

Sathyanarayanan N. Aakur

ENB221 Computer Vision and Pattern Recognition Group
Computer Science and Engineering Department
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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	Jan, 2016 - Present
	<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	
	Applied Scientist Intern	Amazon Go
	May 2018 - Aug 2018	Boston, MA
	<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
	Oct 2012 - November 2015	Chennai, India
	<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
	Apr 2012 - Oct 2012	Chennai, India
	<ul style="list-style-type: none">Implemented automated reporting for clientsImplemented client validation and report generation for business process validation in Supply Chain Management.	
RESEARCH EXPERIENCE	Applied Scientist Intern	Amazon Go
	May 2018 - Aug 2018	Boston, MA
	Mentor: Dr. Mirko Ristivojevic	
	Developed and tested new algorithms and technology for real time activity detection and segmentation using convolutional neural networks.	
	Graduate Research Assistant	University of South Florida
	May 2017 - Present	Tampa, FL
	Advisor: Dr. Sudeep Sarkar	

Undergraduate Research Assistant

Jan 2010 - July 2010

Advisor: Dr. Srinivasan Devashankar

Developed and implemented novel algorithm for line following and maze solving robots using low quality visual camera and IR sensors.

Velammal Engineering College

Chennai, India

ACADEMIC HONORS AND AWARDS

Senior Fellow, USF NSF I-Corps

Oral Paper 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, 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*).
2. **Sathyanarayanan Aakur**, Sudeep Sarkar. A Perceptual Prediction Framework for Self Supervised Event Segmentation. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019. [pdf].
3. **Sathyanarayanan Aakur***, Daniel Sawyer*, Sudeep Sarkar. Fine-grained Action Detection in Untrimmed Surveillance Videos *Winter Conference on Applications of Computer Vision Workshops*, 2019.
4. **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].
5. **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].
6. 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.
7. **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].
8. **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]
9. **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]
10. **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. In Submission.
2. Vishalini R. Laguduva*, **Sathyanarayanan Aakur***, Shakil Mahmud, Robert Karam, Srinivas Katkoori. Design and Optimization of Convolutional Neural Networks for Constrained Platforms. In Submission.

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

Graduate Teaching Assistant Spring 2019 Graduate Course: Computer Vision	University of South Florida Tampa, FL
Instructional Assistant Spring 2017 - Present USF I-Corps Sessions: NSF Lean Business Canvas Course	University of South Florida Tampa, FL
Graduate Teaching Assistant Spring 2017 Graduate Course: Biometrics Undergraduate Course: IT Data Structures/Algorithms	University of South Florida Tampa, FL
Graduate Teaching Assistant Fall 2016 Undergraduate Course: IT Data Structures Undergraduate Course: Computational Geometry	University of South Florida Tampa, FL
Instructor Summer 2017 Undergraduate Course: IT Programming Fundamentals Student Evaluation: 4.13/5.0	University of South Florida Tampa, FL
Graduate Teaching Assistant Spring 2016 Undergraduate Course: Automata Theory/Formal Languages	University of South Florida Tampa, FL

PROFESSIONAL SERVICE

Reviewer ICCV 2019, CVPR 2019, IEEE Access
External Reviewer: PLOS ONE, IROS 2017, CAIP 2017
Organizational Assistant: Computer Vision / AI Seminar series, University of South Florida. Fall 2016 - Fall 2018
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

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

**TECHNICAL
SKILLS**

Languages: Python; C++;C

Machine Learning Frameworks: TensorFlow; CUDA

Big Data: MapReduce; Hive; Pig

**PROFESSIONAL
REFERENCES**

Dr. Sudeep Sarkar

Professor, and Chairperson

Department of Computer Science and Engineering

University of South Florida

Tampa, Florida USA

Tel: +1 (813) 974 2308

sarkar@cse.usf.edu

Dr. Kenneth Malmberg

Associate Professor

Department of Psychology

University of South Florida

Tampa, Florida USA

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Dr. Rangachar Kasturi

Douglas W. Hood Professor

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