

Sathyannarayanan N. Aakur

MSCS 210 Computer Vision and Understanding Lab
Department of Computer Science
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RESEARCH INTERESTS	Application of Cognitive Models in Computer Vision Predictive Learning for Active Event Segmentation in Videos; Explainable models for video interpretations; Contextual Models of Memory for video summarization	
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	Oklahoma State University Stillwater, OK
	Applied Scientist Intern	Amazon Go Boston, MA
	May 2018 - Aug 2018	
	<ul style="list-style-type: none">Responsible for developing and testing new algorithms and technology for real time activity detection and segmentation using convolutional neural networks.Worked with Tensorflow, Python, C++, and associated tools and frameworks.	
	Programmer Analyst	CTSI-Global Chennai, India
	Oct 2012 - November 2015	
	<ul style="list-style-type: none">Designed and implemented data capturing and processing freight bills (CTSI-DOC). Led a team of 4 programmers.Increased data entry productivity by 75% and reduced cost of manual processing by a factor of 150% by capturing and processing bills in-house.Improved client-facing web interface for freight bill auditing (Exception Handling) to improve user experience and include additional features; Improved user experience by 85% according to feedback survey from clients.	
	Programmer Analyst Intern	CTSI-Global Chennai, India
	Apr 2012 - Oct 2012	
RESEARCH EXPERIENCE	<ul style="list-style-type: none">Implemented automated reporting for clientsImplemented client validation and report generation for business process validation in Supply Chain Management.	
	Applied Scientist Intern	Amazon Go Boston, MA
	May 2018 - Aug 2018	
	Mentor: Dr. Mirko Ristivojevic	
	Graduate Research Assistant	University of South Florida Tampa, FL
	May 2017 - Present	
	Advisor: Dr. Sudeep Sarkar	

Undergraduate Research Assistant
Jan 2010 - July 2010
Advisor: Dr. Srinivasan Devashankar

Velammal Engineering College
Chennai, India

**ACADEMIC
HONORS
AND AWARDS**

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
Best Student in Foreign Language - French, Leo Matriculation School	2009

**PEER
REVIEWED
PUBLICATIONS**

1. 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.
2. Vishalini R. Laguduva, **Sathyanarayanan Aakur**, Srinivas Katkoori. Latent Space Modeling for Cloning Encrypted PUF-based Authentication. *IFIP International Internet of Things (IoT) Conference*, 2019.
3. 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*).
4. **Sathyanarayanan Aakur**, Sudeep Sarkar. A Perceptual Prediction Framework for Self Supervised Event Segmentation. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019. [pdf].
5. **Sathyanarayanan Aakur***, Daniel Sawyer*, Sudeep Sarkar. Fine-grained Action Detection in Untrimmed Surveillance Videos *Winter Conference on Applications of Computer Vision Workshops*, 2019.
6. **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].
7. **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].
8. 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.
9. **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].
10. **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]
11. **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]
12. **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. Vishalini R. Laguduva, **Sathyanarayanan N. Aakur**, Srinivas Katkoori. Cloning Attacks on Encrypted PUF-based Authentication in IoT Edge Nodes using Latent Space Modeling. Under Review.
4. **Sathyanarayanan N. Aakur**. 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. Daniel Sawyer (Undergraduate, 2016 - 2018)
Mentored on deep learning for action and object recognition in videos. [*Now at: Ph.D. Program at University of South Florida*]
2. Subramanian Viswanathan (Master's, Fall 2016 - Spring 2017)
Mentored on parallelization and high performance computing for computing inherent privacy of very large social graphs ($> 10^6$ nodes). [*Now at: Goldman Sachs*]

TEACHING EXPERIENCE

Instructor Oklahoma State University
Spring 2020 - Present Stillwater, OK
Spring 2020: CS 5323 Design and Implementation of Operating Systems II

Instructor University of South Florida
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)

Instructor University of South Florida
Summer 2017 Tampa, FL
Undergraduate Course: IT Programming Fundamentals
Student Evaluation: 4.13/5.0

PROFESSIONAL SERVICE **Program Committee:** AAAI 2020
Reviewer: WACV 2020, ICCV 2019, CVPR 2019, CVPR 2020, CRV 2020, ECCV 2020, IEEE Access
External Reviewer: PLOS ONE, IROS 2017, CAIP 2017
Organizer: Computer Vision / AI Seminar series, 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.

PROFESSIONAL REFERENCES Available upon request.