Subarna Tripathi

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I lead the Visual Algorithms Research team with a focus on long-term video understanding and generation, structured and multimodal learning at Intel AI Lab. My additional responsibilities include helping in strategizing and looking over Intel's global university investments in AI.

Education

2013–2018 **PhD, Electrical and Computer Engineering**, *University of California San Diego*, USA.

Dissertation **Improving Object Detection and Segmentation by Utilizing Context**

2007–2011 **MS Research, Electrical Engineering**, *Indian Institute of Technology, Delhi*, India.

2001–2005 **BTech, Computer Science and Engineering**, *West Bengal University of Technology*, India.

Professional & Research Experiences

May 2018 – present **Research Scientist/Manager**, Visual Algo research @Intel Labs.
Structured video and multimodal representation learning.

Jun 2013 – Mar 2018 **Graduate Research Assistant**, UC San Diego.
Improving Object Detection and Segmentation by utilizing contexts.

Sept 2016– to Dec 2016 **Research Intern**, Qualcomm Multimedia R&D, San Diego, USA.
A low-complexity Object-Detection model using Deep CNN with TensorFlow-Slim

Jun 2016– to Sept 2016 **Research Intern**, Google Research and Machine Intelligence, Seattle, USA.
Person instance segmentation with human pose using Deep CNN with TF-Slim. Follow-up work used in **Portrait Mode** of Pixel Phones

Jun 2015 – Sept 2015 **Research Intern**, Microsoft Research, Redmond, USA.
Self-calibrating eye-gaze tracking for head mounted virtual reality systems.

May 2006 – Oct 2012 **Technical Leader**, STMicroelectronics, Noida and Bangalore, India.
Computer Vision, Stereo Vision, Machine Learning, Object Tracking, Video Compression - applied research projects in the Advanced System Technology (AST) group.

Jul 2005 – May 2006 **Member of Technical Staff**, Interra Systems, Noida, India.
I developed TraceViewer, MP4/3GPP analyzer for Interra's *Vega* Video Analyzer.

Selected Publications

Papers **Remark**, *For full paper list see:*, Google Scholar Profile.

[37] **Ego-VPA: Egocentric Video Understanding with Parameter-efficient Adaptation**, *Tz-Ying Wu, Kyle Min, Subarna Tripathi, and Nuno Vasconcelos*, under review, 2024.

[36] **3-series Blog on Long-Form Video Representation Learning Towards Data Science Blog** , *Subarna Tripathi*, 2024.

[35] **LAVITI- Constrative Language-Video-Time Pretraining**, *Hengyue Liu, Kyle Min, Hector A Valdez, Subarna Tripathi*, under review, 2024.

[34] **SViTT-Ego: A Sparse Video-Text Transformer for Egocentric Video**, *Hector A Valdez, Kyle Min, and Subarna Tripathi*, under review, 2024.

[33] **VideoSAGE: Video Summarization with Graph Representation Learning**, *JM Rojas Chaves, and Subarna Tripathi*, CVPRW, 2024.

[32] **Action Scene Graphs for Long-Form Understanding of Egocentric Videos**, *Ivan Rodin*, Kyle Min*, Antonino Furnari*, Subarna Tripathi, and Giovanni Maria Farinella*, CVPR 2024.

[31] **Unbiased video scene graph generation**, *Sayak Nag, Kyle Min, Subarna Tripathi, Amit K. Roy-Chowdhury*, CVPR 2023.

[30] **SViTT: Temporal Learning of Sparse Video-Text Transformer**, *Yi Li, Kyle Min, Subarna Tripathi, Nuno Vasconcelos*, CVPR 2023.

[29] **Single-Stage Visual Relationship Learning using Conditional Queries**, *Alakh Desai, Tz-Ying Wu, Subarna Tripathi, Nuno Vasconcelos*, NeurIPS, 2022.

[28] **Learning Long-Term Spatial-Temporal Graphs for Active Speaker Detection**, *Kyle Min*, Sourya Roy*, Subarna Tripathi, Tanaya Guha, and Somdeb Majumdar*, ECCV 2022.

[27] **Text Spotting Transformers**, *Xiang Zhang, Yongwen Su, Subarna Tripathi and Zhuowen Tu*, CVPR, 2022.

[26] **Joint Hand Motion and Interaction Hotspots Prediction from Egocentric Videos**, *Shaowei Liu, Subarna Tripathi, Somdeb Majumdar, Xiaolong Wang*, CVPR, 2022.

