Swagatika Panda

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Research Interests

Applications of computer vision, robotics and machine learning for scene understanding and perception.

Education

- **Northeastern University** — Boston, USA
  M.S. in Computer Science (GPA: 3.583/4) — *Sep 2014 - May 2016*
  - **Advisor:** Dr. Robert Platt
- **International Institute of Information Technology** — Hyderabad, India
  MS by Research, Electronics & Communication Engineering (CGPA: 9.5/10) — *Aug 2010 - Aug 2014*
  - **Advisor:** Prof. C.V. Jawahar
- **University College of Engineering** — Burla, Orissa, India
  B.Tech, Electronics & Telecommunication Engineering (CGPA: 8.69/10) — *2003-2007*

Work Experience

- **Northeastern University** — Boston, USA
  Research Assistant — *Sep 2014 - May 2016*
- **Center for Visual Information Technology, IIIT-H** — Hyderabad, India
  Research Assistant — *Aug 2010 - Jun 2014*
- **Computer Vision Lab, IIT Madras** — Chennai, India
  Project Associate — *Jan 2010 - July 2010*
- **Aricent Technologies (Holdings) Ltd** — Chennai, India
  Software Engineer — *Feb 2008 - Jan 2010*
- **IIT, Kharagpur** — Kharagpur, India
  Summer Intern — *May 2006 - July 2006*

Publications

- Swagatika Panda, A.H. Abdul Hafez and C.V. Jawahar, **Single and Multiple View Support Order Prediction in Clutter for Manipulation**, Journal of Intelligent & Robotic Systems 2016
- Swagatika Panda, A.H. Abdul Hafez and C.V. Jawahar, **Learning Support Order for Manipulation in Clutter**, IROS 2013
- Swagatika Panda, A.H. Abdul Hafez and C.V. Jawahar, **Learning Semantic Interaction among Graspable Objects**, PReMI 2013
- Raj Gupta, Reddy M. Sailaja, Swagatika Panda, Sushant Sharma, Anurag Mittal, **Foreground-background Separation on GPU using Order based Approaches**, ICVGIP 2010

MS Thesis

- **Learning semantic interaction among indoor objects**
  In this work, support relationship among objects involving physical contact is inferred, and a sequence or support order is learned in which the surrounding objects of our object of interest should be removed while causing minimal damage to the environment. Support order prediction is also extended to multiple views to overcome the limitations of single-view. An RGBD dataset using Kinect is collected to explore clutter involving physical contact.

Projects

- **3D Shape Completion for Graspable Objects**[*NEU, Sep'15-Feb'16*]: Worked on shape completion of novel objects using exemplar training method by Rock *et. al.* The aim of this project is to recover the 3D mesh from given depthmap of an object.
- **Semantic Segmentation: Learn from Neighbourhood**[*NEU, Oct'15-Dec'15*]: Performed segmentation on RGBD data using signature properties of a region such as uniform surface, depth gradient, or color, CRFs and belief propagation.
- **Object Detection on RGBD Images**[*NEU, Jan-Aug'15*]: Implemented object detection on the "University of Washington RGBD Dataset", and compared the performance with state-of-the-art. I explored different features, machine learning techniques and techniques to generate object proposals. In my final implementation, I used Selective Search, Deformable Parts Model, Multi-class SVM and Hard Negative Mining to obtain the best performance.
- **Point Cloud Scene Registration**[*NEU, Oct-Dec'14*]: Explored different descriptors and approaches to solve the problem of "scene registration" in RGBD scenario, where holes and noisy data pose significant challenge.
- **Object Localization in Clutter for Grasping**[*NEU, Sep-Oct'14*]: Performed localization and pose estimation of an object in clutter given the model of the object. This was followed by localizing grasp affordances on the object and subsequently grasping the object by the Baxter robot.
- **Movie Scene Localization**[*IIIT-H, Oct-Dec'11*]: Used visual Bag-of-Words approach to retrieve a query location of a movie in various other scenes of one or more movies.
- **Image Retrieval**[*IIIT-H, Feb-Apr'11*]: Developed a complete pipeline for image retrieval using Bag of Words model on the Caltech-101 image dataset and further improved its performance using tf-idf and query expansion.
- **Video Analysis**[*IIIT-H, Feb-Mar'11*]: Analyzed long news video footage using computer vision techniques such as shot detection, scene classification and face detection, and performed tasks such as news channel detection, news tickers removal, news anchor detection, cricket shot detection, parliament news classification, etc.
- **Bidirectional Similarity**[*IIIT-H, Oct-Dec'10*]: Implemented the paper titled "Summarizing Visual data using bidirectional similarity" by Simakov *et al.* in a group of two. In this work, image re-targeting was performed using bidirectional similarity that preserved completeness and coherence.
- **Wavelet-based Image Denoising**[*IIIT-H, Oct-Dec'10*]: Implemented the work "Adaptive wavelet thresholding for image denoising and compression" by Chang *et al.* In this work, Visushrink (universal thresholding) and BayesShrink (adaptive wavelet-based soft thresholding) are applied to noisy images and compared.
- **Real-time Tracking for Surveillance**[*IIT-M, Jan-Jun'10*]: Performed real-time humans tracking in outdoor setting using Kalman filter as part of the project "Multiple Camera Detection and Tracking".

- **Networking Protocols**[*Aricent, Feb'08-Jan'10*]: Worked in multiple projects involving development of multicasting protocols in layer 3 such as PIM, IGMP and DVMRP and stabilization of automated test suites for layer 2 protocols.

Academic achievements

- Was selected for CRA-Women Grad Cohort Workshop 2016 at San Diego, California.
- Was selected for CRA-Women Grad Cohort Workshop 2015 at San Francisco, California.
- Received IROS Student Travel Grant and IACRS Travel Grant to attend IROS 2013.
- Received PReMI Student Travel Grant to attend PReMI 2013.
- Qualified for "National Talent Search" (NTS) scholarship held by NCERT, New Delhi, India in 2001.
- Secured 4^{th} rank in class 10^{th} held by Board of Secondary Education, Orissa, India in 2001.

Activities

- Attended NorthEast Robotics Colloquium: NERC 2015 at WPI, Worcester, CVPR 2015 at Boston, and NEMS 2015 at Northeastern University, Boston in the year 2015.
- Attended NERC 2014 at Brown University, Providence, RI.
- Created a LaTeX tutorial for students at CVIT, IIIT-Hyderabad to help writing research papers.
- Mentored participants in Summer school organized by CVIT, IIIT-Hyderabad in summer 2013.
- Actively engaged in hobbies like painting, sketching, blogging and gardening.

Skills

Languages: C, C++, MATLAB, Python, Shell Scripting
Tools/library: PCL, ROS, OpenGL, OpenCV, LibSVM, LaTeX

Advanced Courses

MS(NEU)
Intensive Computer Systems
Intensive Principles of Programming Languages
Advanced Algorithms
Foundations of Artificial Intelligence
Robotic Science and Systems
Advanced Machine Learning

MS(IIIT)
Digital Image Processing
Computer Vision
Pattern Recognition
Time Frequency Analysis
Artificial Neural Networks
Machine Learning

MOOCs

Coursera:
Python Data Structures (Feb 2016)
Programming for Everybody (Dec 2015)
(Getting Started with Python)
The Brain and Space (Oct 2015)