Hewan Shrestha

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Education

April 2023 – Present | **M.Sc. Visual Computing , Saarland Informatics Campus, Saarland University, Germany**
- GPA : 1.9
- Thesis : Towards Multimodal Misinformation Detection in Nepali Social Spaces *(in progress)*
- Supervisors : **Prof. Dr. Dietrich Klakow** and **Dr. Usman Naseem**
- Relevant Courses :

High-Level Computer Vision | 3D Computer Vision | Image Acquisition Methods | Data Science

August 2018 – June 2022 | **B.Tech in Computer Science & Engineering, Madanapalle Institute of Technology & Science, India**
- GPA : 9.12/10
- Thesis : Deep Learning based Detector for Face Mask Recognition
- Supervisors : Dr. R. Anandkumar and Ms. Swati Megha
- Relevant Courses :

Data Structures | Design & Analysis of Algorithms | Database Management Systems | Software Engineering

June 2016 – June 2018 | **High School, Satyawati Secondary School, Nepal**
- GPA : 3.43/4

Research Interests

Computer Vision : Self-supervised learning, Vision-language models, Transfer learning
Multimodal Analysis : Multimodal fusion, Out-of-context image-text analysis
Social Computing : Misinformation propagation, AI for underrepresented languages

Research Experience

May 2023 – Present | **Graduate Research Assistant, Interdisciplinary Institute for Societal Computing (I2SC), Germany**
- Working on detecting mobility patterns in conflict-affect regions from low-resolution satellite images provided by PlanetScope
- Built a pipeline to automate the satellite image data collection and pre-process from PlanetScope using Open Street Map(OSM)
- Built a pipeline to scrape Google Maps Popular Times to create annotations for parking occupancy of satellite images
- Currently working on making the Google Maps Scraper pipeline efficient and scalable

Python | APIs | OSMNX | bash | Planet

February 2022 – April 2022 | **Research Intern, Innopolis University, Russia**
- Built a custom face-mask detector using a COVID-19 face-mask dataset
- Compared and analysed detection and tracking results using one-stage and two-stage algorithms on face-mask dataset

Python | PyTorch

March 2020 – July 2021 | **Undergraduate Research Assistant, Madanapalle Institute of Technology & Science, India**
- Built a classifier to detect sentiment analysis of Hindi script
- Built a pipeline to segment and detect dermatoscopic images using transfer learning
- Processed brain tumor MRI images with image segmentation and deep convolution neural network for melanoma detection
- Conducted literature survey related to edge-computing paradigms

Python | PyTorch | scikit-learn | LaTeX

Publications

Workshop Papers

Angela John, Theophilus Aidoo, Hamayoon Behmanush, Irem B. Gunduz, **Hewan Shrestha**, Maxx Richard Rahman, Wolfgang Maaß "LLMRS : Unlocking Potentials of LLM-Based Recommender Systems for Software Purchase" in *Proceedings of 33rd Annual Workshop on Information Technologies and Systems*, 2023.

Conference Papers

Hewan Shrestha, Swati Megha, Subham Chakraborty, Manuel Mazzara, Iouri Kotorov "Face Mask Recognition Based on Two-Stage Detector" in *Proceedings of International Conference on Intelligent Systems Design and Applications*, 2022.

Hewan Shrestha, Chandramohan Dhasarathan, Manish Kumar, R. Nidhya, Achyut Shankar, Manoj Kumar "A Deep Learning Based Convolution Neural Network-DCNN Approach to Detect Brain Tumor" in *Proceedings of Academia-Industry Consortium for Data Science*, 2020.

Journal Papers

Hewan Shrestha, Chandramohan Dhasarathan, Shanmugam Munisamy, Amudhavel Jayavel "Natural Language Processing Based Sentimental Analysis of Hindi (SAH) Script an Optimization Approach" in *International Journal of Speech Technology*, 2020.

Hewan Shrestha, Subash Chandra Bose Jaganathan, Chandramohan Dhasarathan, Kannadhasan Suriyan "Detection and classification of dermatoscopic images using segmentation and transfer learning" in *Multimedia Tools and Applications*, 2023.

Book Chapters

Sana Sodanapalli, **Hewan Shrestha**, Chandramohan Dhasarathan, Puviyarasi T., and Sam Goundar "Recent Advances in Edge Computing Paradigms : Taxonomy Benchmarks and Standards for Unconventional Computing" in *Research Anthology on Edge Computing Protocols, Applications, and Integration*, 2022.

Projects

Self-Supervision in Time for Satellite Images (S3-TSS) — July 2023

github.com/hewanshrestha/S3-TSS Project Paper

Proposed S3-TSS, a self-supervised learning method for remote sensing that leverages temporal data for natural augmentation, addressing the lack of labeled data. Unlike traditional pretext tasks, S3-TSS outperforms the SeCo baseline across four datasets, demonstrating its effectiveness for satellite imagery.

Docker | Python | PyTorch | git | LaTeX

LLMRS : Unlocking Potentials of LLM-Based Recommender Systems for Software Purchase — July 2023

github.com/igunduz/LLMRS

Employing these models to capture user preferences and efficiency remains an open question. In this paper, we propose LLMRS, an LLM-based zero-shot recommender system where we employ pre-trained LLM to encode user reviews into a review score and generate user- tailored recommendations. We experimented with LLMRS on a real-world dataset, the Amazon product reviews, for software purchase use cases. The results show that LLMRS outperforms the ranking-based baseline model while successfully capturing meaningful information from product reviews, thereby providing more reliable recommendations.

Python | Pandas | scikit-learn | Transformers | NLTK

Structure from Motion — February 2024

github.com/nis-ane/Structure-From-motion Project Report

This project implements a Structure from Motion (SfM) pipeline from scratch, which reconstructs 3D scenes from a set of 2D images. The pipeline processes the input images to estimate the camera poses for each frame and generates a sparse 3D point cloud of the scene. Key steps include feature detection and matching, camera pose estimation, triangulation, and bundle adjustment to optimize the 3D structure and camera parameters. The implementation demonstrates a fundamental understanding of computer vision techniques and provides a robust framework for 3D reconstruction tasks.

Python | OpenCV | Matplotlib | Numpy | git | LaTeX

Competencies

Languages	Python, HTML5, CSS
Libraries & Frameworks	PyTorch, PyTorch-Lightning, Hydra, Weights&Biases, scikit-learn, Numpy, Pandas, Matplotlib
Data & GIS Tools	OpenCV, GeoPandas, OSMNX
Essentials	Docker, git, Condor, bash scripting
Operating Systems	Ubuntu, Windows, Mac OSX
Miscellaneous	LaTeX, Microsoft Office

Languages

Nepali	Native
English	C1 (IELTS : 7.5)
Hindi	Fluent
German	A1

Outreach and Volunteering

2021-Present	Reviewer - The Journal of Supercomputing
2018-2020	Student Volunteer - National Service Scheme
2016-2017	Treasurer - Newa Cultural Society
2014-2016	Junior Scout - Nepal Scouts

References

Prof. Dr. Ingmar Weber
Alexander von Humboldt Professor for AI
Saarland University, Germany
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Dr. Till Koebe
Postdoctoral Researcher
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Dr. Chandramohan Dhasarathan
Assistant Professor
Thapar Institute of Engineering & Technology, India
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