

Arjun Chauhan

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EDUCATION

Manipal Institute of Technology, Manipal, India

July 2016 – June 2020

Pursuing Bachelor of Engineering in **Electronics & Communication Engineering** with **Minor** in **Data Science** (CGPA 8.5/10)

Internships

DeepRivWidth : Applying Semantic Segmentation for River Width Measurement in SAR Images

Guide: Dr. Ujjwal Verma, Dept of ECE, MIT, Manipal

January – June 2020

- Implemented and Tested **UNet** and **DeepLabv3+** on SAR Images for identifying land and water in SAR Images
- Attained an **accuracy of 93% (Unet) and 98% (DeepLabv3+)**
- Developed a distance measuring algorithm using **morphological transformation** and **euclidian distance measurement**. Obtained an **average error of 22 meters**.
- Observed temporal data to **help municipality make better decisions** regarding water allocation.

Leveraging AI to Optimize Bandwidth for Streaming Services

December 2019

Myelin Foundry, Bengaluru, Intern

- Applied deep learning algorithms such as **ESPCN** and **SRGAN** to reduce bandwidth requirements for Over the Top (OTT) streaming services for Hotstar (a leading OTT provider in India)
- Aided **implementation and optimize image filters to improve visual** quality of videos at the edge.
- Improved **VMAF** score by **30 units**.

Collision Prevention Assistance System (ADAS)

July 2019

Karel Electronics R&D, Ankara, Intern

- Developed a system for cars to **detect oncoming traffic and pedestrians** using **Haar Cascades**, **Optical Flow** and **Multi-object tracker** to improve road safety.
- **Integrated rear-view camera** displays with a buzzer to warn the driver about any threats on roads.
- Demonstrated this system to **FIAT, Turkey** at a meeting between Karel Electronics and FIAT.

Parking and Surround View Assistance System (ADAS)

July 2018

Karel Electronics R&D, Ankara, Intern

- Incorporated **4 cameras** to work simultaneously to get an **overall composite video feed** with the next generation rear-view cameras (instead of mirrors) in cars using **OpenCV, V4L2, Driver Programming and C** on an in house developed **embedded platform**.
- Implemented **calibration and homography transforms** for seamless merging of feeds.

Projects

Rescue Bees

September-December 2019

Coursera Show-a-skill Challenge

- Developed an algorithm for **detecting people in distress using a swarm of drones** aimed at **aiding rescue and relief operations** during natural calamities. Implemented using **Ardupilot, ROS, and Tensorflow**.
- Incorporated an algorithm to **geocode images** and relay it back to base station and developed an application interface to plot and show these images.

No-Permission-No-Take off (NPNT) System

October-December 2018

Makerthon Challenge, IIT Bombay Techfest

- Developed a modular unit to **enforce government drone regulations** on the flight controller making it compulsory for the drone to return to base if any regulation was violated.
- Incorporated an algorithm to **monitor operating parameters** of the drone and **plan the path on detecting violation**.
- Analysed the simulation using a System-In-The-Loop (SITL) before final hardware implementation.

Non-Invasive Engine Inspection Prototype

March – July 2018

TATA Innoverse Challenge

- Developed a prototype for **TATA Motors** to inspect engines to be refurbished using borescope, Arduino, and Raspberry Pi.
- Implemented image processing and **fault detection using deep learning** for the prototype to **reduce** the amount of **time** required in completely dismantling and **examining** an engine from **a few hours to 10 minutes**.
- Attained an **accuracy of 85%** for defect detection using **UNet**.

Automated Othomosaic Generation and 3D Model Construction using Aerial Imagery

March – June 2018

TATA Solverhunt 2 Challenge

- Developed an approach to **plan route** and capture images using drone and provide an **orthomosaic image** and **3D Model**.
- Demonstrated this system to **TATA Steel** for their inspection purposes.
- Implemented using **Ardupilot, SITL simulation, ROS and OpenCV**.

Follow-me Drone

July - September 2017

AeroMIT, Advanced Drone Research subsystem

- Modelled the development of **vision-based control system** for drones.
- Visual identification was based on **HOG transform** and tracking was done using **Farneback Optical flow**.
- Capable of running **real-time edge operations** on computationally limited platform.

Publications

- U. Verma, **Arjun Chauhan**, M.Pai, R. Pai, **Deep Learning based Semantic Segmentation approach for River Width Measurement in SAR Images**, *Geoscience and Remote Sensing Letters*, Submitted.
- **Arjun Chauhan**, A. Kumar, S. Srivastava, R. Bhatnagar, **Analysis of Online News Popularity and Bank Marketing Using ARSkNN**, *Advances in Intelligent Systems and Computing, Springers IC4S, Bangkok, October 2017*, pp.13-22, ISBN No: 978-981-13-0341-8, Volume 759

Key Course Project

INTELLIGENT HOME INTRUDER DETECTION SYSTEM

ECE 3111: Microcontroller Lab

- Designed and implemented an intelligent home security system using an ATmega 328P. Consisted of a Real Time Clock module (through I2C), keypad and LCD.
- System had the ability to detect an intruder based on the type of error made while entering the code.
- System could also detect an intruder even if the correct code were entered. This was done based on the time taken to enter the code, hour at which it was being accessed, and the number of times it was accessed that day.
- System could be configured by the user directly through the keypad and could also train the system to improve its accuracy.

Achievements and Awards

- Awarded the second position in National level competition organised by Coursera (2019)
- Finalist for MBRDI's Virtual Drive Challenge Hackathon (2019).
- **Won** the Makerthon challenge held at **IIT Bombay Tech Fest** (2018).
- **Won** National level **TATA Solverhunt 2** Challenge (2018).
- **Honoured** for our proposed solutions to TATA Motors and TATA International at **TATA's Annual Review Ceremony** (2018).

Technical Skills

- Programming Languages: C, C++, Python, MATLAB
- Machine Learning Libraries: Keras, Tensorflow
- Design and Simulation Software: LATEX, Simulink, LTSpice
- Hardware: Arduino, Raspberry Pi, Tinkerboard

Positions of Responsibility

Technical Head

2019-2020

IE-E&C Student Chapter

- Conducted **workshops** for a group of **approximately 250 students** addressing the topics of Arduino programming and machine learning (**kNN, SVM, ANN**) with Python during TechTatva (College Tech Fest).
- Responsible for organizing and guiding the club's activities during technical and cultural fests.
- Helped participants with their projects for the annual Winter Project Competition.

Relevant Courses Taken

Electronics and Communication Engineering

Computer Vision, Motion and Geometry Based Methods in Computer Vision, Linear and Digital Control Systems, Microcontrollers, Data Science, Advanced Data Science, Linear Algebra, Probability and Statistics, Calculus, Differential Equations, Python Programming, Introduction to Avionics and Navigation Systems

Massive Open Online Courses

- Machine Learning by Stanford University (Coursera)
- Data Science Specialization by Johns Hopkins University (Coursera)
- Deep Learning Specialization by deeplearning.ai (Coursera)
- Tensorflow in Practice Specialization by deeplearning.ai (Coursera)
- Artificial Intelligence for Robotics (Udacity)