

# Srijan Das | Curriculum Vitae

9201 University City Blvd, Charlotte, NC – 28223 – USA

+1 8582077487 • 704-687-1835 • sdas24@uncc.edu

<https://srijandas07.github.io>

[www.linkedin.com/in/srijan-das](https://www.linkedin.com/in/srijan-das) <https://github.com/srijandas07>

Currently, I am an Assistant Professor in the Department of Computer Science at the University of North Carolina at Charlotte. My research work aims at designing systems for understanding humans in videos that can be successfully deployed in daily-living environments encompassing challenges typical of real-world settings.

## Research Interests

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Machine Learning/Deep Learning (3D Convolutional Neural Networks, Recurrent Neural Networks, Transformers) for Computer Vision applications (action classification, temporal action detection, deep fake detection, anomaly detection, etc).

## Education

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- **Université Côte d'Azur (Lab: INRIA, Sophia Antipolis)** **France**  
*Ph.D. Computer Science* 2017–2020  
Supervisor : Dr. Francois Bremond & Dr. Monique Thonnat
- **National Institute of Technology, Rourkela** **India**  
*M.Tech Computer Science & Engineering , GPA - 9.17/10* 2015–2017
- **St. Thomas' College of Engineering & Technology, Kolkata** **India**  
*B.Tech Computer Science & Engineering , GPA - 8.99/10* 2011–2015

## Current & Previous Employment

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- **University of North Carolina at Charlotte** **USA**  
*Computer Science Department, Assistant Professor* August 2022–Current
- **Stony Brook University** **USA**  
*Robotics Lab, Postdoctoral Associate* April 2021–July 2022
- **INRIA** **France**  
*STARS Team, Researcher* August 2017–November 2020
- **INRIA** **France**  
*STARS Team, Masters' Internship* January 2017–April 2017
- **National Institute of Technology** **India**  
*Computer Science Department, Teaching Assistant* July 2016–December 2016

## Projects

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- **Awarded NSF CRII:** *'Understanding Activities of Daily Living in Indoor Scenarios'* (Aug 2023-Jul 2025)

It is projected that, by 2050, 1 in 6 people in the world will be over the age of 65, up from 1 in 11 in 2019. Thus, elderly are a growing demographic group in society. This inevitably translates into the need to increase the workforce in healthcare. The rising demand for healthcare amid a pandemic can be combated by deploying activity monitoring systems, which could help monitor the health state of older patients and support the early detection of potential physical or mental disorders. Thus, building such monitoring systems requires an automated understanding of Activities of Daily Living (ADL) performed by humans. Most of the investigations towards modeling human activities owing to the advancements in computer vision are targeted for generic internet videos. Existing models are fabricated for recognition in web videos whereas viewpoint variation and subtle motion that characterize ADL generally cannot handle uncertainty and tend to underperform in real-world scenarios. Moreover, they have difficulties distinguishing similarly looking activities. Thus, the key objective of this project is to build a framework for recognizing ADL which can be deployed in monitoring systems. The project will also perform complementary educational and outreach activities that engage students in research and STEM.

This project will develop a multi-modal framework predominantly based on RGB and Pose modalities due to their easy accessibility in indoor scenarios. This framework aims at addressing two important challenges - the limited availability of labeled ADL videos and how to combine different heterogeneous modalities (RGB and Poses) for classifying activities. Thus, this project will explore the integration of two interrelated research directions - (A) a study on learning from limited training distribution and (B) a study on combining modalities like RGB and Depth. In the first study, we will explore the possibilities of mitigating the limitation of the scale of available data in the ADL domain for effective training of Neural Networks for video understanding. In the second study, we aim at improving the effectiveness of RGB-based human activity recognition by leveraging the human localized regions within a scene. Finally, we will develop a multi-modal Neural Network for ADL by integrating human localized RGB and 3D poses of the human actor. This research study will reveal several new dimensions towards understanding Activities of Daily Living which could be a big takeaway for the computer vision community.

