

Sathyanarayanan N. Aakur

MSCS 210 Computer Vision and Understanding Lab
Department of Computer Science
Oklahoma State University, Stillwater, Oklahoma 74078

Mail: saakurn@okstate.edu
Website: <http://saakur.github.io>

RESEARCH INTERESTS	Application of Cognitive Models in Computer Vision Predictive Learning for Active Event Perception in Videos; Commonsense Reasoning for Visual Understanding; Contextual Models of Memory for Event Perception	
TEACHING INTERESTS	Image/Video processing, Computer Vision, Introduction to Programming, Data Structures, Pattern Recognition	
EDUCATION	University of South Florida , Tampa, FL	Summer 2019
	<i>Ph.D.</i> , Computer Science and Engineering Advisor: Dr. Sudeep Sarkar	
	University of South Florida , Tampa, FL	Fall 2015
	<i>Master of Science</i> , Management Information Systems	
	Anna University , Chennai, India	Spring 2013
PROFESSIONAL EXPERIENCE	<i>Bachelor of Engineering</i> , Electronics & Communications Engineering Advisor: Prof. Leena Jasmine Thesis: Real-time Data Acquisition for Production Report Generation	
	Assistant Professor Aug 2019 - Present	Oklahoma State University Stillwater, OK
	Applied Scientist Intern May 2018 - Aug 2018	Amazon Go Boston, MA
	Programmer Analyst Oct 2012 - November 2015	CTSI-Global Chennai, India
	Programmer Analyst Intern Apr 2012 - Oct 2012	CTSI-Global Chennai, India
ACADEMIC HONORS AND AWARDS	Outstanding Reviewer at CVPR 2020 (Top 3.9% of reviewers)	2020
	Senior Fellow, USF NSF I-Corps	2019
	Oral Presentation, Conference on Computer Vision and Robotic Vision	2017
	Outstanding Contribution to the Company, CTSI-Global	2015
	Best Student Project Award, Velammal Engineering College	2010
PEER REVIEWED PUBLICATIONS	Best Student in Foreign Language - French, Leo Matriculation School	2009
	1. Sanjoy Kundu, Nikhil Gunti, Bailey Hendrickson, Sunil More, Sathyanarayanan Aakur . Benchmark and Evaluation of Low Resource Object Detection in Biomedical Images. IEEE Workshop on Applied Imagery and Pattern Recognition, 2020. Accepted, to appear.	
	2. Sathyanarayanan N. Aakur , Sudeep Sarkar. Action Localization through Continual Predictive Learning. European Conference on Computer Vision (ECCV) 2020. Accepted, to appear.	
	3. Vishalini R. Laguduva, Shakil Mahmud, Sathyanarayanan Aakur , Robert Karam, Srinivas Katkoori. Dissecting Convolutional Neural Networks for Efficient Implementation on Constrained Platforms. IEEE International Conference on VLSI Design (VLSID), 2020. (<i>Oral</i>)	
	4. Vishalini R. Laguduva, Sathyanarayanan Aakur , Srinivas Katkoori. Latent Space Modeling for Cloning Encrypted PUF-based Authentication. IFIP International Internet of Things (IoT) Conference, 2019. (<i>Oral</i>)	

