Kamal Shrestha

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Academic Details

Year	Degree	Institute	CGPA/Marks(%)
2023	M.Tech Computer Science and Engineering(2 year)	IIT Hyderabad	9
2020	Bachelors in Computer Engineering	Kathmandu University	92.3%
2020	Microdegree in Artificial Intelligence (1 year)	Fuse Machines AI Center	10
2015	XII (Higher Secondary Education Board)	St. Xavier's College	81.4%
2013	X (School Leaving Certificate)	Valley Public Boarding School	88.25%

Scholastic Acheivements

Dr. Homi Jahangir Babha Scholarship Scheme, HJBSS — 2021-2023
- **Fully Sponsored** by the **Ministry of External Affairs, Government of India with EdCIL** and provided by the Embassy of India, Nepal to study **M.Tech in Computer Engineering** at IIT Hyderabad on the basis of academic qualifications of BTech. **1 (in CSE) of 3 selected out of 10000+** students from entire Nepal per year through embassy screenings and college interviews, and the scholarship is worth **12 lakhs INR (self-sponsored).**

Golden Jubilee Scholarship Scheme (GJSS) — 2016-2020
- **1 of 200 out of 20000+ recipient**s of the prestigious GJS awarded by the **Embassy of India, Nepal** for Nepalese students based on B.Tech academic certifications with a monthly stipend of **NPR 4,000 for four years.**

Fuse Machines Artificial Intelligence Fellowship Program — 2019-2020
- **1 of 15 recipients in 2000+** applications of Micro Degree™ in Artificial Intelligence continued to Micro Degree™ in Machine Learning and Deep Learning, worth **NPR 58,000 each.**
- Selections were based on knowledge in in-person exams, interviews, and coding sessions.

Kathmandu University Merit-based scholarship (2x) — 2016, 2017
- **1 out of 60 students,** awarded for securing the highest SGPA in the Computer Engineering batch in the 2nd and 6th semesters, **each worth NPR 60,000.**

Work Experience

Fusemachines — Kathmandu, Nepal (Jul 2020 - Dec 2021)
Machine Learning and Curriculum Engineer

- Worked on **clients based (US, Germany) and in-house projects** that involved all stages of a**pplied ML, DL, and NLP in real-world data** (from the collection, cleaning, and EDA to model building, deployment, and maintenance).
- Worked as a **lead curriculum engineer** to design, create, review and refine course materials (reading materials, presentation slides, audio transcripts, auto-graded assignments, hands-on implementations, quizzes) for Fusemachines AI Education Programs: **Computer Science for AI**, Micro Degree™ in **Artificial Intelligence, Machine Learning, Deep Learning, and Natural Language Processing, AI for Health, AI for Business and Impact of AI on society.**
- Designed and Developed **a fully automated Video and Text-to-Speech(TTS) Generation System** for Fusestudio(in-house project), which focuses on creating an entire video given Google Slides presentation and audio transcript mimicking how a person presents with the same using Tacotron2, GlowTTs, and MelGAN.
- Remodeled and optimized **Questions Answering and Difficulty Ranking Model along with Content Recommendation System** (in terms of better representations, raking, and recommendations) for quizzes, assignments, and exams using BERT, Ensemble models, Elastic Search, MongoDB, and FastAPI.

Q. I. Roberts Jr-Sr High School & Herald International College — Florida, USA & Kathmandu, Nepal (Jun - Dec 2021)
Computer Science Course Instructor

- Designed, planned, implemented, and instructed **daily lesson plans, coding sessions, and online lectures** for the course "Computer Science for AI" to high school students of US and undergraduate BSc. CSIT final year students of Nepal.
- The class was of **size 60 in Nepal and 18 in the US**
- Received an **overall rating of 4.65/5 from Nepal students** and **4.35/5 from US students**
- The course topics include Introduction to AI, Fundamentals of CS, Python Programming, Scientific Python(Numpy, Pandas and Matplotlib), Data Structure, Database Management, and Web Application Basics.