## Technical skills

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- **Programming Languages:** Proficient in: C, C++, Python, Matlab, TeX, Java, R.
- **Packages:** Pandas, Scikit-learn, TensorFlow, Keras, Pytorch

## Talks

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- Talk on "From Few to More: Enhancing ViT Performance on Limited Data" at PHPC Lab in UNC Charlotte. (April 2023)
- Talk on "From Pixels to Robots: Recipes for Vision-Enabled Robot Learning" at the Seminar on Controls and Robotics in UNC Charlotte. (March 2023)
- Talk on "Quo vadis, computer vision!" at the PhD seminar in UNC Charlotte. (January 2023)
- Invited Talk in AICTE sponsored Short Term Course on "Multiple Modalities are all you need for Video Understanding!" at IIITDM Kancheepuram. (March 17, 2022)
- Talk on "Vision for understanding Activities of Daily Living" at [SciTech Talks](#). (September 4, 2021)
- Seminar talk on "How to combine modalities for understanding Activities of Daily Living? " for CSE 600 at Stony Brook University, NY, USA. (April 30, 2021)

- Seminar talk on "How to combine RGB & Poses for understanding Activities of Daily Living?" at Université Lumière Lyon 2 (November 23, 2020).
- Talk on "Spatio-temporal attention mechanisms for Activities of Daily Living" at Nice Data Science meetup (November 28, 2019)
- Talk on "Activity Recognition for Healthcare" at Summer School Brain Innovation Generation @ UCA (August 30, 2018)

## Teaching

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- Instructor of ITCS 4152/5152 001 Computer Vision Course at UNC Charlotte in Fall 2022 and Spring 2023.
- Conducted 2 Lectures at SKFGI Webinar series 2020 on "Surviving the Deep Learning Apocalypse" (August 2020)
- Conducted 3 Lectures on Deep Learning for Computer Vision at 3IA Cote d'Azur for students of MSc of Data Science and Artificial Intelligence (2019-20)

## My Research Team

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| 1. | <b>Dominick Reilly</b><br><i>University of North Carolina at Charlotte, USA</i><br>Thesis - <i>Video Transformers for Activities of Daily Living</i>                     | <b>Ph.D. Student</b><br><i>August 2022–Current</i>          |
| 2. | <b>Jacob Nielsen</b><br><i>South Denmark University, Denmark</i><br>Thesis - <i>Semi-supervised Learning for Object Detection in Dual-view Aerial Videos</i>             | <b>Masters' Student</b><br><i>August 2022–Current</i>       |
| 3. | <b>Ian Boyles</b><br><i>University of North Carolina at Charlotte, USA</i><br>Capstone Project - <i>Exploring Video Swin Transformers for Activities of Daily Living</i> | <b>Undergraduate Student</b><br><i>January 2023–Current</i> |
| 4. | <b>Jonathan Lorrain</b><br><i>University of North Carolina at Charlotte, USA</i><br>Individual Study - <i>Benchmarking Dual-view Drone Dataset for Object Detection</i>  | <b>Masters' Student</b><br><i>March 2023–Current</i>        |

## Publications

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### Patents

- **Srijan Das**, Rui Dai, Francois Bremond, Luca Minciullo, Lorenzo Garattoni, Gianpiero Francesca. METHOD FOR RECOGNIZING ACTIVITIES USING SEPARATE SPATIAL AND TEMPORAL ATTENTION WEIGHTS. Publication Number WO/2021/069945, International Application No PCT/IB2019/001142 (Publication date 04.15.2021).
- **Srijan Das**, Rui Dai, Francois Bremond, Luca Minciullo, Lorenzo Garattoni, Gianpiero Francesca. METHOD AND SYSTEM FOR DETECTING AN ACTION IN A VIDEO CLIP. European Patent Application EP20306343.3, filed in 2020 (Patent Pending).

