

## Sathyanarayanan N. Aakur

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

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<b>RESEARCH INTERESTS</b>	<b>Application of Cognitive Models in Computer Vision</b> Predictive Learning for Active Event Perception in Videos; Commonsense Reasoning for Visual Understanding; Contextual Models of Memory for Event Perception	
<b>TEACHING INTERESTS</b>	Image/Video processing, Computer Vision, Introduction to Programming, Data Structures, Pattern Recognition	
<b>EDUCATION</b>	<b>University of South Florida</b> , Tampa, FL	Summer 2019
	<i>Ph.D.</i> , Computer Science and Engineering	
	Advisor: Dr. Sudeep Sarkar	
	<b>University of South Florida</b> , Tampa, FL	Fall 2015
	<i>Master of Science</i> , Management Information Systems	
	<b>Anna University</b> , Chennai, India	Spring 2013
<b>PROFESSIONAL EXPERIENCE</b>	<i>Bachelor of Engineering</i> , Electronics & Communications Engineering	
	Advisor: Prof. Leena Jasmine	
	Thesis: Real-time Data Acquisition for Production Report Generation	
	<b>Assistant Professor</b>	Oklahoma State University
	Aug 2019 - Present	Stillwater, OK
	<b>Applied Scientist Intern</b>	Amazon Go
<b>ACADEMIC HONORS AND AWARDS</b>	May 2018 - Aug 2018	Boston, MA
	<b>Programmer Analyst</b>	CTSI-Global
	Oct 2012 - November 2015	Chennai, India
	<b>Programmer Analyst Intern</b>	CTSI-Global
	Apr 2012 - Oct 2012	Chennai, India
	Outstanding Reviewer at CVPR 2020 (Top 3.9% of reviewers)	<b>2020</b>
<b>PEER REVIEWED PUBLICATIONS</b>	Senior Fellow, USF NSF I-Corps	<b>2019</b>
	Oral Presentation, Conference on Computer Vision and Robotic Vision	<b>2017</b>
	Outstanding Contribution to the Company, CTSI-Global	<b>2015</b>
	Best Student Project Award, Velammal Engineering College	<b>2010</b>
	Best Student in Foreign Language - French, Leo Matriculation School	<b>2009</b>
<b>PEER REVIEWED PUBLICATIONS</b>	1. Sai Narayanan, Akhilesh Ramachandran, <b>Sathyanarayanan N. Aakur</b> , Arunkumar Bagavathi. GRaDL: A Framework for Animal Genome Sequence Classification with Graph Representations and Deep Learning. <i>International Conference on Machine Learning Applications (ICMLA'20)</i> , 2020.	
	2. Sanjoy Kundu, Nikhil Gunti, Bailey Hendrickson, Sunil More, <b>Sathyanarayanan N. Aakur</b> . Benchmark and Evaluation of Low Resource Object Detection in Biomedical Images. <i>IEEE Workshop on Applied Imagery and Pattern Recognition, 2020</i>	
	3. <b>Sathyanarayanan N. Aakur</b> , Sudeep Sarkar. Action Localization through Continual Predictive Learning. <i>European Conference on Computer Vision 2020</i> . Accepted, to appear.	

4. 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. **(Oral)**
5. Vishalini R. Laguduva, **Sathyanarayanan Aakur**, Srinivas Katkoori. Latent Space Modeling for Cloning Encrypted PUF-based Authentication. *IFIP International Internet of Things (IoT) Conference*, 2019. **(Oral)**
6. 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)**.
7. **Sathyanarayanan Aakur**, Sudeep Sarkar. A Perceptual Prediction Framework for Self Supervised Event Segmentation. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019. [pdf].
8. **Sathyanarayanan Aakur\***, Daniel Sawyer\*, Sudeep Sarkar. Fine-grained Action Detection in Untrimmed Surveillance Videos *Winter Conference on Applications of Computer Vision Workshops*, 2019.
9. **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].
10. **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].
11. 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.
12. **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].
13. **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]
14. **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]
15. **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.
4. **Sathyanarayanan N. Aakur**, Sanjoy Kundu, Nikhil Gunti. Knowledge Guided Learning: Towards Open Domain Egocentric Action Recognition with Zero Supervision. Under Review.

5. **Sathyanarayanan Aakur**, Sudeep Sarkar. Self-supervised Object-centric Representations for Action Localization. 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 Fall 2019 - Present)
2. Sanjoy Kundu (Ph.D. Student Spring 2020 - Present)
3. Shubham Trehan (Ph.D. Student Fall 2020 - Present)
4. Priyadarshini Ramamurthy (Ph.D. Student Fall 2020 - Present)
5. Vineela Indla (M.S. Student Fall 2020 - Present)
6. Makenzie Terrell (B.S. Student Fall 2020 - Present)
7. Gilbert Rotich (Ph.D. Student (USF), 2017-2019)
8. Daniel Sawyer (Undergraduate (USF), 2016 - 2018) [*Now at: Ph.D. Program at University of South Florida*]
9. 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:** DEEP-DIAL (AAAI-2021), Machine Learning for Graphs (ICMLA 2020), ICMLA 2020 (Computer Vision)  
**Program Committee:** AAAI 2020, AAAI 2021  
**Reviewer:** IET Computer Vision, WACV 2020, ICCV 2019, CVPR 2019, CVPR 2020, CRV 2020, ECCV 2020, WACV 2021, NeurIPS 2020, ACCV 2020, ICLR2021, CVPR2021, IEEE Access  
**External Reviewer:** PLOS ONE, IROS 2017, CAIP 2017

**Organizer:** DEEP-DIAL Workshop (AAAI-2021), Special Session on Machine Learning for Graphs (ICMLA 2020), 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** *Towards Intelligent Agents with Open World Visual Understanding* . Collaborative Assistants for the Society (CASY 2020). Fall 2020

**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.

**PROFESSIONAL** Available upon request.

## REFERENCES