Mayank Kumar

Rice University
ECE Department, MS-380
6100 Main Street
Houston, TX 77005

Phone: 832-593-1893
Email: mk28@rice.edu
Website: www.ece.rice.edu/~mk28/

Objective

To be a leader in technology which touches human lives

Education

PhD candidate, Electrical and Computer Engineering, Rice University 2014 - Present
Advised by Dr. Ashutosh Sabharwal
MS in Electrical and Computer Engineering, Rice University Aug, 2014
GPA 4.04/4.00
B.Tech in Electrical Engineering, IIT, Delhi May, 2010
GPA 8.96/10.00*, Department Rank 3*

Scholastic Achievements

NSF Awards for young professionals contributing to smart and connected health (2016)
Texas Instruments Graduate Student Fellowship (2015-Present)
Audience Choice Award, Rice 90 Second Thesis Competition 2014
Best Graduate Student Poster, Rice ECE Affiliates Day 2014
NASA Space Health Challenge 2014 (2nd Prize)
Best B.Tech Project Award in IIT Delhi, 2010
Yahoo HackU Award, 2009 by Yahoo R&D
Indian National Physics Olympiad, 2006

MS Research

Robust estimations of Photoplethysmograms using a camera Spring 2014

- Developed a new algorithm (distancePPG) for monitoring vital signs (pulse rate, pulse rate variability, breathing rate) using a person's video
- Improved performance of existing methods to make it work for all skin tones, under varied lighting conditions and in different motion scenarios

Publications

[J1] Mayank Kumar, Ashok Veeraraghavan, and Ashutosh Sabharwal, "DistancePPG: Robust non-contact vital signs monitoring using a camera," Biomed. Opt. Express 6, 1565-1588 (2015)

[C1] Mayank Kumar, James Suliburk, Ashok Veeraraghavan and Ashutosh Sabharwal, "PulseCam: High-resolution blood perfusion imaging using a camera and a pulse oximeter," 2016 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Orlando, FL, 2016, pp. 3904-3909.

[C2] Peter Washington, Mayank Kumar, Anant Tibrewal, and Ashutosh Sabharwal, 'ScaleMed: A Methodology for Iterative mHealth Clinical Trials' IEEE Healthcom 2015 - SSH 2015.

[C3] M. Chowdhary, CSR Technology, USA; M. Sharma, A. Kumar, IIT, India; S. Dayal, CSR Technology, India; M. Kumar, IIT, India. Robust Attitude Estimation for Indoor Pedestrian Navigation using MEMS Sensors. ION GNSS 2012

[C4] Dhruv Jain, Himanshu Gupta, Deeksha Gautam, Mayank Kumar, Vinay Ribeiro, Manish Sharma. Whitespace Network for Vehicular Communication. COMSNETS 2013

Patents

[P1] Camera-based photoplethysmogram estimation (US Utility Patent Application, Nov 2015)

[P2] High resolution blood perfusion imaging using a camera and a pulse oximeter (US Provisional Patent, April 2016)

[P3] A system and apparatus for Auditory Evoked Potential (AEP) data acquisition for hearing screening (India Patent, 2011)

Experience

Innovator-in-Residence, Gauss Surgical Inc., Los Altos, CA. Summer 2015
- Explored the prospect of productizing non-contact vital sign monitoring, developed minimum viable prototype.

Teaching Assistant, Rice University, ECE Dept. Fall 2014
- Conduct weekly concept review sessions for ELEC-241, Fundamental of Electric Engineering

Corporate R&D Intern, Qualcomm, San Diego, CA Summer 2013
- Developed new algorithm for non-linear interference cancellation (NLIC) in 4G communication systems.
- Proposed and implemented new ideas to reduce convergence time and implementation cost of developed algorithm

Algorithm Developer, Stanford India Bio-design, AIIMS New Delhi Fall 2011
- Devised novel algorithm for detecting weak (100 nV) Auditory Brainstem Response (ABR) signal in presence of 30 dB high EM noise
- Patented the algorithm (and prototype) (India Patent)

Algorithm Developer, CSR plc, Noida, Spring 2011
- Developed error model using Extended Kalman filter (EKF) for a mobile phone based pedestrian navigation system
- Benchmarked performance of navigation algorithm and suggested scope of improvements

Engineering Trainee, Texas Instruments, Bangalore Summer 2009
- Developed an application to measure performance of GPS receivers during field trials in absence of ground truth data

Leadership Experience

Co-founder, Yantrr Electronic Systems (YES) Pvt. Ltd. 2010-2015
- Developed the cloud architecture for Yantrr M2M device cloud
- Shaped the strategy for YES to be a leader in Industrial machine-to-machine communications

Technical Skills

Programming Language: Python, C/C++, MATLAB, VHDL
Software Libraries: OpenCV (Computer Vision), Scikit Learn (Machine Learning), TensorFlow (deep-learning), OpeGL (Computer Graphics)
Hardware Platform: Arduino, BeagleBone, C5515 TI DSP, DM365 DaVinci, Xilinx Virtex IV

References*

Dr. Ashutosh Sabharwal (Prof. Rice, ECE), Dr. Ashok Veeraraghavan (Asst. Prof. Rice, ECE), James W. Suliburk, MD, FACS (Asst. Prof. of Surgery, Baylor College of Medicine), Siddharth Satish (Founder and CEO, Gauss Surgical)
** All references are made available upon request*