### Conferences

- Saarthak Kapse, **Srijan Das**, and Prateek Prasanna, "CD-Net: Histopathology Representation Learning using Pyramidal Context-Detail Network", In 20th IEEE International Symposium on Biomedical Imaging, ISBI 2023, Colombia, April 18-21, 2023.
- **Srijan Das** and Michael Ryoo, "ViewCLR: Learning Self-supervised Video Representation for Unseen Viewpoints", In Proceedings of the IEEE Winter Conference on Applications of Computer Vision, WACV 2023, in Waikoloa Village, Hawaii, January 3-7, 2023.
- Jinghuan Shang, **Srijan Das**, and Michael S. Ryoo, "Learning Viewpoint-Agnostic Visual Representations by Recovering Tokens in 3D Space", In Thirty-sixth Conference on Neural Information Processing Systems, NeurIPS 2022, New Orleans, December 2022.
- Xiang Li, Jinghuan Shang, **Srijan Das**, and Michael S. Ryoo, "Does Self-supervised Learning Really Improve Reinforcement Learning from Pixels?", In Thirty-sixth Conference on Neural Information Processing Systems, NeurIPS 2022, New Orleans, December 2022.
- Rui Dai, **Srijan Das**, Kumara Kahatapitiya, Michael Ryoo, Francois Bremond, "MS-TCT: Multi-Scale Temporal ConvTransformer for Action Detection", To Appear in Proceedings of the IEEE Conference on Computer Vision & Pattern Recognition, CVPR 2022, New Orleans, June 19-24, 2022.
- Rui Dai, **Srijan Das**, Francois Bremond, "CTRN: Class Temporal Relational Network For Action Detection", In Proceedings of the 32nd British Machine Vision Conference, BMVC 2021, United Kingdom, Virtual, November 22-25, 2021.
- Rui Dai, **Srijan Das**, Francois Bremond, "Learning an Augmented RGB Representation with Cross-Modal Knowledge Distillation for Action Detection", In Proceedings of the IEEE International Conference on Computer Vision, ICCV 2021, Virtual, October 11-17, 2021.
- Snehasis Majhi, **Srijan Das** and Francois Bremond, "DAM: Dissimilarity Attention Module for Weakly-supervised Video Anomaly Detection", In Proceedings of the 17th IEEE Int'l Conf on Advanced Video and Signal-based Surveillance, AVSS 2021, video, Virtual, November 16-19, 2021.
- Abhijit Das, **Srijan Das** and Antitza Dantcheva, "Demystifying Attention Mechanisms for Deep Fake Detection", In Proceedings of the IEEE International Conference on Automatic Face and Gesture Recognition, FG 2021, Virtual, Jodhpur, India, December 15-18, 2021.
- Snehasis Majhi, **Srijan Das**, Francois Bremond, Ratnakar Dash and Pankaj Kumar Sa, "Weakly-supervised Joint Anomaly Detection and Classification", In Proceedings of the IEEE International Conference on Automatic Face and Gesture Recognition, FG 2021, Virtual, Jodhpur, India, December 15-18, 2021.
- Rui Dai, **Srijan Das**, Luca Minciullo, Lorenzo Garattoni, Gianpiero Francesca and Francois Bremond, "PDAN: Pyramid Dilated Attention Network for Action Detection", In Proceedings of the IEEE Winter Conference on Applications of Computer Vision, WACV 2021, Virtual, January

5-9, 2021.

- **Srijan Das**, Saurav Sharma, Rui Dai, Monique Thonnat, Francois Bremond, "VPN: Learning Video-Pose Embedding for Activities of Daily Living", In Proceedings of the 16<sup>th</sup> European Conference on Computer Vision, ECCV 2020, Virtual, August 23-28, 2021.
- **Srijan Das**, Monique Thonnat, Francois Bremond, "Looking deeper into Time for Activities of Daily Living Recognition", In Proceedings of the IEEE Winter Conference on Applications of Computer Vision, WACV 2020, in Snowmass Village, Colorado, March 2-5, 2020.
- **Srijan Das**, Rui Dai, Michal Koperski, Luca Minciullo, Lorenzo Garattoni, Francois Bremond, Gianpiero Francesca, "Toyota Smarthome: Real-World Activities of Daily Living", In Proceedings of the IEEE International Conference on Computer Vision, ICCV 2019, in Seoul, South Korea, October 27 - November 2, 2019.
- **Srijan Das**, Arpit Chaudhary, Francois Bremond, Monique Thonnat, "Where to Focus on for Human Action Recognition?", In Proceedings of the IEEE Winter Conference on Applications of Computer Vision, WACV 2019, in Waikoloa Village, Hawaii, January 7-11, 2019.
- **Srijan Das**, Monique Thonnat, Kaustubh Sakhalkar, Michal Koperski, Francois Bremond, Gianpiero Francesca, "A New Hybrid Architecture for Human Activity Recognition from RGB-D videos", In Proceedings of the 25th International Conference on MultiMedia Modeling, MMM 2019, in Thessaloniki, Greece, January 8-11, 2019.
- **Srijan Das**, Kaustubh Sakhalkar, Michal Koperski, Francois Bremond, "Spatio-temporal Grids for Daily Living Action Recognition", In Proceedings of the Indian Conference on Computer Vision, Graphics and Image Processing, ICVGIP'18, Hyderabad, India, 19-21 December 2018.
- **Srijan Das**, Michal Koperski, Francois Bremond, Gianpiero Francesca, "Deep-Temporal LSTM for Daily Living Action Recognition", In Proceedings of the 14th IEEE International Conference on Advanced Video and Signal-Based Surveillance, AVSS 2018, in Auckland, New Zealand, 27-30 November 2018.
- **Srijan Das**, Michal Koperski, Francois Bremond, Gianpiero Francesca, "Action Recognition based on a mixture of RGB and Depth based skeleton", In Proceedings of the 14th IEEE International Conference on Advanced Video and Signal-Based Surveillance, AVSS 2017, in Lecce, Italy, 29 August - 1st September, 2017.
- **Srijan Das**, Saurav Sharma, Sambit Bakshi, Imon Mukherjee, "A Framework for Pixel Intensity Modulation Based Image Steganography", In Proceedings of International Conference on Advanced Computing and Intelligent Engineering, ICACIE 2016, Bhubaneswar, India, 21-23 December 2016.
- Imon Mukherjee, Biswajita Datta, Reeturaj Banerjee, **Srijan Das**, "DWT Difference Modulation Based a Novel Steganographic Algorithm", In Proceedings of 11th International Conference on Information Systems Security, ICISS 2015, Kolkata, India, 16-20 December 2015.

