

## Suman Saha

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### Contact Information:

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### RESEARCH INTERESTS

*Computer Vision and Machine Learning*

### EDUCATION

**PhD** in Computing and Mathematics (September 2014 - Present)

**Artificial Intelligence and Vision research group**, Oxford Brookes University

Thesis direction: *Online spatiotemporal human action localisation in streaming videos*

Supervisors: Professor Fabio Cuzzolin, Professor Nigel Crook, Dr Tjeerd Olde Scheper

**MSc** in Computer Science

(September, 2012 - March, 2014)

**University of Bedfordshire**, United Kingdom

Grade: **double distinction** (Scored 94.27% marks)

Thesis: *A Monocular Vision Approach for Obstacle Detection and Collision Avoidance for Low-cost Quadcopters*.

Supervisors: Ashutosh Natraj, Sonia Waharte

Related Publication link, Project page link, MSc thesis poster

**Polytechnic Diploma Engineering** in Computer Science (August, 1999 - June, 2002)

Siddaganga Polytechnic College, Tumkur, Karnataka, India

### RESEARCH EXPERIENCE

**University of Bedfordshire**

(June, 2013 - September, 2013)

*Research Intern*

Project title: *New Foundational Structures for Engineering Verified multi-UAVs*

Collaborator: Department of Computer Science, University of Oxford

### PUBLICATIONS

- **Suman Saha**, Gurmurt Singh, Michael Sapienza, Philip H. S. Torr, Fabio Cuzzolin. 2016. *Deep Learning for Detecting Multiple Space-Time Action Tubes in Videos*, In Proceedings of the 27-th British Machine Vision Conference (BMVC), York, United Kingdom. Our proposed method **achieved the state-of-the-art results to date** in spatiotemporal human action localisation in videos.  
Project page link, YouTube video link.
- **Suman Saha**, Ashutosh Natraj and Sonia Waharte. 2014. *A real-time monocular vision-based frontal obstacle detection and avoidance for low cost UAVs in GPS denied environment*, 2014 IEEE International Conference on Aerospace Electronics and Remote Sensing Technology, Yogyakarta, pp. 189-195. Project page link, Paper link.
- **Suman Saha**. 2014. *A Monocular Vision Approach for Obstacle Detection and Collision Avoidance for Low-cost Quadcopters*, MSc thesis, University of Bedfordshire, UK.
- **Suman Saha**. 2014. *Face Recognition using PCA and Multilayer Feedforward Neural Networks*, European Journal of Applied Sciences and Technology.
- **Suman Saha**. 2014. *Parallelization of Genetic Algorithms using MapReduce*, European Journal of Applied Social Sciences Research.

<b>PROFESSIONAL EXPERIENCE</b>	Tata Steel Limited, Jamshedpur, India <b>Software Analyst</b> at the Research and Development Division (R&D) Major works include: <ul style="list-style-type: none"> <li>Designed and developed a software to increase the thermal efficiency and reduce the fuel consumption of WRM (wire rod mill) reheating furnace.</li> <li>Designed and developed software to predict mill force, mean flow stress, strain, percentage elongation, yield strength using <i>ANN</i> (artificial neural networks).</li> <li>Maintained a software which predicts the mechanical properties of the hot rolled strip using a series of physical and microstructural based models, coupled with various techniques including <i>ANN</i> (artificial neural networks).</li> <li>Applied different Machine learning algorithms such as SVM (Support Vector Machine), PCA (Principal Component Analysis) for production data analysis.</li> </ul>	(November, 2006 - August, 2012)
	SICT Pvt. Ltd. India <b>Software Developer</b>	(July, 2002 - October, 2006)
<b>TEACHING EXPERIENCE</b>	<b>Oxford Brookes University, United Kingdom</b> <ul style="list-style-type: none"> <li>Delivered an introductory lecture on <i>Advance Computer Vision</i> to MSc students, 6th July 2015.</li> <li>Helped two MSc Computer Vision students with their final projects (2015-2016 batch).</li> <li>Teach undergraduate students <i>IT Skills</i> module (September 2016-2017 batch).</li> </ul>	
	<b>Tata Steel Limited, Jamshedpur, India</b> <ul style="list-style-type: none"> <li>Guided 3 Bachelor in Computer Science summer interns at R&amp;D division (2010).</li> </ul>	
<b>TECHNICAL REPORT, TALK</b>	<ul style="list-style-type: none"> <li>Delivered a talk on spatio-temporal human action localisation at the Departmental Research Seminar, Oxford Brookes University, February 2016.</li> <li><i>A survey report on Deep Learning Approach for Human Action Detection from Video</i> submitted to CCT Dept. Oxford Brookes University, September, 2015.</li> <li><i>Performance analysis on temporal tubes: A benchmarking report</i> submitted to CCT Dept. Oxford Brookes University, 2014.</li> <li><i>Streaming hierarchical graph based video segmentation</i>, a talk presented at research group seminar, Oxford Brookes University, November, 2014.</li> <li><i>Streaming hierarchical graph based video segmentation: A step-by-step guide</i> submitted to CCT Dept. Oxford Brookes University, 2014.</li> </ul>	
<b>AWARDS AND ACHIEVEMENTS</b>	<ul style="list-style-type: none"> <li>Our group won the reading group competition at <i>ICVSS 2015 Summer School</i> - 2015</li> <li>Received the prestigious University Research Studentship award, Oxford Brookes University - 2014</li> <li>Successfully passed ICVSS 2015 examination, July 2015.</li> <li>Nominated for the prestigious Overseas PhD Scholarship award Scheme, Aberystwyth University, United Kingdom (<i>declined</i>) - 2014</li> <li><i>Best Overall Performance award</i> for MSc course, 3rd April, 2014</li> <li><i>Best Masters Project award</i> on 3rd April, 2014</li> <li><i>Merit Scholarship award</i> at Masters level, 2014</li> </ul>	