5. Vishalini R. Laguduva, Sheikh Ariful Islam, **Sathyanarayanan Aakur**, Srinivas Katkoori and Robert Karam. Machine Learning based IoT Edge Node Security Attack and Countermeasures *IEEE Computer Society Annual Symposium on VLSI (ISVLSI)*, 2019. (*Oral*).
6. **Sathyanarayanan Aakur**, Sudeep Sarkar. A Perceptual Prediction Framework for Self Supervised Event Segmentation. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019. [pdf].
7. **Sathyanarayanan Aakur***, Daniel Sawyer*, Sudeep Sarkar. Fine-grained Action Detection in Untrimmed Surveillance Videos *Winter Conference on Applications of Computer Vision Workshops*, 2019.
8. **Sathyanarayanan Aakur**, Fillipe DM de Souza, Sudeep Sarkar. Going Deeper with Semantics: Exploiting Semantic Contextualization for Interpretation of Human Activity in Videos. *Winter Conference on Applications of Computer Vision*, 2019. [pdf].
9. **Sathyanarayanan Aakur**, Fillipe DM de Souza, Sudeep Sarkar. Generating Open World Descriptions of Video using Commonsense Knowledge in a Pattern Theory Framework. *Quarterly of Applied Mathematics*. [pdf].
10. Gilbert Rotich*, **Sathyanarayanan Aakur***, Rodrigo Minetto, Mauricio Segundo, Sudeep Sarkar. Using semantic relationships among objects for geospatial land use classification. *IEEE Applied Imagery Pattern Recognition Workshop*, 2018.
11. **Sathyanarayanan Aakur**, Fillipe DM de Souza, Sudeep Sarkar. On the Inherent Explainability of Pattern Theory-based Video Event Interpretations. Book Chapter, *Explainable and Interpretable Models in Computer Vision and Machine Learning in the Springer Series on Challenges in Machine Learning*. [pdf].
12. **Sathyanarayanan Aakur**, Fillipe DM de Souza, Sudeep Sarkar. Inherently Explainable Model for Video Activity Recognition *AAAI Workshop On Reasoning and Learning for Human-Machine Dialogues*, 2018 (*Oral*). [pdf]
13. **Sathyanarayanan Aakur**, Fillipe DM de Souza, Sudeep Sarkar. Towards a Knowledge-based Approach to Video Comprehension. In *Conference on Computer and Robot Vision (CRV)*, 2017 (*Oral*). [pdf]
14. **Sathyanarayanan Aakur**, Mithun Singh. Real Time Data Acquisition System for Production Report Generation. In *International Conference on Computational Intelligence and Advanced Manufacturing Research (ICCIAMR)*, 2013.

PUBLICATIONS UNDER REVIEW

1. Kenneth Malmberg*, **Sathyanarayanan Aakur***, Sudeep Sarkar. A Bayesian Network Model of the Reinstatement of Autobiographical Context. Under Review.
2. **Sathyanarayanan Aakur**, Sudeep Sarkar. Abductive Reasoning as Self Supervision for Common Sense Question Answering. Under Review.
3. **Sathyanarayanan N. Aakur**, Arunkumar Bagavathi. Unsupervised Gaze Prediction by Energy-based Surprise Modeling. Under Review.

TECHNICAL REPORTS

1. **Sathyanarayanan Aakur**, Daniel Sawyer, Michal Balazia, Sudeep Sarkar. An Examination of Proposal-based Approaches to Fine-grained Activity Detection in Untrimmed Surveillance Videos *Proceedings of TRECVID 2018, NIST, USA*, 2018.
2. **Sathyanarayanan Aakur**, Michael Goltz, Alanould Alsalam. An Automated Jigsaw Puzzle Solver using Local and Global Discriminant Features. *University of South Florida (USF)*, 2016.
3. **Sathyanarayanan Aakur**. An Evaluation of Methodologies for Predicting the Forest Cover Type via Visual Features. *University of South Florida (USF)*, 2014.

MENTORING

1. Nikhil Gunti (M.S. Student (OSU) Fall 2019 - Present)
2. Sanjoy Kundu (Ph.D. Student (OSU) Spring 2020 - Present)
3. Shubham Trehan (Ph.D. Student (OSU) Fall 2020 - Present)
4. Priyadharsini Ramamurthy (Ph.D. Student (OSU) Fall 2020 - Present)
5. Vineela Indla (M.S. Student (OSU), Fall 2020 - Present)
6. Gilbert Rotich (Ph.D. Student (USF), 2017-2019)
7. Daniel Sawyer (Undergraduate (USF), 2016 - 2018) [*Now at: Ph.D. Program at University of South Florida*]
8. Subramanian Viswanathan (Master's (USF), Fall 2016 - Spring 2017)[*First Job: Goldman Sachs*]

