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EDUCATION

- **PhD in Computer Engineering (Computer Vision)**, Aug 2008 - Present, GPA – 3.6
University of Central Florida, Orlando, FL, USA
Advisor(s): Prof. Mubarak Shah, Dr. Rahul Sukthankar
- **Bachelor of Engineering with honors. (Computer Science)**, June 2003, Agg. – 78.5%
University of Burdwan (Asansol Engineering College), West Bengal, India
Undergraduate Thesis: Study of Image Compression Algorithms
Advisor: Prof. Bhabatosh Chanda

RESEARCH INTERESTS

Action Recognition, Image Registration, Image Segmentation, Scene Interpretation, Object Recognition, Compressed Sensing

WORK EXPERIENCE

1. Aug 2008 – Present, Graduate Research Assistant

Computer Vision Lab, Computer Engineering Department (UCF)

- Presented an efficient alternative to the traditional vocabulary based on bag-of-visual-words (BoV) used for visual classification tasks. The representation is both conceptually and computationally superior to the bag-of-visual-words as it is an iteratively generated Maximum Likelihood estimate of an image given a set of characteristic features which are randomly sampled. The representation has comparable performance to the state-of-the-art, on experiments over a challenging scene categorization dataset and two equally challenging human action datasets.
- Proposed an approach to explore the relationship between the geometric composition of photographs with their visual attractiveness and introduced a novel approach to enhance their aesthetic appeal using spatial recomposition. The method is primarily targeted at single-subject compositions, where the location of the dominant foreground object in the frame largely determines the photographs visual appeal. This work is accepted as a full paper in ACM Multimedia International conference 2010.
- Introduced a technique to solve the problem of tracking objects persistently from surveillance platforms integrating aerial (moving) and ground (fixed) platforms in typical urban scenarios. The method successfully tracks an object in scenarios where it could be occluded from the field of view of the aerial camera while it is present in the field of view of the ground camera. Using meta-data available at the airborne camera and the calibration parameters of the ground camera, the object of interest's position in both cameras local coordinate systems are transformed to a generic world coordinate system. Trajectories obtained in terms of the generic world coordinate system are then merged assuming a temporal continuity. This work was partially funded by US Govt.'s VACE program.
- Developed **CocoaLight** - a fast and efficient system for aligning aerial image sequences for moving *Object Detection* and *Tracking* using OpenCV and C. This tool is an important contribution towards UCF- Lockheed Martin's involvement in DARPA's *Video and Image Retrieval and Analysis Tool (VIRAT)* project and is extensively used to extract motion-compensated chips depicting human activities from aerial videos.

2. June 2006 – Aug 2008, Staff Software Engineer

IBM Systems & Technology Labs, Bangalore, India

- Involved in programming device drivers for High Speed Network adapters/switches operating on Linux/AIX as part of IBM's proposal for DARPA's High Productivity Computing Systems (HPCS) project.
- Introduced Fortran 90 modules support for IBM's Message Passing Library, Enhanced thread security in MPI functions, Developed function call trace for IBM MPI in its Linux and AIX implementation (32/64-bit), Designed and implemented heap memory usage indicator for MPI library runtime.
- Implemented basic image transformation and compression algorithms on Cell processor exploiting its vector processing abilities.
- Involved in Campus Recruitment, Delivered technical talks (University Relations).

3. February 2004 – May 2006, Junior Research Engineer

Software Engineering & Technology Labs, Infosys Technologies Ltd., Bangalore, India

- Developed secure environments for application execution through different system virtualization techniques, Enforced quality of service parameters for dynamic virtual hosts, Proposed strategies to reduce Virtual machine (VM) start-up and inter-VM application migration latencies, Integrated open-source Para-virtualization (Xen) and Container-based (Linux VServer) virtualization solutions to produce a prototype capable of above functionalities [CCGRID '06].
- Proposed a Video-on-Demand solution based on loosely coupled network of commodity workstations and open-source multimedia streaming technologies to address compute-data-bandwidth constraints, introduced an adaptive content fragmentation scheme.

- Migrated Union Bank of Scotland's Financial algorithms from Solaris Sparc 32-bit SMP architecture to Linux IA-64 cluster, Parallelized sequential parts of code to gain in throughput.

