# Nikhil Karnwal

+1858-214-0179 • nikhilkarnwal93@gmail.com

## EDUCATION

**University of California San Diego** — **California, USA**
Masters, Machine Learning & Robotics — Sept, 2020 – Present

**Indian Institute of Information Technology** — **Allahabad, India**
Bachelor of Technology with Hons., Information Technology (IT) — July, 2010 - May, 2014
GPA: 8.92/10

## COURSES

Machine Learning, Computer Vision, Deep Learning, Robotics, Advance NLP, Distributed System, Design and Analysis of Algorithms, Data Structures, Deep Generative Models, Probability, Linear Algebra

## RESEARCH PROJECTS

**InCabin Activity Detection in Autonomous Driving**
Formulated a novel method of detecting InCabin activity of a driver by introducing Body Pose along with feature map leading to around 1% improvement in overall accuracy over the baseline.

**LipSync using Generative Adversial Network**
Formulated a novel method for LipSync generation using Sequence Discriminator to ensure that predicted sequence is real.

**Motion Forecasting in Autonomous Driving**
Working on a novel method of using MaxEntropy Inverse Reinforcement Learning for trajectory prediction on nuScene dataset.

**Cancer Lineage Subtype Classification Using Gene Hierarchial Neural Networks**
Implemented a hierarichal neural network based on Cancer Dependency Map for predicting tumor type and subtype based solely on tumor sequencing data.

**Neural Conditional Random Fields for Constituency Parsing**
Implemented Neural CRF for constituency parsing on Penn TreeBank dataset with Bi-LSTM as encoding backbone network.

**NER for Synthatic Biology related articles using BioBertCRF**
Working on NER for entities for different chemicals, gene, et.c using BioBertCRF.

**Implementation of paper - 'Show, Ask, Attend, and Answer'**
Implemented paper – 'Show, Ask, Attend, and Answer: A Strong Baseline For Visual Question Answering' on VQA_v2.0 data set and reproduced the results. This library can be installed and used as a baseline to generate any model on top of it. *Source-Code*

**Perception: SLAM using Kalman Filter**
Implemented SLAM using Kalman Filter for unicycle robot using SSD object detector for landmark detection and mapping.

**OneStage Visual Grounding on Talk2Car Dataset**
Implemented OneStage learning based architecture for detecting an object in an image that is referred in the respective text command. It merges visual feature map from DarkNet and text embedding from BERT followed by stack of Visual Attention layers and YOLO layer for object detection.

**Semantic Segmentation on BSDS using UNet**
Implemented UNet architecture on Berkeley Segmentation Dataset semantic segmentation. It is implemented in python using PyTorch Deep Learning framework on GPUs leveraging Kaggle compute machines. *Source-Code*

**Transfer Learning using InceptionV3 network for Object Recognition**
Developed a library to create object classifier using Transfer Learning paradigm through tensorflow. Currently, it is using InceptionV3 pre-trained deep learning model and generating feature vector that are being again passed to a Dense layer. *Source-Code*

## WORK EXPERIENCE

**Microsoft R&D India** September,2020 – July,2021

*Senior Software Engineer, Office*

- Worked on stabilising Teams Migration Service by introducing durable tasks for syncing and validating database.

**Uber R&D India** October,2018 – September,2020

*Software Engineer 2*

- Architected, Developed and Launched a backend of an Insights generation service which consisted of following components –
  - ETL pipeline on Hive to compute Statistical Features by churning trips level data for around 15 million users at an interval of 24hr.
  - Machine Learning model on Michelangelo, a distributed ML platform by Uber.
  - Elasticsearch for storing business metrics and insights.
  - Thrift based service implemented in Golang.
- Developed a service to *cluster customers using K-Means Clustering* model based on different business metrics and extract insights on real time data.
- Optimized memory consumption of a Golang services by 75% using *Streaming Paradigm to load and transform data replacing Bulk load and transform*.

**Microsoft R&D India** July,2014 – October,2018

*Bing (Search Engine), Software Engineer 2*

- Designed & Implemented library for answers generation and document summarization for ***Question-&-Answering system*** in Bing by leveraging Deep Semantic Similarity Model and Decision Tree machine learning algorithms**.**
- Designed & Implemented ***web-ranking algorithms*** for improving the relevance of search results in Bing for verticals like Shopping, Education, Application, Seasonal etc. by using Decision Tree and Deep Neural Network.
- Developed ***query and document classifiers*** for the classification of search queries by using SVM models and DNN models for a range of verticals.
- Developed a ***RESTful service on azure using Azure Redis Cache database*** for serving as backend for exam-result Answer in Bing using .Net.
- Developed ***an android application for peer to peer data transfer*** between two mobiles over the intranet.

## BLOG & REPOSITORY

Blog **-** HomePage
Machine Learning Repo – GitHub-ML
Algorithm & Data Structures Repo – GitHub-Algorithm

## SKILLS

**Languages**: C, C++, Java, C#, Python, Android, .Net, GoLang.
**Frameworks**: Tensorflow, PyTorch, Scikit-Learn, Keras
**Tools**: Azure technologies, Visual Studio, Netbeans, Matlab, Android Studio, Anaconda, Spyder, Kafka, Elasticsearch, Hive, MichelAngelo, PyML.