TEACHING EXPERIENCE

Instructor Oklahoma State University
Spring 2020 - Present Stillwater, OK
Spring 2020: CS 5323 Design and Implementation of Operating Systems II
Fall 2020: CS 4783/5783 Machine Learning

Instructor University of South Florida
Summer 2017, Summer 2019 Tampa, FL
Undergraduate Course: IT Programming Fundamentals
Student Evaluation: 4.0/5.0

Graduate Teaching Assistant University of South Florida
Spring 2016 - Spring 2019 Tampa, FL
Spring 2019: Computer Vision (Graduate)
Spring 2017 - Summer 2019: USF I-Corps Sessions (NSF Lean Business Canvas Course)
Spring 2017: Biometrics (Graduate), IT Data Structures/Algorithms (Undergraduate)
Fall 2016: IT Data Structures (Undergraduate), Computational Geometry (Undergraduate)
Spring 2016: Automata Theory/Formal Languages (Undergraduate)

PROFESSIONAL SERVICE

NSF Panels: IIS CHS (2020)
Track Chair: Machine Learning for Graphs (ICMLA 2020), DEEP-DIAL (AAAI 2021)
Program Committee: AAAI 2020, AAAI 2021
Reviewer: ICLR 2021, IET Computer Vision, WACV 2020, ICCV 2019, CVPR 2019, CVPR 2020, CRV 2020, ECCV 2020, WACV 2021, NeurIPS 2020, ACCV 2020, IEEE Access
External Reviewer: PLOS ONE, IROS 2017, CAIP 2017
Organizer: Special Session on Machine Learning for Graphs (ICMLA 2020), DEEP-DIAL (AAAI 2021), AI Seminar (University of South Florida. Fall 2016 - Spring 2019)
Co-Organizer: Robotics Competition, INNOWIZ Symposium 2012-2013, Velammal Engineering College
Web Chair: INNOWIZ Symposium 2012-2013, Velammal Engineering College

TALKS

Invited Talk *The Role of Commonsense Knowledge in Visual Understanding.* Oklahoma State University. Fall 2018
Invited Talk with Dr. Sudeep Sarkar. *Going Deeper with Semantics: Exploiting Semantic Contextualization for Interpretation of Human Activity in Videos.* Technical Seminar Series, Statistical Shape Analysis & Modeling Group, Florida State University. Fall 2018
Invited Talk with Dr. Sudeep Sarkar. *Video Event Understanding with Pattern Theory.* Robotics Technical Seminar Series, Department of Mechanical Engineering, University of South Florida. Spring 2018

Invited Talk *Leveraging ConceptNet to Reduce Training Requirements for Video Descriptions*, Seminar in AI, University of South Florida, Spring 2017.

FUNDING

Current

1. *Collaborative Research: RI: Medium: Understanding Events from Streaming Video - Joint Deep and Graph Representations, Commonsense Priors, and Predictive Learning*, NSF CISE Core Program, \$285,126, (Total: \$1,005,543) **PI**.
2. *Deep Learning Computational Algorithms for Disease Diagnosis by Genome Sequence*, USDA National Animal Health Laboratory Network, \$158,136, **Co-PI**.
3. *Accelerating Research Discoveries with GPU-enabled Computing*, Oklahoma State University Core Facility Support Program, \$150,000, **Co-PI**.
4. *Next Generation User Interfaces for Gateway Autonomous Operations*, NASA X-Hab Project, \$30,000, **Co-PI**

Submitted, Pending

1. *Enabling Lifelong Learning for grounded Visual Understanding with Attention, Compositional Understanding and Abductive Learning*, NSF Science of Learning Program, \$425,150, **PI**.

PROFESSIONAL Available upon request.
REFERENCES