervised algorithms including Page rank and sequence learning with LSTM (Enc-Dec model). Compared the results with a preset abstractive summary using Pyrouge.

Short Term Projects & Assignments

Microsoft CFD	**HairStylist,** Built a mobile application that assisted in deciding which hair style is best suited for the frontal face photo that would be captured on camera. Face features were extracted using Haar cascade and an SVM was trained to capture details.
Distributed Systems	**MapReduce on Hadoop HDFS,** To retrieve count and distribution of words in a huge corpus of novels. Used MPI to implement distributed grep.
Linear Algebra	**Group Theory,** Presented a mathematical modeling and report on application of group theory to molecular symmetry theory.
Operating Systems	**Quick Shell,** Developed a multithreaded working UNIX command-prompt style shell in C.
Computer Graphics	**Short Animated Movie,** Used OpenGL 3.0 to implement a physics engine. Used Blender to incorporate textures, ray tracing and character rigging to make an animated short.
Adv. Computer Networks	**Switch Algorithms,** Circuit & packet switched communication, packet capture, weighted fair queuing, scheduling algorithms and IP Lookup.
DS + ACN	**Encrypted File Transfer,** Used Java's RMI and socket programming for serialised and encrypted data transfer.
Database Systems	**SQL Engine,** Data parsing engine with caching (B+ Tree) that can execute SQL queries to large databases.
IT Workshop	**Hostel Management Portal,** Built a multi-functional web application using Web2py's MVC framework.

Courses

- **Computer Science** : Computer Programming, Data Structures and Algorithms, Computer System Organisation and Architecture, Operating Systems, Database Systems, Software System Analysis and Design, Artificial Intelligence, Advanced Computer Networks, Graphics, Digital Image Processing, Computer Vision, Statistical Methods in AI, Principles of Information Security, Distributed Systems and Algorithms, Natural Language Processing, Advanced Computer Vision, Deep Learning, Multimedia Systems, Graduate Algorithm Analysis
- **Electrical** : Digital Signals Analysis and Applications, Digital Logic and Processors, Electrical Science
- **Mathematics** : Linear Algebra, Discrete Math, Abstract Algebra, Complex Math and Probability Theory, Basics of Infosec and Crypto

Technical Skills & Knowledge

Programming Languages, C, C++, Python, MATLAB, Java

Web Technologies, HTML5, CSS, Javascript, AngularJS

Database Tools, MySQL, Django

Other Platforms and Tools, Bash, LaTeX, MATLAB, OpenCV, TensorFlow + Keras, Pytorch, Caffe

Editors/IDEs, Vim, Sublime, Atom, Visual Studio

Operating Systems Env, Linux, Windows, Android (Basic)

Interests & Extra-Curricular

Threads	**Felicity '16, '17,** Coordinated the online contest Cache In as a part of a series of college fest online events.
Quizzing	**Coordinator and Admin of IIIT's Quiz Club,** Responsibilities included conducting quizzes of various genres, organizing external events, Felicity's quizzes, maintaining the page on social media.
Swimming	**Zonal and National Level,** Represented my school, won multiple medals
Others	**Hobbies,** Football (House, School, College), Creative Writing, Debate, Scrabble, Reading