

# M Nishkal Gupta

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## ABOUT ME

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A self motivated technology enthusiast interested in bringing useful and creative ideas into existence by applying my expertise by the knowledge gained from my education and industrial experience. Always looking to take up roles that push my limits to get the best out of me which would benefit the industry as well as the society.

### Profile Links

**LinkedIn, GitHub, Personal Website**

## EDUCATION

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| <b>Blekinge Institute of Technology</b><br><i>Masters in Science, Dept of Computer Science</i>   | Karlskrona, Sweden<br><i>Jan. 2019 – Oct 2020</i> |
| <b>Jawaharlal Nehru Technological University</b><br><i>Masters in Technology in Electronics Engineering, Emphasis on Telecommunication Systems</i> | Hyderabad, India<br><i>June 2018 – Jan 2019</i>   |
| <b>Jawaharlal Nehru Technological University</b><br><i>Bachelors in Electronics and Communication Engineering</i>                                  | Hyderabad, India<br><i>Aug 2015 – May 2018</i>    |

## EXPERIENCE

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| <b>GenAI and MLOps Research Engineer</b><br><i>One Convergence</i>   | December 2022 – Present<br><i>Hyderabad, India</i> |
| <ul style="list-style-type: none"><li>• Data Curation Agentic Framework Using Generative AI: Developed AI agents for data curation, utilizing retrievers, term agents, and ontology templates to manage and transform data from NCBI GEO datasets. Created a multi-agent system using Autogen and LangGraph for efficient metadata curation and annotation.</li><li>• AI Agents for Bio - Served as the architect for an AI-driven system that routes complex biological queries to specific agents based on their domain expertise. Designed the Router Agent, which uses a machine learning algorithm and prompt engineering to dynamically route queries to the most suitable agents, optimizing response quality, performance, and latency.</li><li>• Terraform Automation for DKubeX: Architected and implemented Terraform scripts for deploying DKubeX infrastructure on EKS clusters. Automated the setup and installation of AI and MLOps platforms, ensuring scalable and repeatable cloud infrastructure.</li><li>• Led the development of Retrieval Augmented Generation (RAG) pipelines using LlamaIndex and fine-tuned both LLMs and embedding models for various use cases, including life sciences.</li><li>• Integrated machine learning pipelines using Flyte for deploying vision-based ML models (e.g., nuclei count and doxycycline detection) in the domain of life science.</li></ul> |  |
| <b>Freelancer</b><br><i>SKN Technologies</i>   | April 2022 – Nov 2022<br><i>Hyderabad, India</i>   |
| <ul style="list-style-type: none"><li>• Worked as a freelancer for an AI/ML consulting startup for providing clients with solutions for their business problems using some of the cutting edge AI/ML and MLOps tech stack.</li></ul>   |  |
| <b>Software developer for 5G packet core</b><br><i>Ericsson AB</i>   | Aug 2021 – Feb 2022<br><i>Gothenburg, Sweden</i>   |
| <ul style="list-style-type: none"><li>• Developer to maintain products (units, nodes, networks, systems and solutions) including all development activities such as: requirement analysis, system design, architecture design, hardware design, software design, integration, verification, simulations, tools design, product life cycle management support and product documentation.</li></ul>  |  |
| <b>Research Assistant</b><br><i>Blekinge Institute of Technology</i>   | June 2019 – September 2019<br><i>Sweden</i>        |
| <ul style="list-style-type: none"><li>• Worked as a research assistant under Professor Siamak Khatibi, I supported him on two projects, first one being data simulation and analysis using various statistical as well as machine learning models majorly related to markovian chain model for supporting the communication network of a bus. Second project involved with developing of a own algorithm for path planning of a turtlebot 2 robot and it's comparison with A* and dijkstra's algorithms for performance evaluation.</li></ul>  |  |

## Technical Intern

Caribou Technologies

May 2018 – June 2018

Hyderabad, India

- Worked on IoT tech stack (Raspberry Pi, Linux OS and customized sensors), developing and testing functionalities using C and Python libraries over the cloud for building smart lock solutions as part of the home automation project in collaboration with cross country team in India and Canada.

## RESEARCH WORK

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### Dynamic Curvature Constrained Path Planning Algorithm (Published in Arxiv) Sep 2023 - Nov 2023

- \* Designed and implemented a novel 2D path planning algorithm, emphasizing efficiency and constraint-awareness. DCCPPA connects start and goal points using the shortest distance, optimizing path nodes. When encountering obstacles, the algorithm traverses their perimeters, dynamically adjusting to the environment. This approach minimizes sampling nodes and enhances path simplicity compared to traditional methods like PRM and RRT. DCCPPA demonstrates potential in robotic path planning by reducing complexity and improving computational efficiency. **Paper Link :** <https://arxiv.org/html/2410.03253v1>

### Master Thesis - Design of Key-exchange Mechanisms using Blockchain. Jan 2020 – Oct 2020

- \* Designed and analyzed a framework by performing extensive research for adapting a decentralized PKI for key exchange mechanisms for software artifacts for micro-services with the help of blockchain technologies.

