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Kartik

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## EDUCATION

### Master of Statistics with Data Science- Merit

August 2023

*University of Edinburgh, Scotland*

Courses: Reinforcement learning, Machine Learning and Pattern Recognition, Statistical Programming, Incomplete data analysis, Bayesian theory, Bayesian data analysis, Probabilistic modelling and reasoning.

### Bachelor of Engineering Computer Science and Engineering- 8.66/10(CGPA)

May 2021

*Panjab University, Chandigarh(India)*

Courses: Quantum and statistical physics, Web development, Artificial Intelligence, Data structures and algorithms, Data mining, Modeling and simulation.

## WORK EXPERIENCE

### Web Development Intern

*GrowVation, Chandigarh*

July 2018

- Led a team of four in creating the front-end from the ground up, employing fundamental technologies.
- Developed the backend using Node.js and crafted the front-end using React(using Bootstrap).
- Utilized and enhanced skills in Bootstrap (web framework), HTML, Cascading Style Sheets (CSS), and JavaScript, React, Node.js.

### Research Intern

*Defence Research and Development Organisation (DRDO), New Delhi*

June - July 2019

### Processing of laser-induced Fluorescence(LIF) Spectra of chemicals using Machine Learning

- In this project, we revolutionised the processing of LIF spectra(produced using the Raman effect) for chemicals by implementing supervised Machine Learning algorithms, specifically Support Vector Machines(SVMs). Our goal was to significantly curtail costs associated with traditional methods reliant on physical equipment. By automating the LIF spectrum analysis, we paved the way for more efficient and cost-effective chemical analysis processes.
- Elucidate relationships between data patterns of wavelengths of different minerals generated under control and test conditions.
- Built a Desktop application using Tkinter to give a GUI(graphical user interface) to the built model.
- Skills gained are Data preprocessing, Data mining, Machine learning algorithms and Python

### Volunteer

*Rising India youth organisation, Chandigarh*

August 2019 - December 2021

- Taught unprivileged children about computers and their functions.
- Build software using Python for the NGO to keep check of their data and remove any redundancy in the database.
- During my time at the NGO, I organised two events named Hindi-pakhwara and youth conclave which are Hindi poetry and debate competitions respectively.

## PROJECT

### Replicating YelpCamp Review Website with Node.js Backend and Bootstrap Frontend November 2023

Explore the live project: [campsite-qgot.onrender.com/](https://campsite-qgot.onrender.com/)

- Successfully deployed the website using MongoDB Atlas, a cloud database platform, and hosted it on Render.com using the free version.
- Implemented CRUD functionality using MongoDB, integrated Mapbox for map display, and utilized Cloudinary for storing images in the cloud.
- Developed a comprehensive review system for user feedback.
- Currently in the process of building the frontend using React and Material-UI.

### Exploring anomaly detection using autoencoders(AEs) and variational autoencoders(VAEs) in network security June 2023

Master Dissertation

- Created a method for tuning the threshold for classifying anomalies(cyberattacks) based on the reconstruction error in AEs and VAEs with 99% recall score(sensitivity) even in highly imbalanced datasets.
- Evaluated anomaly detection performance by contrasting autoencoders (AEs) and variational autoencoders (VAEs) against conventional techniques like KNN, isolation forest, and one-class SVM.
- Interpreted the prediction of the BlackBox models(AEs and VAEs) using LIME(Local Interpretable Model-agnostic Explanations) and SHAP(Shapley Additive explanations). The important features in the datasets for detecting the anomalies(cyberattacks) are also derived.
- For more details: <https://github.com/kartik481/Anomaly-detection-using-AE-and-VAEs/blob/main/Dissertation.pdf>

## SKILLS

<b>Programming</b>	Python, R, C++, Javascript
<b>ML Tools</b>	Pytorch, Keras, Open AI Gym, scikit-learn, Bayesian machine learning
<b>Other</b>	Git, Javascript, HTML5, CSS, React, Node.js, SQL, MongoDB, AWS(Amazon web services)
<b>Communication</b>	English, Dogri(native), Hindi

## CERTIFICATION & ACHIEVEMENTS

- **Web Developer Bootcamp 2023 by Colt Steele (Udemy)**: Expanded my knowledge in HTML, CSS, JavaScript, React, MongoDB, and Node.js.
- My team was selected for one of the World's Largest Hackathon-Smart India Hackathon 2019 Finale under the Ministry of External Affairs Government of India.
- Securing the 3rd position in the North India Cybersecurity Hackathon, an event organised by the US Embassy.
- For Undergraduate studies, awarded with a Scholarship for full 4 years for securing 8th position in the Himachal Pradesh State in 12th Board Exams.