- Secured highest marks in Computers Science in standard X(96%) and XII(grade: A).
- Secured top rank in school in standard 'X' final board examinations.

## COURSES UNDERTAKEN

- CS231n: Convolutional Neural Networks for Visual Recognition, Stanford Vision Lab (mode - online).
- Machine Learning course, department of Computer Science, University of Oxford (mode - online).
- Attended International Computer Vision Summer School 2015, Sicily, Italy.
- Attended doctorate training programme for statistical methods of data analysis, Oxford Brookes University, 2015.
- Attended training session on the use of Oxford Brookes high performance computing facilities, 2015.
- Attended talk on *Visualizing and Understanding Recurrent Neural Networks* by *Andrej Karpathy*, Stanford Computer Science group, at Engineering and Science Department, Oxford University.
- Attended two reading groups in the Department of Engineering Science at University of Oxford, topic discussed Generative Adversarial Nets (GANs), Variational Autoencoders (VAEs), June, 2016.
- *MSc taught courses*: Intelligent Agents, Programming Embedded Systems, Distributed and Parallel Computing, Systems Architecture, Data Modelling and Management, Network Systems, Cryptography and Cryptanalysis, Professional Project Management.
- *Self-motivated learnings (MSc)*: Multiple View Geometry in Computer Vision, Probability Theory and its Applications, Linear Algebra, Single and Multi-Variable Calculus.
- *Polytechnic Diploma Engineering*: Applied Mathematics, Applied Science, Digital Electronics and Introduction to Microprocessor, Electrical and Electronic Engineering, Computer Network and Architecture, System Programming, Software Engineering, Operating System, Advanced C programming and Data Structures.

## SERVICES AND PARTICIPATION

- Presented a poster on *Deep Learning for Detecting Multiple Space-Time Action Tubes in Videos* in the *MURI Meeting* at St. Catherines College, Oxford, UK, 1st August, 2016.
- Presented a poster on *Online Human Action Localisation based on Appearance and Motion Cues* at *(ICVSS) 2015*, Sicily, Italy, July 2015.
- Actively participated in the TeenTech event at London, 1st December 2015.
- Attended the Ambassadors visit at Gipsy Lane campus, Oxford Brookes University, UK, 30th September, 2015.
- Actively participated in the BBC News live broadcast at BBC broadcasting hub, London, 14th September, 2015. Watch: [video1](#) , [video2](#).
- Taking humanoid robot Artie to Magna Carta event on 18th June 2015.
- Actively participated in the Outburst Festival with humanoid robot Artie and the Naos, 9th May, 2015.
- Actively participated in the Joint University Alliance and Deloitte research showcase, Royal Institution, 21 Albemarle Street, London, W1S 4BS, UK, 12 March, 2015.