[25] **Exploiting Long-Term Dependencies for Generating Dynamic Scene Graphs**, *Shengyu Feng, Subarna Tripathi, Hesham Mostafa, Marcel Nassar, Somdeb Majumdar*, WACV 2023.

[24] **Towards Single Image Panoptic 3D Parsing in the Wild**, *Sainan Liu, Vincent Nguyen, Yuan Gao, Subarna Tripathi, Zhuowen Tu*, arXiv preprint, arXiv:2021.

[23] **Self-Supervision for Scene Graph Embeddings**, *Brigit Schroeder, Adam Smith, Subarna Tripathi*, WiML at NeurIPS, 2021.

[22] **In Defense of Scene Graphs for Image Captioning**, *Kien Nguyen*, Subarna Tripathi*, Tanaya Guha, Bang Du, Truong Nguyen*, ICCV 2021.

[21] **Learning of Visual Relations: The Devil is in the Tails**, *Alakh Desai*, Tz-Ying Wu*, Subarna Tripathi, Nuno Vasconcelos*, ICCV 2021.

[20] **Dynamic Emotion Modeling with Learnable Graphs and Graph Inception Network**, *Amir Shirian, Subarna Tripathi, Tanaya Guha*, IEEE Trans on Multimedia, 2021.

[19] **Structured-Query based Image Retrieval Using Scene Graphs**, *Brigit Schroeder, Subarna Tripathi*, CVPR workshop DIRA, 2020.

[18] **Generating Images in Compressed Domain using Generative Adversarial Networks**, *B. Kang, S. Tripathi, and T. Nguyen*, IEEE Access, 2020.

[17] **Layout Compositions from Attributed Scene Graphs**, *Subarna Tripathi, and Anahita Bhiwandiwalla*, NeurIPS workshop (WiML), 2019.

[16] **Triplet-Aware Scene Graph Embedding**, *Brigit Schroeder, Subarna Tripathi, and Hanlin Tang*, ICCV workshop (SGRL), 2019.

[15] **Heuristics for Image Generation from Scene Graphs**, *Subarna Tripathi, Anahita Bhiwandiwalla, Alexei Bastidas, and Hanlin Tang*, ICLR workshop (LLD), 2019.

[14] **Compact scene graphs for layout composition and patch retrieval**, *Subarna Tripathi, Sharath Nittur Sridhar, Sundaresan and Hanlin Tang*, CVPRW (CEFRL), 2019.

[13] **Using Scene Graph Context to Improve Image Generation**, *Subarna Tripathi, Anahita Bhiwandiwalla, Alexei Bastidas, and Hanlin Tang*, CVPRW (WiCV), 2019.

[12] **PartNet: A Large-scale Benchmark for Fine-grained and Hierarchical Part-level 3D Object Understanding**, *Kaichun Mo, Shilin Zu, Angel X. Chang, Li Yi, Subarna Tripathi, Leonidas J. Guibas, Hao Su*, CVPR, 2019.

[11] **Pose2Instance: Harnessing Keypoints for Person Instance Segmentation**, *S. Tripathi, M. Collins, M. Brown, and S. Belongie*, arXiv preprint arXiv:1704.01152.

[10] **Correction by Projection: Denoising Images by Inferring Latent Vectors from Generative Adversarial Networks**, *S. Tripathi, Z.C. Lipton, and T. Nguyen*, arXiv preprint arXiv:1803.04477.

[9] **LCDet: Low-Complexity Fully-Convolutional Neural Networks for Object Detection in Embedded Systems**, *S. Tripathi, G. Dane, B. Kang, V. Bhaskaran, and T. Nguyen*, CVPRW, 2017.

[8] **Low-Complexity Object Detection with Deep Convolutional Neural Network for Embedded Systems**, *S. Tripathi, B. Kang, G. Dane, and T. Nguyen*, SPIE, 2017.

[7] **Precise Recovery of Latent Vectors from Generative Adversarial Networks**, *Z.C. Lipton, and S. Tripathi*, ICLR 2017, Workshop track.

[6] **A Statistical Approach to Continuous Self-Calibrating Eye Gaze Tracking for Head-Mounted Virtual Reality Systems**, *S. Tripathi, and B. Guenter*, WACV 2017, (**The Best Paper Award**).