Position of Responsibility

IT MEET v8.0 Documentation Lead and Marketing Representative — Dhulikhel, Nepal (2020)
Kathmandu University
- **The lead of the documentation team and senior member of the marketing team** of one of Nepal's premier annual IT events, IT Meet v8.0, with **25 different events** and the participation of more than **50 Tech. companies** with internships and full-time career opportunities.
- Directed a team of **25** through multiple documentation stages for sponsorship (proposals, cost analysis,

contracts, MoU) and **collaboration with 10-20 companies** to successfully bring in **8 different companies** with total funding of **NPR 110,000, i.e., 20% of the total funding.**

IT MEET v7.0 Photography Event Organizer
Dhulikhel, Nepal
Kathmandu University
(2019)
- Organized **all Nepal Photography Competition** (open theme), which was judged by the president of Nepal Photography Association (NPA) and the Dean of Engineering at Kathmandu University
- A collective **prize pool of NPR 25,000** was shared among the top 3 winners with scholarships to a photography workshop, 14*20 inch framed winning photos, and cash prizes.

Executive Board Member
Dhulikhel, Nepal
Kathmandu University Computer Club (KUCC)
(2018-2019)
- An active student-run club of the Department of Computer Science and Engineering at Kathmandu University solely responsible for the majority of extracurricular activities like LTSP (Linux Terminal Server Project) and Software Freedom Day.
- Conducted **20+ workshops** (on varied topics) in collaboration with multiple guests from premium companies like **A Yomari Company, Fusemachines, Deerwalk, F1Soft International, MIDAS,** and more every year.

Ambassador
2017
Em-Blood Android Application with Nepal Red Cross Society
- Supervised **a team of ten volunteers among five different teams** in spreading awareness of the need for fresh emergency blood within different blood donation centers, hospitals, universities, schools, and blood banks.
- Involved in creating awareness posters, an **indexable database (using Google Firebase)** for health professionals, and managing help desks in every hospital (in **a distributed network**) that patients can contact in need of fresh blood/ blood donors.

Volunteering
- Worked as a **medical volunteer for first aid** in Inter College Basketball Tournament organized by Kathmandu University Student Welfare Council   2017
- Worked as a volunteer in all **Nepal Counter Strike Competitions at IT MEET 2018,** organized by Kathmandu University Computer Club   2018
- Worked as a volunteer in **Annual General Meeting of Kathmandu University Youth Red Cross Circle (KUYRCC)**

Course Works

B. Tech.
2016-2020
- Machine Learning, Artificial Intelligence, Data Structures and Algorithms, Algorithm and Complexity, Software Engineering, Probability and Statistics, Linear Algebra, Computer Architecture, Operating Systems, Human-Computer Interaction, Digital Signal Processing, Compiler Design, Speech and Language Processing, C, C++

M. Tech.
2021-2023
- Fundamentals of Machine Learning, Natural Language Processing, Information Retrieval, Deep Learning, Computer Vision, Network Security, Computer Networks, Advanced Data Structure and Algorithms

Supplementary
- **Stanford course CS224N**: Natural Language Processing with Deep Learning   2022
- **Hugging Face Course** (Datasets, Dataloaders, Transformers, NLP Tasks)   2022
- **DeepMind x UCL**, Introduction to Reinforcement Learning 2015   2019
- **Technical Writing One,** Google Developers   2019

Publication

Aditi Bagora, **Kamal Shrestha**, Kaushal Kumar Maurya, and Maunendra Sankar Desarkar. 2022. Hostility Detection in Online Hindi-English Code-Mixed Conversations. In Proceedings of 14th ACM Web Science Conference 2022 (WebSci '22). ACM, New York, NY, USA, 11 pages doi: 10.1145/3501247.3531579   June 2020

Shrestha, K. , Poudyal, P. , Karki, J. , Ranabhat, D. (2022). A Machine Learning Approach to Identify Fake News. Center for Project Management and Information Systems (PMIS) Review, 1–13. http://journal.pmis.du.ac.bd/journaldetails.php?pid=2203281648465920   2020