- Attended the Real World Impact filming event organised by University Alliance on 31st January, 2015 at Gipsy lane campus, Oxford Brookes University, UK, 31st January, 2015.

## COMPUTING SKILLS

- **Programming Languages:** C/C++, Matlab, Lua, Java
- **Libraries:** Torch, Caffe, OpenCV, Multiprocessing in Matlab.
- **Operating Systems:** Linux and Windows.
- **Development Environments:** Eclipse, GCC, NetBeans.
- **Productivity Applications:** LaTeX, Bitbuekt, Github, Vim, Kate, MS Office, Libreoffice
- **Multi-media development software:** Inkscape, Openshot, Audacity, GIMP

## REFERENCES

### Academic references

1. Professor Fabio Cuzzolin
  - Relationship: Director of studies and PhD Supervisor.
  - Organization: Oxford Brookes University
  - Position: Professor of Artificial Intelligence
  - Website URL: <http://cms.brookes.ac.uk/staff/FabioCuzzolin/>
  - E-mail: [fabio.cuzzolin@brookes.ac.uk](mailto:fabio.cuzzolin@brookes.ac.uk)
2. Professor Nigel Crook
  - Relationship: PhD co-supervisor
  - Organization: Oxford Brookes University
  - Position: Head of the Computing and Communication Technology Department
  - Website URL: <https://www.brookes.ac.uk/profiles/staff/nigel-crook/>
  - E-mail: [ncrook@brookes.ac.uk](mailto:ncrook@brookes.ac.uk)
3. Dr Tjeerd Olde Scheper
  - Relationship: PhD co-supervisor and research tutor
  - Organization: Oxford Brookes University
  - Position: Senior Lecturer at Computing and Communication Technology Department
  - Website URL: <http://cct.brookes.ac.uk/staff/tjeerdoldescheper.html>
  - E-mail: [tvolde-scheper@brookes.ac.uk](mailto:tvolde-scheper@brookes.ac.uk)
4. Dr Michael Sapienza
  - Relationship: PhD advisor
  - Organization: University of Oxford
  - Position: Postdoctoral research fellow
  - Website URL: <https://sites.google.com/site/mikesapi/>
  - E-mail: [michael.sapienza@eng.ox.ac.uk](mailto:michael.sapienza@eng.ox.ac.uk)
5. Dr Ashutosh Natraj
  - Relationship: MSc supervisor
  - Organization: University of Oxford
  - Position: Postdoctoral research fellow

- Website URL: <https://www.cs.ox.ac.uk/people/ashutosh.natraj/>
  - E-mail: [ashutosh.natraj@gmail.com](mailto:ashutosh.natraj@gmail.com)
6. Dr Sonia Waharte
- Relationship: MSc co-supervisor
  - Organization: University of Oxford
  - Position: Postdoctoral research fellow
  - Website URL: <https://www.cs.ox.ac.uk/people/sonia.waharte/>
  - E-mail: [sonia.waharte@gmail.com](mailto:sonia.waharte@gmail.com)

### **Professional references**

1. Dr Sumitesh Das
  - Relationship: Project leader
  - Organization: Tata Steel Limited, India
  - Position: Chief (Global Research Programmes) at Tata Steel Limited
  - Website URL: Google Scholar link
  - E-mail: [sumitesh.das@tatasteel.com](mailto:sumitesh.das@tatasteel.com)
  - Link to the reference letter received
2. Dr Abhishek Raj (M. Tech. and PhD, IIT Mumbai, India)
  - Relationship: Project advisor
  - Organization: Tata Steel Limited, India
  - Position: Researcher at R&D division
  - E-mail: [abhishek.raj@tatasteel.com](mailto:abhishek.raj@tatasteel.com)
  - Link to the reference letter received
3. Dr Shaik Shamshoddin (M. Tech. IIT Delhi, PhD IIT Mumbai, India)
  - Relationship: Project advisor
  - Organization: Tata Steel Limited, India
  - Position: Researcher at R&D division
  - E-mail: [shamshoddin@tatasteel.com](mailto:shamshoddin@tatasteel.com)
4. Raju Venkat Dasu (M. Tech. IIT Delhi)
  - Relationship: Project leader
  - Organization: Tata Steel Limited, India
  - Position: Researcher at R&D division
  - E-mail: [dvr019@gmail.com](mailto:dvr019@gmail.com)