Himalaya Sharma

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Education

- **University of Waterloo** — Waterloo, Canada
  Master of Engineering - Electrical & Computer Engineering (Specialization: AI & ML) — *Jan 2022 - Present*
  Relevant Coursework: *Deep Learning, Machine Learning, Statistics for Data Analysis*

Birla Institute of Technology & Science — Goa, India

- *Bachelor of Engineering - Electronics & Communication Engineering* — *Aug 2016 - May 2021*
  Master of Science - Biological Sciences
  Relevant Coursework: *Linear Algebra, Calculus, Probability & Statistics, Digital Signal Processing, Introduction to Bioinformatics*

Experience

- **University of Waterloo**
  Graduate Research Assistant | Advisor - Prof. Zhou Wang — *Sep, 2022 - Present*
  Computer Vision
  - Benchmarked No-Reference IQA (image quality assessment) deep learning models on distorted image databases.
- **Ubiquitous Health Technology Lab - University of Waterloo**
  Data Science Intern | Advisor - Prof. Plinio Morita — *Sep, 2022 - Present*
  Activity recognition
  - Wrangled physiological sensor data and built classification models for activity recognition.
- **Vienna University of Technology & New York University, Abu Dhabi**
  Machine Learning Research Intern | Advisor - Prof. Dr.-Ing Muhammad Shafique — *August, 2020 - May, 2021*
  Machine Learning for healthcare
  - Explored applicability of statistical and machine learning based time-series models for pre-emptive arrhythmia detection using ECG (electrocardiogram) data.
  - Experimented extensively with Temporal Fusion Transformer (TFT), an attention based deep learning forecasting model with variable length multi-step forecast windows.
  - Integrated data generators in the workflow to handle large datasets and experimented with modified loss functions to enhance forecast capability.
  - Evaluated forecast performance of 100+ model variants using visual plots and 3 forecast KPIs - MAPE, MSE and MAE.

Projects

- **Reverse Image Search Engine:** Small-scale clone of Google's search by image [Github]
  - Constructed **content-based image retrieval** system using **VGG-16 deep learning model** and **CIFAR-10** dataset.
  - Trained model (initialized with **ImageNet weights**) for **multi-class classification** and obtained **accuracy** of **89%** on **stratified validation set** and **90%** on **test set**.
  - Utilized network front-end for **feature extraction** and generated **60k** image encodings to compute similarity scores against query image for obtaining **top 5 matches**.

  Tech Stack: *Python, TensorFlow*
- **Jarvis Lite:** Small-scale clone of Iron Man's virtual assistant Jarvis [Github]
  - Recorded **4-second monophonic audio clips (16 kHz)** contaning questions in **wav format** and employed **AssemblyAI's API to generate corresponding speech to text transcripts**.
  - Utilized **OpenAI's API** with a **GPT-3 backend (Davinci variant)** to **produce answers capped at 100 tokens**.

  Tech Stack: *Python, AssemblyAI API, OpenAI API*
- **Elementary Blockchain:** Web application to showcase features of blockchain [Web App] [Github]
  - Employed an **object-oriented approach** to implement a **blockchain model**.
  - Built functionalities to - **view** chain, **mine blocks** (using a simple **proof of work algorithm**), evaluate **validity** and facilitate **tracaebility** of any **illegal modification**.

  Tech Stack: *Python, Flask, HTML, CSS, Heroku*
- **Sensor Data Compression:** Exploration of compression using dimensionality reduction [Video] [Github]
  - Employed **6 feature extraction** and **3 feature selection** techniques on **wearable physiological sensor data**.
  - Achieved **maximum compression** of upto **99.25%** with an **accuracy percentage loss** of only **6.7%**.

  Tech Stack: *Python, Scikit-learn*

Certifications

- **Certified TensorFlow Developer**, by **TensorFlow** | Issued: **27 Aug'22** & Expiry: **27 Aug'25**
- **Certified Cloud Practitioner**, by **Amazon Web Services (AWS)** | Issued: **17 Aug'22** & Expiry: **17 Aug'25**

Skills Summary

- **Tools & Technologies**: Python, R, SQL, Scikit-Learn, TensorFlow, Keras, NumPy, SciPy, Pandas, Matplotlib, Git, AWS
- **Data Science & Machine Learning**: Data Collation & Wrangling, Statistical Analysis, Model Development & Enhancement, Visualization & Interpretation, Clustering, Classification, Regression, Natural Language Processing, Computer Vision