Technical Skills

- **Programming Languages:** Python, C, C++, PHP, HTML, CSS, Bootstrap, SQL
- **Libraries:** Pytorch, Hugging Face Transformers, Scikit-Learn, Keras, Pandas, Numpy, SciPy, Matplotlib, Flask, FastAPI, BeautifulSoup, Docker, Pytest, NLTK, Jupyter, Loguru, Poetry, Commit-Hooks
- **Database:** MySQL, MongoDB, Firebase, Elasticsearch
- **Management:** Git, Github, JIRA, HRM Suite, Trello, Notion, Slack
- **Miscellaneous**: Linux, Bash, Arduino, Anaconda, Latex (Overleaf), MLFlow, Tensorboard, SSH, nbgrader, Wireshark, Visual Studio Code

Projects

Personal Website
- Designed, developed, and hosted a **personal website using Github Pages** for academic and professional updates, including research works, blog posts, curriculum vitae, educational backgrounds, recommendations, gallery, and certifications with the integration of Google Analytics for feed tracking, Disqus for comments and Wistia for video hosting.
- Hosted at shresthakamal.github.io

Natural Language Processing (NLP) Lab of IIT Hyderabad   July, 2022
- Currently working on the design, development, and maintenance of NLP Lab of IITH hosted with Github Pages

Conditional Natural Language Generation (NLG) for Dialog Systems   July 2022
M. Tech. Thesis, supervisor: Dr. Maunendra Sankar Desarkar
- Currently working on generating better representations for in-turn conversational history for a more accurate, diverse, and human-like response in dialogue systems.
- Implemented the TransferTransfo: A transfer learning approach for Neural Network-based Conversational Agents on Persona-chat dataset with training and inference pipeline.
- Worked on finetuning DialoGPT-medium (Toward Human-Quality Conversational Response Generation via Large-Scale Pretraining) from Microsoft Research on the DailyDialog Dataset.

Hostility Detection in Online Hindi-English Code-Mixed Conversations   June 2022
- Proposed a novel hierarchical neural network architecture to identify hostile posts/comments/replies in online Hindi-English Code-Mixed conversations as a part of HASOC'2021
- Adapted multilingual pre-trained models like mBERT, XLMR, and MuRIL to generate contextual representations for natural abstraction and selection of the relevant context by exploiting the hierarchy of the conversations.

Zero Reference Low-Light Image Enhancement with Attention   May, 2022
- A low-light image enhancement task using a deep learning-based Zero-Reference Deep Curve Estimation(ZeroDCE). The idea is to use carefully formulated non-reference loss functions to convert the light enhancement as an image-specific curve estimation task.
- *Draft preparation for a target conference*

Federated Semi-Supervised Medical Image Classification via Inter-Client Relation Matching   April, 2022
- Remodeled and evaluated **medical image classification** with the addition of Self Attention mechanism in every convolutional block: using CBAM to obtain better classification results.
- **Outperformed** the official implementation given a reduced dataset (only 2%) because of computational limitations
- Ranked with the **best Top 2%(A+) of the class** on the basis of two project presentations.

Cracking WPA2-PSK Wi-Fi Passphrase and Defenses   May, 2022
- Focused on **deauthenticating and eavesdropping on the connection between an AP and clients** to capture 4-way handshake messages used to brute force the passphrase using aircrack-ng tools
- Involved complete understanding of handshake protocols, wireless MITM attacks, and understanding potential defenses.

Creating a two-way firewall using raw sockets   May, 2022
- Designed and implemented **a bidirectional firewall system** using raw sockets with extended rules set adaptable for all protocol layers, detection of DDoS attacks, and unbiased performance examination and evaluation

Secure chat communication with Openssl and Man-in-the-middle attacks   April, 2022
- Implemented and demonstrated **a secure peer-to-peer chat application using openssl** along with how evil Trudy(user) cab intercept the chat messages to launch various attacks(Downgrade Attack by rejecting the request for TLS Encryption and MITM attack with two TLS connections at either end and Fake Certificates).

Network Intrusion Detection using Machine Learning Techniques   2022
- A machine learning approach to detect different anomalies and **attacks like DDoS, MITM, Probing attacks, and R2L, in network systems** using classical machine learning techniques like Support Vector Machine, Decision Tree, Random Forest, Naive Bayes, K-Means, and Neural Networks with sampling techniques like SMOTE to report weighted F1 score.