### Research on Fraud Detection in Online Payment Aug 2019 – Nov 2019

- \* Performed an SLR on Online Fraud Detection using various Machine Learning techniques and built a framework to analysis the same practically.

### Research on Trusted Computing in Containers Aug 2019 – Nov 2019

- \* Literature review describing various technologies and proposals for building trust in cloud based containers. The main focus of this paper is to study the trusted platform module (TPM) and it's relationship with container technology.

### Design of Network Architecture Jan 2019 - May 2019

- \* Designed and simulated a network architecture for a startup using Cisco packet tracer. Components included Data/DNS/FTP/Syslog servers, computers, switches etc.

## STARTUP INITIATIVES

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### Abstract AI: Optimizing AI Development with an Abstraction Layer on LLMs Ongoing

- Architecting and developing a platform that optimizes the use of large language models (LLMs) by AI developers. This abstraction layer routes queries to the most appropriate model, balancing cost, speed, and performance. The platform leverages machine learning algorithms for model selection, algorithmic enhancements (e.g., Chain of Thought, Mixture of Agents), and local model deployment for increased efficiency. As of now, 70 percent implementation completed and plan to launch it as product as a service.

## PERSONAL/COLLEGE PROJECTS

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### Automatic Labelling using Machine Learning

- Implemented a machine learning tool for automatically labelling the raw sensor data and later generating features from it. Principal component analysis and Kmeans were the 2 algorithms used.

### Prediction and Analysis of Spam Emails using Machine learning models

- Performed an experiment to compare the computational and predictive performance of ML models on a spam detection task. Ten-fold validation test was conducted to estimate the performance of a model in general, followed by statistical test such as nemenyi and friedman.

### Chat Client and Server

- Built a command line chat system based on Client Server architecture using TCP/IP protocol.

### Quality of Experience for VoIP Service

- Analyzed the performance of Free Call application which is based on voice over internet protocol service in relation to its connectivity to the internet. Performance was measured using delay, data usage and experience.

### **Machine Learning Model for Communication Network of a Bus**

- Developed a ML based model that analyses and rectifies problems in the communication network of a vehicular system. Model supports both static as well as dynamic data. Later google map's API was used for plotting a heat map for the communication between the bus and the reporting stations.

### **Network Architecture for Online Game**

- Proposed a network architecture along with theoretical calculations for monitoring, operation and maintenance of an online game similar to PUBG but with a much higher capacity.

### **Data Modeling of M/M/S Queuing system**

- Designed and implemented a lossless multiple server data model with the help of a state diagram for a cinema theatre using MATLAB with various service and arrival rates. Later statistical analysis was carried out using both graphical and numerical calculations.

### **Image Classifier**

- Built an image classifier based on Convolutional neural network using TensorFlow and python with the help of MNIST data set as input.

## **TECHNICAL SKILLS**

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**Languages:** C/C++, MATLAB, Dart, Python, Go ,BASH, JavaScript, LaTeX.

**Databases:**MySQL, MongoDB, Mongoose, PostgreSQL.

**Web Frameworks and Languages:**HTML/CSS, JSON, Bootstrap,Flask, Nodejs, Expressjs, Flutter, YAML.

**DevOps Technologies:** Git, Git-Lab, Docker, Redis, Anaconda, Kubernetes, HELM, Kustomize , Terraform, AWS, flyte ,Ray, SkyPilot, MLflow.

**ML & LLM Libraries:** Pandas, NumPy, Matplotlib, Scikit Learn, Tensorflow, Transformers, langchain, langgraph, llamaindex, AutoGen.

**IOT devices and OS:** Arduino, Raspberry pi, Onion Omega2+, Linux(Kali and Ubuntu),Windows, ROS(Robot operating system).

**Networking Tools:** Cisco Packet Tracer, Openflow,TCP dump,Wireshark, Transport, Basics of P4. layer protocols (TCP,UDP),Internet Layer Protocols (IPV4&IPV6),SNMP,DNS and ARP

**Blockchain Technologies:** Ethereum(smart contract, Secret Store development, Ocean Protocol),Bitcoin

**MS Office:** Excel, PowerPoint, Word

## **ACHIEVEMENTS**

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### **Merit Scholarship by Swedish Government**

Jan 2019

- Awarded 50% fee wave in Master's Education in Sweden due to outstanding grades from Bachelor's Education.

### **MSME by Government of India**

Feb 2018

- Selected for National Level Idea pitching for startups by Government of India for my idea of "SMART EAR PODS".

### **International Maths Olympiad**

2013

- Attained 126th rank in India for International Maths Olympiad.

## **EXTRA CURRICULAR ACTIVITIES AND HOBBIES**

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**Student Ambassador for Blekinge Institute of Technology, Sweden.**

Sep 2020

**Volunteer at XP 2020 Agile Alliance, Software Community**

Jun 2020

**Student President for Entrepreneurship cell, JNTU Hyderabad**

Mar 2017 – Dec 2018

**DIY RC plane making**

**DIY watch making and engineering**

**Rifle Shooting - Beginner level**

**Professional Cricket and Table Tennis player**