Swarna Kamlam Ravindran

homepage: `https://swarnakr.github.io/`

EDUCATION

PhD, Computer Science — started Aug 2015
Specialization: Computer Vision
Duke University

Master of Science, Electrical Engineering — May 2013
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

Class 12, DAV Matriculation Higher Secondary School, Chennai — March 2005
98% aggregate, Maths: 99.5%, Physics: 98.5%, Chemistry: 99.5%

Class 10, Padma Seshadri Bala Bhavan SSS, Chennai — May 2003
93% aggregate, Maths: 99%, Science: 97%

PUBLICATIONS

- CoMiC: Corners on Maximally-stable Iso-intenstiy Curves, Swarna Kamlam Ravindran and Anurag Mittal, under review at **IEEE CVPR 2015** `http://arxiv.org/abs/1412.1957`, supplementary material on `https://swarnakr.github.io/`.
- CoMiC features for Tracking and Image Matching, Swarna Kamlam Ravindran and Anurag Mittal, **IJCV** draft in preparation.
- Scale-invariant curve-based features for tracking under varying backgrounds, Swarna Kamlam Ravindran and Anurag Mittal, Tech Report, DRDO.
- CMSER: Combined MSERs for better feature matching, Swarna Kamlam Ravindran and Anurag Mittal, Tech Report, DRDO.
- 3D Face Recognition system using a Local Shape Descriptor, Swarna Kamlam Ravindran and Sumithra G, **International Symposium on Computing, Communication, and Control (ISCCC) 2009**.

AWARDS AND ACHIEVEMENTS

- 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 for consistently holding the first rank in the batch. (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 (Jan 2013 - Present)
- 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 - Present)
  - The performance of the Vehicle tracking and Structure from Motion modules of self-driving cars was improved by over 30 % using better point features and more efficient algorithms. Extensive verification tests were conducted on roads in Chennai with heavy traffic.
  - The project was for the Department of Science and Technology, Govt 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 for the Defense Research and Development Organisation.
- **Modules for Music and Speech projects at IIT-Madras** (Nov 2011 - Feb 2012)
  - Data classification was performed using Linde Buzo Algorithm and K means clustering.
  - Bayesian Clustering and Bayesian classification using BE, ML, MAP was implemented to classify high-dimensional data points.
- **Projects in Advanced DSP** (May 2011 - Jul 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** (Jul 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.
  - Collaborated with Dr Manoj Gopalakrishnan at Tata Institute of Fundamental Research.
- **Threshold Decoder for TeNet project, IIT-Madras** (Jan 2012 - Aug 2012)

  - Built a threshold decoder for Soft Linear Block Codes using Bossert Hergert Algorithm.
  - Built decoders for Hamming and Reed Muller codes.
- **Decoders for TeNet project, IIT-Madras** (Jan 2012 - Aug 2012)
  - Built generic encoder-decoders for different types of LDPC codes and channels.
  - Built a generic Viterbi decoder for convolution codes.
- Built software tools and engineered formulations to analyse the variation in price of a stock at Xambala Inc. (May 2009 - Aug 2009)

SKILLS

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

COURSES

- *Vision:* Computer Vision, Geometry for Computer Vision, Pattern Recognition. Audited: Digital Video Processing and Machine Learning.
- *Math:* Advanced Signal Processing, Information and Coding theory, Discrete Math, Probability. Audited: Linear Algebra and Math for Signal Processing.
- *CS:* Fundamentals of Computing, Computer Practice Lab, Programming and Data Structures, Computer Architecture and Organisation, Computer Networks, Operating systems, Object Oriented Programming.

CO-CURRICULAR ACTIVITIES

- Was among the group of 25 students invited to The 3rd Microsoft Research India Computer Vision and Graphics Shindig, a meeting of top CV researchers across the world. (2010)
- Participated in Competitive Programming contests.
- Attended ICTS School on Network Science in EECS at IISC, Bangalore. (2012)
- Attended SPCOM Conference at IISC, Bangalore (2012) and technical workshops by IEEE, TI, IBM, IETE. (2008-2009)
- In-plant Training at Reliance Communications and Airport Authority of India on communication techniques. (2008)

EXTRA-CURRICULAR

- Trek extensively with the Chennai Trekking Club. (2011-2014)
- Silver medal for trekking, cave exploration by Akara. (2003)
- Research Assistant on Made in Madras Ink Documentary on Rehabilitation after Tsunami. (2005)
- Third in the zonal Table Tennis Tournament. (2002)

REFEREES

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

Dr Andrew Thangaraj, Associate Professor, EE, IIT-Madras.
email: andrew@ee.iitm.ac.in

Dr Bhoopathy Bagan K, Professor and former HOD,
EE, Anna University (MIT Campus).
email: bhoopathybagan@annauniv.edu