4. December 2003 – February 2004, Programmer

Systems Integration, CMC Ltd., Kolkata, West Bengal, India

- Involved in the development of an e-governance suite for Ministry of Jharkhand, India.

5. June 2003 – December 2003, Software Developer

Softnet Solutions, Kolkata, West Bengal, India

- Designed and programmed a framework for generating animated images (graphs, histograms, maps) based on dynamic user inputs.
- Developed Company's knowledge asset management product, Designed a peer-to-peer messaging component.
- Independently designed a generic license key generation and validation mechanism that could be plugged as independent module into different Win32 applications.

PATENT

"Video on demand system and methods thereof", Application No. 20070083617(US), 1432/CHE/2005(IN), October 2005.

TEACHING

• September 2006 – January 2007, Visiting Lecturer

Mount Carmel College (Bangalore), Dept. of Computer Science, *Data and Communication networks (CS-502)*.

• June 2006 – August 2006, Guest Faculty

PG Studies (KAS College, Erode), *Distributed Computing (CS-821)*.

HONORS/PROFESSIONAL INVOLVEMENT

- Awardee of Full-Tuition scholarship from EECS department, UCF, Fall 2008 – present.
- Reviewer for IEEE CVPR, IJCV, ACM MM, Fall 2009 – present.
- IBM Tech Ed speaker, presented a talk on System Virtualization, Dec. 2006.
- Program Chair in "First National Conference on Human Computer Interface", Erode, India, Feb. 2007.
- Invited Speaker in the International conference on "Free and Open-Source Software in India(FOSS.IN 2005)", presented a Talk on *Virtualization and Grid Computing*, Bangalore, India, Dec. 2005.

PUBLICATIONS

1. **S. Bhattacharya**, R. Sukthankar, and M. Shah, "A Coherent Framework for Photo-Quality Assessment and Enhancement based on Visual Aesthetics", full paper in *ACM Multimedia International conference*, 2010.
2. **S. Bhattacharya**, H.Idrees, I.Saleemi, S. Ali, and M. Shah, "Real-time moving Object Detection and Tracking in Infra-red Aerial imagery", Book chapter under review in *Machine Vision Beyond Visible Spectrum*, Springer 2010.
3. M. Quaritsch, K. Kruggl, D. Wischounig-Strucl, **S. Bhattacharya**, Mubarak Shah, Bernhard Rinner, "Networked UAVs as Aerial Sensor Network for Disaster Management Applications", Springer Journal E&I, 2009.
4. S. Sundarrajan, H. Nellitheertha, **S. Bhattacharya** and N. Arurkar, "Nova: An Approach to On-Demand Virtual Execution Environments for Grids", IEEE CCGRID 2006 (oral presentation).
5. S. Sundarrajan and **S. Bhattacharya**, "Xen and Server consolidation", Technical Whitepaper, Infosys Tech. Ltd., May 2006.
6. **S. Bhattacharya**, A. Chakrabarti and S. Sengupta, "Scalable and Distributed Mechanisms for Integrated Scheduling and Replication in Data Grids", IEEE CCGRID 2005 (poster).
7. **S. Bhattacharya**, "Using 2-Dimensional Runlength Coding in Loss-less Compression of Grayscale Images", TRP002034 at Indian Statistical Institute, Kolkata, (undergraduate Thesis), Mar 2003.
8. Magazine articles ¹ in Developer IQ titled "Generating Animated images on the fly with PHP and SWF" (Mar 2004, pp.37-39), "Of Windows and messages" (Dec 2003, pp.42-43), "Segmentation faults: A Programmer's Nightmare" (May 03, pp.110-112).

COMPUTER SKILLS

<i>Platform</i>	GNU/Linux, Solaris, AIX, Windows
<i>Programming</i>	MATLAB, C, Perl, Unix Shell, PHP, Win32 API
<i>Debuggers</i>	gdb, pdbx, valgrind
<i>Tools</i>	L ^A T _E X, OpenCV, IBM Cell SDK

¹ Available at <http://www.cs.ucf.edu/~subh/publications>