[5] **Context Matters: Refining Object Detection in Video with Recurrent Neural Networks**, *S. Tripathi, Z. Lipton, S. Belongie, and T. Nguyen*, BMVC, 2016.

[4] **Detecting Temporally Consistent Objects in Videos through Object Class Label Propagation**, *S. Tripathi, S. Belongie, Y. Hwang, and T. Nguyen*, WACV, 2016.

[3] **Semantic Video Segmentation : Exploring Inference Efficiency**, *S. Tripathi, S. Belongie, Y. Hwang, and T. Nguyen*, IEEE ISOCC, 2015.

[2] **Real-time Sign Language Fingerspelling Recognition using Convolutional Neural Networks from Depth map**, *B. Kang, S. Tripathi, and T. Nguyen*, ACPR, 2015.

[1] **Improving Streaming Video Segmentation with Early and Mid-Level Visual Processing**, *S. Tripathi, Y. Hwang, S. Belongie, and T. Nguyen*, WACV, 2014.

Patents [8] **Long duration structured video action segmentation**, *AD Rhodes, B Min, S Tripathi, G Raffa, S Biswas* , US Patent App. 18/459,824.

[7] **Moving object detection and classification image analysis methods and systems**, *S. Tripathi, K Chen, T Nguyen, and Y Hwang*, US Patent App. 15/872,378.

[6] **Method for Detecting a Straight Line in a Digital Image**, *L. Magri, B. Rossi, S. Tripathi, P. Fragneto and E. Piccinelli*, US 9,245,200 B2, Grant.

[5] **GOP-Independent Dynamic Transcoder Bitrate Controller**, *S. Tripathi, and E. Piccinelli*, US 8,913,658 B2, Grant.

[4] **Advance video coding with perceptual quality scalability for regions of interest**, *S. Chaudhury, S. Tripathi, and M. Mathur*, US 9,626,769 B2, Grant.

[3] **Object Tracking**, *S. Chaudhury, S. Tripathi, and S. Dutta Roy*, US 10178396 B2, Grant.

[2] **System and method for object based parametric video coding**, *S. chaudhury, M. Mathur, A. Khandelia, S. Tripathi, B. Lall, S. Dutta Roy, and S. Gorecha*, US 8,848,802 B2, Grant.

[1] **A Method and System for Determining A Macroblock Partition For Data Transcoding**, *S. Tripathi, K. Saha and E. Piccinelli*, US 9,197,903 B2, Grant.

Book Chapter **Animation and Flash Overview**, *Computer Graphics Multimedia and Animation*, Dr. Malay Pakhira, Prentice Hall of India.

Professional Activities

SRC Services Intel's Center Lead Liaison for JUMP2.0 COCOSYS, The AI Hardware Technical Advisory Board (TAB) member since 2023.

Co-organizer CVPR'20 workshop Diagram Image Retrieval and Analysis (DIRA): Representation, Learning, and Similarity Metrics;

Co-leader WiML unworkshop@ICML'21 Connecting Novel Perspectives of GNNs: A Cross-domain Overview;

Guest speaker Deep Learning course @University of Catania (2022, 2023, 2024)

Mentoring session WiCV@CVPR'21, WiML@NeurIPS'21, UCSD ECE AMP 2020-2022

PC member/ Reviewer CVPR, ICCV, ECCV, ACCV, SIGGRAPH, WACV, AAAI, IJCV, IEEE Journals

Area Chair WiML @NeurIPS 2017-to date

Media Coverage

Press **PartNet featured in IEEE Spectrum, The Robot Report, Robotics Business Review, VentureBeat, TechCrunch**.

Intel Internal **Intel Newsroom and Intel AI Blog**.

Others **Diversity in Deep Learning Research Panelist**, *Mentions in KDNuggets and Medium*.

Co-curricular and Extra-curricular Activities

Scholarships **National Scholarship of Merit**, 1999, 2001, India.

Awards **Google Grace Hopper Celebration Award, Travel scholarship**, 2016.

Mentoring	**Intel Ignite Companies**, *AI Global Impact Festival*, Grad and Undergrad Students. Mentoring at WiML, WiCV, AI Impact Festival Winners
Courses	**Computer Vision, Machine Learning, Pattern Recognition, Image Processing**.
Summer Schools	**DLSS & RLSS'17 Montreal, ICVSS'11 Sicily, IMLSS'10 Bangalore**.