Keshav Bhandari, Ph.D.

Computer Vision | Deep Learning | Data Science | Software Engineering

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Experience

Aug 2018–Aug 2022
Doctoral Teaching/Research Assistant., TEXAS STATE UNIVERSITY., San Marcos, TX, USA.
- Facilitate tutorial; hold weekly office hours; grading
- Research in computer vision (360 video analysis, optical flow, action/activity classification)

June 2021–August 2021
Embedded ML Engineer Intern., CADENCE DESIGN SYSTEMS, INC., San Jose, CA, USA.
- Evaluate latest neural network architectures (CNN/RNN/MLP/GAN) on Xtensa Neural Network Compiler.
- Determine functional/performance gaps in current solutions
- Pruning, Quantization and Model Optimization

August 2016–April 2018
Data Scientist, KANTIPUR MEDIA GROUP (KDC), Thapathali, Kathmandu, Nepal.
User acquisition and retention, News Recommendation Engine, Search engine optimization, Internal analysis and reporting tools, Smart cropping, caption generation, sentiment analysis, news neutrality and retrieval,Data analysis, processing, visualization and data product development

Education

August 2018–August 2022 (expected)
Texas State University, San Marcos, TX 78666, USA,
Computer Science, Ph.D.
Thesis: Motion understanding in 360° videos.

2012–2016
Tribhuvan University, Kathmandu, Nepal,
Computer Science, BSc in CS and IT.

Skills

Languages — Python, C/C++, SQL, JS, Cuda, OpenMP, Shell

Domain — Deep Learning, Computer Vision, Object Detection, Segmentation, Action/Activity Recognition, Motion Estimation, Signal Processing, VAE

Frameworks — PyTorch, Keras, Tensorflow, Numpy, Scipy, Pillow, OpenCV, Scikit-Learn, Scikit-Image, Matplotlib, Matlab

Utilities — Anaconda, Git, VS Code, PyCharm, Jupyter Notebook, Blender

Communication — English, Hindi, Nepali

Publications

2020 — **EGOK360: A 360 Egocentric Kinetic Human Activity Video Dataset**, *ICIP 2020, UAE*,
K. Bhandari, M. A. DeLaGarza, Z. Zong, H. Latapie and Y. Yan,
https://ieeexplore.ieee.org/document/9191256.
- *EgoK360 is the first dataset in the domain of first-person activity recognition with a 360° environmental setup, which will facilitate the egocentric 360° video understanding.*

2020 — **Revisiting Optical Flow Estimation in 360 Videos**, *ICPR 2020, Italy*,
K. Bhandari, Z. Zong and Y. Yan,
https://arxiv.org/abs/2010.08045.
- *Novel LiteFlowNet360 architecture for 360 videos optical flow estimation designed as a domain adaptation framework from perspective video domain to 360 video domain.*

2022 — **Learning Omnidirectional Flow in 360° Video via Siamese Representation**, *ECCV 2022*,
K. Bhandari, Z. Zong and Y. Yan.
- *Exploiting equivariance properties of 360° videos for learning omnidirectional flow via siamese representation. This paper also proposed a novel synthetically naturalistic omnidirectional optical flow dataset.*

2022 **VIT360: Egocentric Activity Recognition via Siamese Representation Learning in 360° Videos**,
NeurIPS 2022,

K. Bhandari, Z. Zong and Y. Yan,

Under Review.

○ *Exploiting equivariance properties of 360° videos for egocentric activity recognition.*

Projects

2015 **Wiki-Retrieval: Applying Data Science for Document Retrieval from Wikipedia Using K-NN**,
Tribhuvan University, Nepal.

Summary: Document retrieval tools for Wikipedia people data
Tools: Python, Numpy, Pandas, SciPy, Matplotlib, R

2017 **KDC-AI Research Tools:Internship**, *Kantipur Media Group (KDC), Nepal*.

