Swarna Kamlam Ravindran

homepage: `http://www.cs.duke.edu/~swarnakr`

EDUCATION

PhD, Computer Science — started Aug 2015
Specialization: Computer Vision
Duke University
CGPA: 3.9/4.0

Master of Science, Electrical Engineering — Dec 2014
Specialization: Computer Vision
Indian Institute of Technology Madras, Chennai, India
CGPA: 9.3/10.0

Bachelor of Engineering, Electronics and Communication Engineering — May 2009
Anna University (Madras Institute of Technology Campus), Chennai
CGPA: 8.8/10.0, First Class with Distinction

PUBLICATIONS

- CoMaL: Good Features to Match on Object Boundaries, Swarna Kamlam Ravindran and Anurag Mittal, Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, 2016. `https://comal-iitm.github.io/`.
- CoMaL Tracking: Tracking Points at the Object Boundaries, S. Ramakrishnan, SK Ravindran and A. Mittal, under review CVPR, 2017.
- Scale-invariant curve-based features for tracking under varying backgrounds, Swarna Kamlam Ravindran and Anurag Mittal, Technical Report, DRDO.
- CMSER: Combined MSERs for better feature matching, Swarna Kamlam Ravindran and Anurag Mittal, Technical Report, DRDO.
- 3D Face Recognition system using a Local Shape Descriptor, SK Ravindran and G Sumithra, International Symposium on Computing, Communication, and Control (ISCCC) 2009 organized by IACSIT.

PATENT

CoMaL Tracking: Device for tracking points on boundaries of objects, S. Ramakrishnan, SK Ravindran and A. Mittal. Patent application filed 01/21/2017.

AWARDS AND ACHIEVEMENTS

- Duke Scholarship. (2015)
- Awarded USC Viterbi Deans Masters Fellowship. (2010)
- BSNL (Bharat Sanchar Nigam Limited) Technical Scholarship (2005 - 2009)
- First among over 5000 applicants in the IIT-Madras entrance examination for the Communications stream. (2011)
- Secured rank 378 out of 169,000 applicants in all-India Engineering Entrance Examination. (2005)
- Mrs. YGP Endowment Scholarship. (1999 - 2002)
- Rank 19 in the National level PCM Scholarship Exam. (1998-99)

EXPERIENCE

- Project Officer at the Computer Vision Lab, Computer Science and Engg Dept, IIT-Madras (Dec 2012 - May 2015)
- Project Associate at CV Lab, CSE Dept, IIT-Madras (Dec 2009 - Dec 2012)
- Design Engineer Trainee at Xambala Inc (Financial Information processing) (May 2009 - Aug 2009)

PROJECTS Computer Vision

- **DST Project on Features for 3D applications** (Dec 2012 - May 2015)
  The performance of the feature detection and matching modules were significantly improved at the object boundary regions, useful in applications such as Vehicle Tracking and Structure from Motion. The project was funded by the Department of Science and Technology, Government of India.
- **DRDO Project on Features for Surveillance** (Dec 2009 - Dec 2010)
  A feature detector using a probabilistic combination of stable extremal regions incorporated into a 3D reconstruction system yielded over 15% improvement over existing methods for surveillance. Mosaicing and Contour detection software were implemented by using shape geometry to achieve scale invariance. The project was funded by the Defense Research and Development Organisation, Government of India.
- **Projects in Advanced Digital Signal Processing** (May 2011 - July 2011)
  Non-stationary analysis on audio signals was performed using spectrogram, scalogram and Wigner-Ville distributions. Tools to analyse an ECG signal and perform Signal Quantisation were developed.
- **3D Face Recognition using a Local Shape descriptor** (Dec 2008 - May 2009)
  Designed a face recognition system using a descriptor formed as a 2D histogram of distances between points near a landmark point to the corresponding tangent plane. Experiments were performed on range images of six subjects with varying illumination.
- **Bag detection system for TCS surveillance project** (July 2008 - Dec 2008)
  Principles of symmetricity were used to identify humans carrying bags or other objects. Periodocity check was employed to identify vehicles or animals in motion.

PROJECTS Coding and Information theory

- **Error Correct Code in DNA** (with TIFR, Mumbai) (Dec 2012 - Aug 2013)
  Investigated the presence of an error correction code in the DNA of E.coli by modeling evolution of the DNA as a communication process and mutations as errors.
- **Decoders for TeNet project, IIT-Madras** (Jan 2012 - Aug 2012)
  Built the following decoders: a threshold decoder for Soft Linear Block Codes using Bossert Hergert Algorithm, decoders for Hamming and Reed Muller codes, generic encoder-decoders for different types of LDPC codes and channels and a generic Viterbi decoder for convolution codes.
- **Financial Processing** (May 2009 - Aug 2009)
  Built analysis tools for variation in price of a stock for Xambala Inc.

SKILLS

Languages C, C++, MATLAB, Bash Shell Scripting, LaTeX
Platforms/Frameworks: Linux, OpenCV

GRAD COURSES

- *Vision and Learning:* Computer Vision, Geometry for Computer Vision, Pattern Recognition, Machine Learning, Advanced Machine Learning.
- *Math:* Numerical Linear Algebra and Optimization, Advanced Signal Processing, Information and Coding theory.

REFEREES

Dr. Carlo Tomasi (Advisor), Professor, Duke University.
email: tomasi@cs.duke.edu

Dr. Katherine A. Heller, Assistant Professor, Duke University.
email: kheller@stat.duke.edu

Dr. Haizhao Yang, Assistant Professor, Duke University.
email: haizhao@math.duke.edu

Dr. Anurag Mittal, Associate Professor, IIT-Madras.
email: amittal@cse.iitm.ac.in