Diwas **Pandey**

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Education

M.S. in Computer Science — *Washington State University*

Salmon Creek, Washington — *08/2022 - 05/2024 (expected)*

- Graduate Teaching Assistant
- Current GPA : 4.00
- **Relevant Courses**: Artificial Intelligence, Machine Learning, Computer Vision, Cloud Computing
- **Thesis** : Bio-Markers on ECG Data

B.E. in Computer Engineering — *Tribhuvan University, Nepal*

Kathmandu, Nepal — *10/2016 - 05/2021*

- Grades:79.09%, Recipient of the Full Scholarship Award
- Major Project - Real-Time Number Plate Recognition System using Computer Vision

Experience

Graduate Research: Thesis (Bio-Markers on ECG Data) — *Washington State University*

Salmon Creek, Washington — *08/2022 - Present*

- Conducted a comprehensive literature review on ECG data analysis techniques and bio-markets identification
- Implemented and optimized R peak detection algorithms for ECG data based on research papers
- Implemented data preprocessing, feature extraction, and statistical analysis on a dataset of ECG recordings
- Utilized machine learning algorithms to identify potential bio-markets based on ECG patterns
- **Ongoing work**: Identifying biomarkers from ECG data using diverse activity datasets (hand-bike, jogging, maths, sitting, walking)

Team Lead, Machine Learning Engineer Level II — *Bottle Technology, Pvt. Ltd.*

Jhamsikhel, Lalitpur Nepal — *11/2020 - 06/2022*

- Developed and implemented a Smart Advertisement system to track and analyze viewership of advertisements by detecting pedestrians and vehicles
- Created a CV-based Face Recognition & Attendance System model using RetinaFace and Raspberry Pi
- Released Nepali to Roman Transliteration PyPI package to the Python community
- Collected and prepared the Citizenship dataset for OCR, including image alignment
- Developed an OCR model for Nepali Citizenship documents with Named Entity Recognition (NER) and implemented it for both Devanagari and English scripts
- Conducted extensive research on OCR tools such as Pytesseract, NanoNets, EasyOCR, AWS Textract, and AWS Rekognition
- Deployed ML models on Docker and EC2 using Flask and FastAPI.
- Successfully mentored and trained interns, enabling their transition into full-time employees while instilling professional characteristics

AWS AI/ML Interestship 2020 — *Genese Cloud Academy*

Kathmandu, Nepal — *08/2020 - 10/2020*

- Acquired proficiency in various AWS services, including EC2, S3, Lambda, Polly, Lex, Boto3, Textract, and Rekognition
- Designed and constructed EC2-based websites, integrating S3 for storage and utilizing relational databases, while implementing load balancing for optimized performance
- Developed web applications for visualizing and predicting Corona cases, and engaged in multiple AI/ML projects using Sagemaker

Founder Admin & Content Writer — *aihubprojects.com*

Kathmandu Nepal — *11/2019 - Present*

- Designed and published a comprehensive book on Machine Learning algorithms and Python, featuring scratch implementations
- Published numerous articles and project tutorials on topics including Machine Learning (ML), Natural Language Processing (NLP), and Computer Vision.
- Collaborated as a technical partner with prestigious institutions such as VIT Vellore India, IIT Bangalore, and various Nepalese colleges

Machine Learning Projects

OCR Implementation on Nepali Citizenship

Tools Used : Python, OpenCV, NER Spacy

- Collected and enhanced Nepali Citizenship data, resulting in a high-quality dataset comprising over 20,000 records
- Conducted image alignment to assess and correct skewness and rotation
- Extracted text from backside of citizenship using EasyOCR and mapped information to entities with NER Spacy
- Employed a custom-trained OCR model to extract text in Devanagari script
- Developed a rule-based transliteration PyPI package for romanizing Devanagari script
- Designed a Flask API for the OCR and Transliteration modules and deployed it on EC2 and Docker

River Network Extraction From Satellite Images

Tools Used : Python, OpenCV, U-Net, Attention U-Net, Encoder-Decoder

- Collected, enhanced, and augmented a dataset of over 18,000 satellite images
- Trained and compared performance on U-Net and Attention U-Net networks to obtain binary masks of water surfaces.
- The application of an advanced augmented dataset with Attention U-Net resulted in superior results compared to existing methodologies.

Fake License Plate Generation

Tools Used : Pyhton, OpenCV, GAN

- Utilized computer graphic scripts and Generative Adversarial Networks (GANs) to generate and augment a substantial number of annotated, synthesized license plate images
- Successfully mixed the generated and augmented data, using it as training data for the license plate recognition network

Real Time Number Plate Recognition System

Tools Used :

- YOLO for vehicle detection and ROI techniques to crop License Plate region
- Implemented Mean-SD algorithm to segment License Plate Characters
- Trained a model on Keras to predict and classify the segmented character
- Collected over 10k training and test dataset by cropping the image of vehicles and license plates

Blood Cancer Detection Using CNN

Tools Used: Python, OpenCV, Pytorch

- Designed convolution network that inputs a blood cell images and outputs whether the cell is infected with cancer
- Developed the model with precision score of 0.75 and accuracy score of 0.78

Diabetes Prediction using K-means

Tools Used : Pandas, Numpy, Scikit-learn, Scipy, Matplotlib, Seaborn

- Created & published tutorials on website with Flask implementation implemented on Heroku

Skills

Programming	Python, C++
AI Tools	Scikit-learn, OpenCV, PyTorch, Plotly, Numpy, Pandas, Matplotlib
Skilled in	Computer Vision, Convolutional Neural Network(CNN), Machine Learning Algorithms
AWS Services	EC2, S3, Sagemaker, AWS Rekognition, AWS Lambda
IDE	Visual Studio, Jupyter Notebook, Google Colab, Sagemaker
Back-end	Flask API, FAST API
Software/Tools	Ubuntu 20.04, Windows 11, Git, Heroku, WordPress
Languages	English, Nepali, Hindi
Package Released	Nepali-to-Roman PyPI package

Presentation & Publication

Poster Presentation : Real Time Number Plate Recognition System *Kathmandu, Nepal*

ACEM SET Conference 2020 *03/2020*

- Introduced the concept of Real Time Number plate recognition system and it's usefulness in context of Nepal
- Conducted brief meeting with stakeholders & Traffic Management team of Nepal on it's implementation

Kindle Publication : Ultimate Guide to Python Basics *Kathmandu, Nepal*

Amazon Kindle *05/2020*

- Published a book on Ultimate Guide to Python Basics Kindle Edition