Summary: Word-embeddings modeling for Nepali language.
Tools: Python, Pydata-Stack(Numpy, Pandas, SciPy, Matplotlib, StatsModel), R, Tensorflow, SQL

2019 **Weighted Embedding Based News Retrieval**, *Texas State University, TX, USA*,

https://github.com/keshavsbhandari/Weighted-Embedding-Based-News-Retrieval.

Summary: News retrieval based on nearest neighbour using tf-idf weighted embedding distances.
Tools: Python, Pydata-Stack(Numpy, Pandas, SciPy, Matplotlib)

2021 **360-Projector**, *Texas State University, TX, USA*,

https://github.com/keshavsbhandari/360projector.

Summary: Spherical Convolution by mapping convolution in multiple tangential planes for equirectangular images.
Tools: Python, Numpy, Pillow, Pytorch, CUDA

2021 **Anticipating microchaos in human postural balance**, *Texas State University, TX, USA*,

https://userweb.cs.txstate.edu/~k_b459/chaos.pdf.

Summary: A deep learning based approach for micro chaos anticipation on human postural data from stick balancing task.
Tools: Python, Numpy, Tensorflow2.x, CUDA, Matlab, LSTM, RNN, Signal Processing

Relevant Courses

CS7313: Machine Learning & Pattern Recognition.

○ Advanced theoretical and practical skills to learn, design, implement, and apply machine learning and pattern recognition approaches.

CS7332: Advanced Parallel Computating.

○ Advanced design of parallel algorithms, performance modeling, parallel hardware, language support for parallel programming, and programming models for shared and distributed-memory systems.

CS7312: Advanced Data Mining.

○ In-depth coverage of advanced data mining and information retrieval principles and techniques.

CS7323: Image Processing and Computer Vision.

○ Fundamentals and advanced topics of image processing and principles of computer vision including image formation, acquisition, filtering, segmentation, and several image processing techniques.

CS7311: Data Driven Computation and Methodologies.

○ Computational and statistical methods for using large-scale data sets ('big data') to answer scientific and business questions. Understanding modern software tools such as Spark and Hadoop.

CS7331: High Performance Computing.

○ Advanced design, analysis, and optimization of HPC applications. Topics include high-performance computer architectures, including accelerators and systems-on-chip, performance modeling and benchmarking, and related HPC applications.

Awards

2021   **Computer Science Graduate Academic Excellence Award**, *Texas State University, TX, USA.*

2022   **Computer Science Graduate Academic Excellence Award**, *Texas State University, TX, USA.*

2022   **Computer Science Graduate Research Excellence Award**, *Texas State University, TX, USA.*

Certifications

2018   **Improving Deep Neural Networks: Hyper-parameter tuning, Regularization and Optimization**,
Coursera: https://coursera.org/share/94e7b7b858876170420ef008bd718e8f.

2018   **Neural Networks and Deep Learning**,
Coursera: https://coursera.org/share/16a2790e7e026f37eae1097ffbd1d131.

2016   **R Programming**,
Coursera: https://coursera.org/share/12bcdb071d38362ee92300e715c937e8.

2016   **The Data Scientist's Toolbox**,
Coursera: https://coursera.org/share/9b950e120bd6c94a4f7e83888780c660.

2016   **Machine Learning Foundations**,
Coursera: https://coursera.org/share/59635ee48ee82b4f0f97f834beb61b85,
Coursera: https://coursera.org/share/5de30459975aca7d5ebbd2d295d7b462.

2015   **Introduction to Big Data**,
Coursera: https://coursera.org/share/be515752ff8f97d0b3b2dd72f2edb6cb.

References

Yan, Yan, *yyan34@iit.edu,*
Assistant Professor, Illinois Institute of Technology.

Zong, Ziliang, *ziliang@txstate.edu,*
Associate Professor, Computer Science, Texas State.

Ngu, Anne Hee Hiong, *angu@txstate.edu,*
Professor, Computer Science, Texas State.