## Journals

- Rui Dai, **Srijan Das**, Saurav Sharma, Luca Minciullo, Lorenzo Garattoni, Francois Bremond, Gianpiero Francesca, "Toyota smarthome untrimmed: Real-world untrimmed videos for activity detection", In Transactions on Pattern Analysis and Machine Intelligence, TPAMI, ISSN: 0162-8828, Digital Object Identifier: 10.1109/TPAMI.2022.3169976, PAMI 2022.
- **Srijan Das**, Rui Dai, Di Yang, Francois Bremond, "VPN++: Rethinking Video-Pose embeddings for understanding Activities of Daily Living", In Transactions on Pattern Analysis and Machine Intelligence, TPAMI-2021-05-0786.R1,ISSN: 0162-8828, DOI: 10.1109/TPAMI.2021.3127885, PAMI 2021.
- **Srijan Das**, Khan Muhammad, Sambit Bakshi, Imon Mukherjee, Pankaj K Sa, Arun Kumar Sangaiah, Andrea Bruno, "Lip Biometric Template Security Framework Using Spatial Steganography", In Pattern Recognition Letters, 2018.
- **Srijan Das**, Arpita Dutta, Saurav Sharma, Sanghratna Godbole, "A Comparative Analysis of a novel Anomaly Detection algorithm with Neural Networks", In the International Journal of Rough Sets and Data Analysis (IJRSDA) vol. 4, issue 4.

## Awards

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- **DEC 2017 - NOV 2020:** Recipient of National Scholarship from UCA ED STIC.
- **OCT 2019:** Granted Student Travel Award at ICCV 2019.
- **JUNE 2018:** Selected in FADEX Program 2018 Edition on Artificial Intelligence 2018.
- **OCT-DEC 2017:** Certificate of Outstanding Reviewer for FGCS and CEE Journal (elsevier).
- **AUG 2015 - JUN 2017:** Recipient of MHRD Scholarship through GATE 2015.
- **AUGUST 2014:** Cognizant Certified Student

## Academic Activities

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- Member of the DEI committee for CVPR 2023.
- Senior Program Committee Member for AAAI 2023.
- Session chair for Image Understanding & Activity Recognition session at IPAS 2020.
- Mentored for B.E.N.J.I. in GirlScript Summer of Code 2019 edition.
- Mentor for the Emerging Technology Business Incubator (ETBI) Led by NIT Rourkela, a platform envisaged to transform the start-up ecosystem of the region.
- Reviewer at ICACIE 2017, 2018, SETIT 2018, KCST 2019, ICAML 2019, AVSS 2019, 2022, WACV 2020, 2021, 2022, 2023, CVPR 2021, 2022, 2023, ECCV 2022, ICCV 2021, 2023, IROS 2021.
- Reviewer at TPAMI, Patter Recognition, Elsevier Journal of CVIU, Elsevier Journal of FGCS, Elsevier Journal of Computer & Electrical Engineering, MTAP, and Journal of Signal Processing: Image Communication.
- Volunteer at ICACNI 2014, ICACNI 2016, ICCV 2019, ICLR 2020 & ICML 2020.