SHAUNAK SRIVASTAVA

Course : **M.Sc. (Hons.)** Mathematics and **B.E. (Hons.)** Electronics and Communication Engineering, 2022

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ACADEMIC DETAILS

COURSE	INSTITUTE/COLLEGE	BOARD/UNIVERSITY	SCORE	YEAR
CLASS XII	CMR National Public School, Bangalore	CBSE	94.6 %	2017
CLASS X	Sishu Griha Montessori and High School, Bangalore	CISCE	94.4 %	2015

Subjects / Electives	Discrete Mathematics, Linear Algebra, Mathematical Optimization, Numerical Analysis, Applied Stochastic Processes, Game Theory, Statistical Inferences & Applications, Probability & Statistics, Differential Equations ; Data Structures and Algorithms, Algorithms on Graphs, Algorithmic Toolbox, Graphs & Networks, Cryptography, Deep Learning, Object Oriented Programming; Digital Design, Signals and Systems, Control Systems, Microprocessors and Interfacing, Digital Signal Processing, Digital Image Processing, Computer Architecture
Technical Proficiency	Python, C, C++, MASM; Algorithms, Algorithm Design, Data Structures; Neural Networks, Deep Learning, Tensorflow, Keras, OpenVINO; OpenCV, Image Processing; MATLAB, ROS; Datasets: COCO, KITTI, MOTChallenge, ImageNet

SUMMER INTERNSHIP / WORK EXPERIENCE

Project Intern, Carraro India Pvt. Ltd. **May 2019 - Jul 2019**

Researched on Statistical Process Control and its use in optimizing Six Sigma Processes.
Analyzed manufacturing process data to find variations using statistical tools.
Conducted statistical studies to find Process Capability (Cp), Process Capability Index (Cpk).

PROJECTS

Multi-Object Tracking - Computer Vision **June 2020 - July 2020**

Designed an algorithm for Multi-Object Tracking which has been tested on the **MOT Challenge benchmark** and the **KITTI dataset**. Studied various **online tracking** algorithms such as **SORT, DeepSORT** etc.
Explored **CNN and colour histogram** based feature descriptors for data associations.
Worked with algorithms such as **Kalman Filters, Hungarian Association Method, Linear Assignment, Feature Extraction** and **Track Management**.
Implemented using **Python, NumPy** and **OpenCV**.

Localization and Path Planning for Autonomous Vehicles - Mobile Robotics

Created a working simulation which demonstrates **autonomous navigation** of a vehicle on an a path with obstacles. **Aug 2018 - Dec 2018**
Used the **ROS** framework and **Python** for programming along with **Gazebo** for the simulation environment.
Used **Sensor Fusion** data, such as 3D depth data from RGB-D sensors, IMU data and GPS data for the simulation.

Implemented algorithms like **SLAM, GMapping** and **Extended Kalman Filters** for localization.

Dynamic Hand Gesture Control using Deep Learning - Computer Vision **Jul 2020 - Jul 2020**
Implemented a Hand Gesture recognition system and its application for Power Point Presentations.
Used **Google's mediapipe** hand-tracking model for hand detection followed by classical techniques for gesture recognition using **Python** and **OpenCV**.

Ant Exploration using RL - Reinforcement Learning **Nov 2020 - Nov 2020**
Created a **Reinforcement Learning** agent using **NEAT-python** for environment exploration and collision avoidance.
Used **pygame** for creating the game environment. NEAT-python implements an **evolutionary neural network** to perform learning. Experimented with different environment layouts to understand effect on learning speed.

Projects under Image Processing and Computer Vision Course - Computer Vision
Object Detection and **Blurring** using **Haar Cascades** for privacy protection. **Dec 2019 - Jan 2020**
Object Tracking using **Dense Optical Flow**.

Projects under Deep Learning Specialization Course - Deep Learning
Non-maximal suppression on bounding boxes detected using **YOLO**.**May 2020 - May 2020**
Created a **voice activation** tool, similar to **Siri** and **Alexa**, using **Attention Models**.
Performed **Sentiment Analysis** using **LSTM** and **word embedding**.
Facial Identification System using **Siamese Networks**.

Projects under Data Structures & Algorithms Course - Data Structures and Algorthms
Bi-Directional Dijkstra's algorithm for searching in social networking graphs. **Jun 2020 - Jul 2020**
Contrast Hierarchy and **A* algorithms** for road network traversals.
Bellman-Ford algorithm for optimal currency-exchange.

Voice Digitizer - Microprocessors and Interfacing **Mar 2020 - May 2020**
Designed a voice digitizer system using an 8-bit ADC to convert analog to digital signals and reproduce the signals with modifications. Design used an **8086 microprocessor** chip along with chips like **8255, 8254, 8259** for peripheral device interfacing and interrupt control.
Created a digital simulation using **Proteas** software and coded it using Assembly Language.

The One Game - Computer Programming **Nov 2016 - Jan 2017**
Made a hybrid game out of classic school games of hand-cricket, hangman and rock-paper-scissors.
Used **C++ programming** to make a digital application.

POSITION OF RESPONSIBILITIES

Core Member - Mime Club **Aug 2019 - May 2020**
As a Core Member, my primary role was as Director for a crew of 30 members. Content creation and stage execution came under responsibility.

President - MUN Club, CMR National Public School **Jun 2016 - Mar 2017**
My duties included mentoring students in Model UN and creating a strong debating culture among peers. My team won several awards during my tenure including team delegation awards at national level Model UN competitions.

EXTRA CURRICULAR ACTIVITIES

Event Organization
Worked for the **Department of Sponsorship and Marketing** to raise funds and manage on fest marketing for our cultural, technical and sports festivals.

Acting and Direction
I have been active member for the Mime Club for the last three years and was a core member for the 2019-20 team. I was part of 7 productions as an actor and director. Apart from these, I have also been part of 2 short film productions.

Sports and Athletics
Won several accolades in individual events such as sprints and long jump along with several team events like Football, Relay and Kho-Kho.

AWARDS AND RECOGNITIONS

4th State Rank in Math Olympiad | Silverzone Foundation

CERTIFICATIONS

CERTIFICATION	CERTIFYING AUTHORITY	DESCRIPTION
Algorithms on Graphs	Coursera	Djikstra's Algorithm, Bellman-Ford, Kruskal's Algorithm
Deep Learning Specialization	Coursera	Neural Networks, Hyper-parameter Tuning, CNNs, Sequence Models
Algorithmic Toolbox	Coursera	Time Complexity, Greedy Algorithms, Dynamic Programming
Data Structures	Coursera	Binary Search Tree, Priorty Queue, Hash Table, Stack, List

COMPETITIONS

Cottons Model United Nations - Aug, 2015 Secured the Best Position Paper Award.

Sishu Griha Model United Nations - Jun, 2014 Secured the Best Position Paper Award.

Indian Robotics Olympiad - Sep, 2013 Secured Third Position a the regional round and qualified to compete at the National Level.

First Lego League - Jan, 2012 Awarded the Best Design for our Robot.

SCHOLOARSHIPS

National Talent Search Examination (NTSE) **May 2015**
The National Talent Search Examination (NTSE) is a prestigious award given to students excelling in the studies related to science and encouraging further studies by giving a scholarship. I successfully cleared the NTSE examination at the state level.

LANGUAGES KNOWN

English: Native proficiency

Hindi: Native proficiency

German: Elementary proficiency