Fuse Studio, Video Automation   2020
- Designed and Developed **a fully automated Video and Text-to-Speech(TTS) Generation System** for Fusestudio (an in-house project), which focuses on creating a complete lecture video with subtitles given google presentations slide and audio text transcript mimicking how a person presents in a virtual presentation.
- The best sounding Mozilla TTS models used were Tacotron2, GlowTTs, and MelGAN with different vocoders.

A Machine Learning Approach to Identify Fake News   June 2020
- Focused on applying NLP sentence classification to generate contextual sentence representations passed over classical machine learning classification heads to predict whether the provided sentence is fake or not with a certain degree of confidence.
- Evaluated using lexical/syntactical/grammatical/factual features based only on raw text and semantic features based on contextual representations with attentive weights.

Implementation of Machine Learning Approach to Detect Click baits in Online News   2020
- Characterization of the raw textual data using multiple hand-crafted attributes combined with the contextual word vector representations and modeled using RNN and LSTM with attention to the classification of clickbait headlines in online news portals.

- Pre-Print published in *Fuse Machines Inc Annual Journal*, 2020

Automatic Obstacle Avoidance Four wheeler   2019
- Designed and created an **obstacle avoidance self-driving car** that uses ultrasonic sound sensors directed motor modules for detection, navigation, and avoidance using Arduino.

Self Diagnosis, Computer-Aided Diagnosis (CAD)   2019
- A computer-aided diagnosis approach **to detect potential diseases based on symptoms.**
- Users were asked a series of dynamic questions (the next question depended on the previous answer) that were converted to a feature set for making inferences.
- Baseline models were Naive Bayes, multi-layered (four) deep neural networks, and Ensemble Techniques like Gradient Boosted Tree(XG-Boost) trained in detecting Tuberculosis and Hepatitis.

Generation of National Flags using GAN   2019
- Scrapped **600 national flags of 60 different countries** to train DC-GAN using Keras API for the generation of unique national flags of our own.

Simulation of the sorting algorithms using OpenGL   2018
- Created a simple desktop application to visualize sorting algorithms like the **Bubble sort, Insertion sort, and Merge Sort** in C++ using SDL/SFML.

RentSpace, a rental solution   2017
- An **android application that acts as a mediator for customers** (Customer to Customer approach) to address the need to rent, lease and sell available spaces like rooms, apartments, lands, hotels, conference halls, etc., online.

Certification	
NVIDIA Deep Learning Institute (DLI)	February - April 2022

- **NVIDIA Deep Learning Institute (DLI)**
  - Fundamentals of Deep Learning,
  - Accelerating Data Engineering Pipelines,
  - Fundamentals of Accelerated Data Science with RAPIDS,
  - Accelerated Computing with CUDA Python,
  - Accelerated Computing with CUDA C/C++
- **AWS Certified Machine Learning – Specialty,** Amazon AWS   August, 2021
- **Complete Google Slides Course**-Create Stunning Slides, Udemy   May, 2021
- **Python for Machine Learning with Numpy, Pandas and Matplotlib**, Udemy   May 2021
- **Machine Learning from Beginner to Advance**, Udemy   June 2021
- **How to win Data Science Competition: Learn from Top Kagglers**, Coursera.   October, 2020
- **Effective Client Communication**, Fusemachines, Nepal   July, 2020

Participation	

- Effective Manuscript Writing, Ethics, and Plagiarism by ACS   July, 2022
- Participation in Online Navachetana Shivir, Psychological Well-Being Session, Art of Living   2021
- Symposium on Artificial Intelligence for Sustainable Development   January, 2020
- Project demonstrator at ICT Startup and Innovation Mela representing Team Madhya for Youtube based Startup   2020
- Online Research Paper Writing Training conducted by NIRC   May, 2020
- 3rd National Workshop on Machine Learning and Data Science   August, 2020
- Webinar on cyber security and cyberspace organized by Oxford Stem, Code For Change   June 2020
- Arduino Workshop, K.U. Robotics Club   April 2018
- Prixa Excellence Award for Project RentSpace, Android Application   June 2017

Extra Curricular Activities	

- First position in Intra College - Xavier's Cup Basketball Tournament (Boys) among seven different teams   2014
- Second Position in All Nepal University Level Basketball Tournament organized by Kathmandu University   2016
- Participation in Madan Bhandari Memorial Cup organized by All Nepal Football Association (ANFA)   2013