

Unique Karki

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EDUCATION

- **Kathmandu University** Kavre, Nepal
Bachelors in Computer Science; GPA: 3.04 *Aug 2017 - Mar 2022*
 - **Relevant Courses:** Artificial Intelligence, Data Structures and Algorithms, Algorithm and Complexity, Software Engineering, Probability and Statistics, Calculus, Linear Algebra, Cloud Computing, C, C++.

TALKS

- **National Conference On Mathematics And Its Application - NCMA 2022** Ilam, Nepal
Slide Presentation *Jun 2022*
 - **Presentation Topic:** Artificial Neural Network-Genetic Algorithm For Optimization Of Multivariate Function: An Application To Lactic Acid Production.

RESEARCH EXPERIENCE

- **Florida State University** Tallahassee, Florida
Remote Research Intern *Aug 2024 - Present*
 - **Research Focus :** Engaged in advanced research on Graph Neural Networks (GNNs), exploring innovative methods to enhance model security and performance.
 - **Collaborative Projects :** Worked closely with Prof. Yushun Dong on cutting-edge initiatives aimed at developing robust techniques to safeguard GNN models against emerging threats.
 - **Contributions :** Actively contributed to research discussions, offering insights and ideas that shaped the direction of ongoing projects.
 - **Remote Engagement :** Demonstrated strong self-management and communication skills by maintaining consistent progress reports and effective collaboration in a remote setting.
- **Kathmandu University** Kavre, Nepal
Researcher *Aug 2021 - Present*
 - **Modeling:** Understanding lactic acid experimental dataset provided by the team from the Department of Biotechnology and training ML models based on the data.
 - **Optimization Of ML Models:** Benchmarking the performance of different ML Models including Neural Networks and Random Forest for the provided lactic acid dataset and multivariate function.
 - **Optimization Using Meta-heuristic Algorithm:** Benchmarking the performance of Particle Swarm and Genetics Algorithm to find the optimal values of multivariate functions.
 - **Developing Python Package:** Developed a Python package (**evolutionpy**) to implement meta-heuristic algorithms.

EXPERIENCE

- **Bajra Technologies Pvt. Ltd.** Kathmandu, Nepal
Associate Software Engineer *Jun 2022 - Jun 2023*
 - **Electronic Healthcare Record (EHR) For Hospitals :** Involved in developing, testing, code documentation, code review, and bug fixing for new and existing features
 - **Fast Healthcare Interoperability Resources (FHIR) :** Hands-on experience in FHIR standards, data models, and integration. Expertise includes server selection, API communication, and data transformation for seamless data exchange with Healsuite, an electronic Healthcare Record (EHR) for hospitals. Implemented patient data retrieval, health record updates, and efficient data searches within FHIR server. Meticulously documented integration process.
 - **Server Setup And Management:** Involved in maintaining and deploying staging servers.
 - **Recruitment:** Interviewed multiple candidates for multiple rounds of recruitment.
- **LIS Nepal** Lalitpur, Nepal
Software Engineering Intern *Jan 2022 - Apr 2022*
 - **ETL Development:** Involved in the ETL part of the project. Responsible for the ETL development of Data from the source to the target. It involved developing the extraction script, performing the transformations, and loading scripts to load into the tables. Responsible for end-to-end validation of the transformed data using SQL queries in Snowflake database. Involved in the scheduling of the batch and documentation of the entire system.

• Bottle Technology Pvt. Ltd.

Associate Machine Learning Engineer

Lalitpur, Nepal

Sept 2020 - Jan 2021

- **Project Planning:** Developed a plan to help clothing store customers find their ideal size, collaborating with stakeholders and gathering requirements.
- **Optical Character Recognition (OCR):** Conducted experiments with YOLO v2 and OCR for Devanagari characters to automate customer measurement extraction from measurement bills. Explored OCR techniques for Devanagari characters to extract data from non-English bills, enhancing system adaptability accurately.
- **Machine Learning Algorithms:** Developed a model to accurately predict the size of clothes from the customers' body measurements. Optimized the algorithm for reducing the error in predictions.

TEACHING EXPERIENCE

• V.S. International College (Affiliated to Tribhuvan University)

Course Instructor

Kathmandu, Nepal

Apr 2022 - Present

- **Subjects taught:** Artificial Intelligence (CACS410), Non-credit Computer Lab Work
- **Responsibilities:** Teaching undergraduate students; Guiding and supervising research projects to undergraduate students; Organizing academic events such as seminars, workshops, and conferences.

LEADERSHIP EXPERIENCE

• Kathmandu University Computer Club

Executive Member

Kavre, Nepal

Jun 2019 - Sept 2020

- **Daily Operations:** Coordinated daily operations of the club, ensuring smooth execution of events and activities.
- **Strategic Planning:** Led strategic planning initiatives, including budgeting, future planning, membership growth, and organizing the Annual General Meeting.
- **Event Management:** Organized and managed the IT Meet, the largest departmental event at Kathmandu University, involving event logistics, volunteer coordination, and execution.
- **Financial Management:** Secured sponsorship and funding for events, effectively negotiating and convincing sponsors to support the club's initiatives.
- **Workshops:** Facilitated technical workshops on Python and machine learning, contributing to the skill development of club members.

ACADEMIC PROJECTS

- **Watermarking GNN based on Random Graphs:** Implemented a methodology for watermarking Graph Neural Networks (GNNs) using Erdos-Renyi random graphs to embed unique identifiers for model integrity and ownership protection. The project includes generating ER graphs, combining them with existing datasets (Cora, PubMed), and evaluating GNN authenticity through trained models.
- **Vamana Algorithm Implementation:** Translated the theoretical concepts of the research paper "*DiskANN: Fast Accurate Billion-point Nearest Neighbor Search on a Single Node*" by Microsoft's research team into C++ code. Implemented the Vamana algorithm, a graph-based proximity search system for scalable and efficient approximate nearest neighbor search in high-dimensional spaces.
- **PDFInsight - PDF Summarization Tool:** Developed a PDF summarization tool using large language model, integrated with Streamlit for a user-friendly interface. Implemented functionality to extract and summarize text from PDFs, allowing for efficient content review. Utilized advanced NLP techniques to create concise summaries, enhancing document processing and analysis.
- **Image Filtering Enhancement:** Explored fundamental image processing techniques for filtering and enhancing images by implementing various filters such as Gaussian blur, median filter, and bilateral filter to improve image quality. Additionally, explored histogram equalization to enhance image contrast.
- **Face Recognition Attendance System:** Developed an attendance system using face recognition with Python's OpenCV and Flask. Integrated Haar Cascade classifier for precise frontal face detection and employed OpenCV recognizer to achieve reliable and accurate face recognition.

SKILLS SUMMARY

- **Programming Languages:** Python, R, Matlab, C, C++, JavaScript, SQL
- **Python Packages:** NLTK, Pytorch, Scikit-Learn, OpenCV, Pandas, Numpy, Matplotlib, Flask, Django, BeautifulSoup, Regex, Jupyter
- **Database:** PostgreSQL, MySQL
- **Miscellaneous:** Git, Github, Bash, LATEX, Linux

CERTIFICATIONS

- **Data Analysis with Python May 2020**
- **Machine Learning, April 2020**
- **Data Visualization with Python, April 2020**
- **Using Python to Access Web Data, June 2020**
- **Databases and SQL for Data Science with Python, June 2020**