문성광

PhD
Department of Electrical and Computer Engineering
Mississippi State University

PERSONAL

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생년월일: November 3, 1980, Bucheon, South Korea

EDUCATION

Ph.D. in Electrical & Computer Engineering — Aug. 2007 - Dec. 2012
Mississippi State University, Starkville, MS — GPA 3.72/4.00 (42 credits)
Thesis: "Block Compressed Sensing of Images and Video"
Advisor: Dr. James E. Fowler

B.S. in Computer Engineering — Mar. 2000 - Dec. 2002, Mar. 2005 - May 2007
KwangWoon University, Seoul, South Korea — GPA 3.00/4.00 (117 credits)
Study Area: Digital Image Processing (Motion Detection)
Advisor: Dr. Sungwon Lee

Exchange Student in Electrical & Computer Engineering — Aug. 2006 - May 2007
Mississippi State University, Starkville, MS — GPA 3.80/4.00 (30 credits)

RESEARCH INTERESTS

- Compressed sensing
- Images and video coding
- Medical image reconstruction

EXPERIENCE

Research

- Block compressed sensing recovery of images
  Compressed sensing(CS) is a platform that enables sub-Nyquist sampling of a sparse signal spatial/ transform domain by means of random projection, and block based CS (BCS) is one of practical approach. It allows an extremely light-weight/fast data acquisition but leaves an under determined recovery problem at the data receiver side. In this project, we developed a simple-yet-efficient block-based iterative recovery technique called BCS-SPL using smoothed projected Landweber method in conjunction with directional transform and bivariate shrinkage.
- Block compressed sensing recovery for video
  BCS-SPL is further extended to video sequence obtained by the frame-by-frame sampler without any modification. It is similar to the concept of distributed video coding where temporal redundancy in video is exploited in receiver side except CS encoder is much simpler. We devised a reconstruction technique based on BCS-SPL by iteratively enhancing motion vectors by reconstructing random projected residual between current and reference frame instead random measurements of the current frame. Overall scheme is called motion compensated (MC) BCS-SPL.
- Quantized block CS recovery for images
  Quantization is an inevitable process in CS as does in digital signal processing, which induces errors. Using the fact that each block in BCS measurements generates block correlation even in the random domain which can be exploited by the differential pulse-code modulation (DPCM). We adapt DPCM into BCS-SPL to reduce the bit rate, resulting in better reconstruction with increased bit-budget.

- Compressed sensing recovery for dynamic magnetic resonance images (MRI)
  Sub-Nyquist CS sampling in MRI permits the scan time radically decreased, which is crucial for dynamic MRI. We applied the projected Landweber of BCS-SPL on partial Fourier coefficients to iteratively reconstruct each frame and further enhanced by residual reconstruction where motion is captured by telescopic searching.
- Code: http://www.ece.msstate.edu/~fowler/BCSSPL/

Teaching

- Teaching Assistant
  Digital Device and Logic Design, Mississippi State University Fall 2010 - Fall 2012
  - Taught 60 (Fall semester) - 120 (Spring semester) students in the lab.
  - Supervisor: Mrs. Jane Moorhead
  - Assisted instructor to develop lab materials effective for the large classroom environment by writing comprehensive lab manuals, reports, on-line quizzes, and auxiliary programs.

Work

- Consultant & Marketer
  Sisa Education Company, Seoul, South Korea Jun. 2004 - Nov. 2004
  - Assisted administration of the Test of English for International Communication (TOEIC) at middle and high school.
- Soldier
  Defense Intelligence Command, Republic of Korea Army, Seoul, South Korea Mar. 2002 - Apr. 2004
  - Dispatched classified documents to other command headquarters.

PUBLICATIONS

Refereed Journal Articles

[1] James E. Fowler, Sungkwang Mun, and Eric W. Tramel, "Block-based compressed sensing of images and video," Foundations and Trends in Signal Processing, vol. 4, no. 4, pp. 297–416, March 2012

Refereed Conference Papers

[1] Sungkwang Mun and James E. Fowler, "Motion compensated compressed sensing for dynamic MRI," in Proceedings of the International Conference on Image Processing, Melbourne, Australia, September 2013

[2] Sungkwang Mun and James E. Fowler, "DPCM for quantized block-based compressed sensing of images," in Proceedings of the European Signal Processing Conference, Bucharest, Romania, August 2012

[3] James E. Fowler, Sungkwang Mun, and Eric W. Tramel, "Multiscale block compressed sensing with smoother projected Landweber reconstruction," in Proceedings of the European Signal Processing Conference, Barcelona, Spain, August 2011, pp. 564–568

[4] Sungkwang Mun and James E. Fowler, "Residual reconstruction for block-based compressed sensing of video," in Proceedings of the Data Compression Conference, James A. Storer and Michael W. Marcellin, Eds., Snowbird, UT, March 2011, pp. 183–192

[5] Sungkwang Mun and James E. Fowler, "Block compressed sensing of images using directional transforms," in Proceedings of the International Conference on Image Processing, Cairo, Egypt, November 2009, pp. 3021–3024

SKILLS

Programming: C/C++, Verilog, Matlab, LaTeX, HTML
Operating Systems: Windows, Linux, UNIX
Language: English, Korean

SERVICES

Web Administrator

- Korean Student Association, Mississippi State University — Aug. 2008 - Dec. 2012
  Maintained the web site, http://ksa-msu.com
- Starkville Korean Church, Starkville, Mississippi — Jan. 2010 - Present
  Created and maintaining the web site, http://skpc.us

Graduate Ambassador
Electrical and Computer Engineering, Mississippi State University — Aug. 2008 - Dec. 2012
Assisting the prospective especially international students for admission for the graduate program.

Vice President
Korean Student Association, Mississippi State University — Aug. 2008 - May. 2009, Aug. 2010 - May 2011
Planned yearly plan and budget for the organization, and helped the exchange students, transferred students, and visiting professors settle down.

HONORS AND AWARDS

Research Assistantship, Geo systems Research Institute — Fall 2008 - Summer 2010, Summer 2011,12
Scholarship, Kwangwoon University, Seoul — Fall 2005
Excellent Military Prize, Information School, Republic of Korea Army — May 2002

REFERENCES

Dr. James E. Fowler: fowler@ece.msstate.edu, +1 (662) 325-3640, +1 (662) 325-2578
Dr. Jenny Q. Du: du@ece.msstate.edu, +1 (662) 325-2035
Mrs. Jane Moorhead: janem@ece.msstate.edu, +1 (662) 325-2096