1101 LEAH AVE, APT 1116
SAN MARCOS, TX 78666, USA
(+1) 512 214 2063
keshav.bhandari@txstate.edu
GitHub: keshavsbhandari
LinkedIn: keshav-bhandari

Keshav Bhandari, Ph.D.

Computer Vision | Machine Learning | Data Science

Summary

My expertise in Artificial Intelligence (AI), particularly in the fields of computer vision and deep learning, supported by extensive research and industry experience, positions me to develop advanced fall detection systems for enhancing patient safety in U.S. healthcare. This endeavor not only improves individual lives but also serves the national interest by reducing healthcare costs and improving the overall safety and well-being of vulnerable populations across the country.

Education

August 2018–August 2022 **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.

Experience

Sep 2023-Present **Assistant Professor of Instruction (Sep 2024 - Present)**
Lecturer(Sep 2023 – Aug 2024), *Department of Computer Science,* Texas State University, San Marcos, TX, USA.

Conduct research in the area of artificial intelligence, focusing on computer vision. Investigate and develop state-of-the-art computer vision technologies suitable for fall detection systems in healthcare to improve patient safety, particularly for the elderly and individuals with mobility issues. Detailed duties include teaching, advising student research, conducting independent and collaborative research, publishing findings at conferences, and reviewing scholarly journals. Tools/equipment used include important computer vision libraries and languages such as OpenCV, TensorFlow, PyTorch, Python, and other scientific computation software and platforms.

Aug 2022–July 2023 **Sr. Data Engineer**, Tesla Inc., Palo Alto, CA, USA.
Conduct research and development in the area of data analytics, focusing on the development of a performance measurement pipeline for large-scale automotive fleets. Investigate and create advanced pipelines for collecting extensive fleet data and training machine learning models to address multiple automotive issues. Detailed duties include building and refining AI models to enhance performance and efficiency across various projects. Tools/equipment used include data processing and machine learning frameworks such as Python, pandas, Scikit-learn, TensorFlow, and PyTorch, as well as big data and visualization tools like Hadoop, PySpark, Scala, Bokeh, and Flask.

Sep 2018–July 2022 **Doctoral Research/Teaching/Instructional Assistant**, Texas State University, San Marcos, TX, USA.
Conduct research in the area of computer vision, focusing on understanding motion in 360-degree videos. Investigate and develop AI models and innovative algorithms to address the challenges of spherical video data. Detailed duties include continuing PhD research, developing and validating models, and publishing findings in peer-reviewed journals. Tools/equipment used include specialized software such as PyTorch, TensorFlow, Python, CUDA, and other scientific computation tools. Additionally, grade programming assignments, assist with teaching labs and machine learning classes, and provide technical support and tutoring to undergraduate students.

June 2021–August 2021 **Embedded ML Engineer Intern**, Cadence Design Systems, San Jose, CA, USA.
Conduct research and development in the area of neural network architectures, focusing on the evaluation of CNNs, RNNs, MLPs, and GANs on the Xtensa Neural Network Compiler. Investigate functional and performance gaps between existing solutions and the Xtensa platform, with a focus on pruning, quantization, and model optimization. Detailed duties include analyzing neural network performance, identifying areas for improvement, and optimizing models to enhance efficiency. Tools/equipment used include the Xtensa Neural Network Compiler and various neural network frameworks.

August 2016–April 2018 **Data Scientist**, Kantipur Media Group (KDC), Central Business Park, Thapathali Road, Kathmandu 44600, Nepal.
Conduct research and development in the area of news recommendation systems. Investigate methods for data analysis, processing, and visualization to improve the effectiveness and fairness of news recommendations. Detailed duties include developing and refining data products, analyzing sentiment, ensuring news neutrality, and creating visualizations to support data-driven decisions. Tools/equipment used includes data analysis software such as Python, pandas, scikit-learn, TensorFlow, PyTorch, Matplotlib, and D3.js.

Publications

2024 **Pole balancing on the fingertip: Model-motivated machine learning forecasting of falls**, *Frontiers*,
M Debnath, J Chang, K Bhandari, DJ Nagy, T Insperger, JG Milton, and HH Ngu Anne.
https://digital.library.txstate.edu/handle/10877/16085

2022 **Motion and activity understanding in 360° videos: An egocentric perspective**, *Texas State University, San Marcos, Texas*,
K. Bhandari, Ph.D. Dissertation.
https://digital.library.txstate.edu/handle/10877/16085

2022 **Learning Omnidirectional Flow in 360° Video via Siamese Representation**, *ECCV 2022*,
K. Bhandari, Z. Zong and Y. Yan,
https://www.ecva.net/papers/eccv_2022/papers_ECCV/papers/136680546.pdf.

- *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.*

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.*

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.*

Projects

2022 **VIT360: Egocentric Activity Recognition via Siamese Representation Learning in 360° Videos**,
K. Bhandari, Z. Zong and Y. Yan.

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

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

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

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)

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

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

Skills

Languages: Python, SQL, PySpark, CUDA

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

Frameworks	PyTorch, Keras, Tensorflow, PySpark, Numpy, Scipy, Pillow, OpenCV, Scikit-Learn, Scikit-Image, Matplotlib, Bokeh, Holoviz
Utilities	Anaconda, Git, Jupyter Notebook
Communication	English, Hindi, Nepali

Awards

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

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

2021 **Computer Science Graduate Academic 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*.

Service

2024 **EXPAND-AI (NSF Award No.:2334268)**, *Expand AI is an NSF-funded initiative to support Expanding AI Innovation through Capacity Building and Partnerships (ExpandAI). This project focuses on establishing and growing AI-related activities at Texas State University.*.

2024 **Reivewer for ACM MM 2024**.

2024 **Springer Nature: Machine Vision and Applications**.

2024 **Image and Vision Computing(IMAVIS)**.

2024 **Computer Vision and Image Understanding(CVIU)**.

2024 **Neurocomputing(NEUCOM)**.

2021 **Reivewer for EPIC ICCV Workshop**.

References

Dr. Yan, Yan, *yyan34@iit.edu*,
Gladwin Development Chair, Assistant Professor, Department of Computer Science, Illinois Institute of Technology, Chicago, IL.

Dr. Ngu, Anne Hee Hiong, *angu@txstate.edu*,
Professor, Computer Science, Texas State University, San Marcos, TX.

Dr. Christian Richardt , *christian@richardt.name*,
Research Scientist Lead at the Codec Avatars Lab, Meta Platforms Inc., Pittsburgh, PA, USA.

Dr. Nicu Sebe , *niculae.sebe@unitn.it*,
Full Professor, Leader of Multimedia and Human Understanding Group (MHUG), University of Trento, Italy.