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		processing and information theory. We applied this CS technique to WSN which consists of a large number of wireless sensor nodes and a central fusion center (FC). This CS based signal acquisition and compression is done by a simple linear projection at each sensor node. Then, each sensor transmits the compressed samples to the FC. The FC which collects the compressed signals from the sensors jointly reconstructs the signals in polynomial time using a signal recovery algorithm. The distributed sensors observe similar event in designated region. Therefore, the observed signals have considerable correlation each other. We pay some effort in modeling correlation between the signals acquired from the sensors. After modeling the correlated signals, we propose POMP (Phased-OMP) which can recover any type of correlated signals stably and effectively. We introduce the idea of our proposed algorithm in detail and then compare the reconstruction performance of POMP with previous algorithms
5	2012-12-13	Multiuser Cooperative Diversity Through Network Coding Based on Classical Coding Theory
	Jintaek Seong	To increase the diversity order of cooperative wireless communication systems without sacrificing the system's rate, they propose the generalized dynamic-network code (GDNC). They showed that the problem of designing network codes that maximize the diversity order is related to that of designing optimal linear block codes, in the Hamming distance sense, over a nonbinary finite fields.
6	2013-01-24	A fast approach for over-complete sparse decomposition based on smoothed L0 norm
	Oliver	This paper proposes a fast algorithm for overcomplete sparse decomposition.The algorithm is derived by directly minimizing the L0 norm after smoothening. Hence, the algorithm is named as smoothed L0 (SL0) algorithm. The authors demonstrate that their algorithm is 2-3 orders of magnitude faster than the state-of-the-art interior point solvers with same (or better) accuracy.
7	2013-01-10	Statistical physics-based re construction in compressed sensing
	Jaewook Kang	In this report, the author introduces a expectation maximization (EM) based belief propagation algorithm (BP) for sparse recovery, named EM-BP. The algorithm have been mainly devised by Krzakala et al. from ParisTech in France. The properties of EM-BP are as given below:1) It is A low-computation approach to sparse recovery, 2) It works well without the prior knowledge of the signal, 3) It overcomes the l1 phase transition given by Donoho and Tanner under the noiseless setup, 4) It is further improved in conjunction with seeding matrices (or spatial coupling matrices). The main purpose of this report regenerates a precise description of EM-BP derivation from the reference paper. It might be very helpful

		for understanding of EM-BP algorithm, and an answer for such a question: How and why does the algorithm work ? Therefore, we will focus on the explanation of 1) and 2) in the properties, and just show the result of the paper with respect to that of 3) and 4).
8	2013-02-07	Performance Analysis of Iterative Decoding Algorithms with Memory over Memoryless Channels
	Jeongmin	In this work, they propose a model for iterative decoding algorithms with memory which covers successive relaxation (SR) version of belief propagation and differential decoding with binary message passing (DD-BMP) algorithms. Based on this model, they derive a Bayesian network for iterative algorithms with memory over memoryless channels and use this representation to analyze the performance of the algorithms using density evolution.
9	2013-02-14	Faster STORM using compressed sensing
	Eunseok	In super-resolution microscopy methods based on single-molecule switching, the rate of accumulating single-molecule activation events often limits the time resolution. Here we developed a sparse-signal recovery technique using compressed sensing to analyze images with highly overlapping fluorescent spots. This method allows an activated fluorophore density an order of magnitude higher than what conventional single-molecule fitting methods can handle. Using this method, we demonstrated imaging microtubule dynamics in living cells with a time resolution of 3 s.
10	2013-02-21	A Node-Based Time Slot Assignment Algorithm for STDMA Wireless Mesh Networks
	Muhammad Asif Raza	In this paper authors present a link capacity model for spatial time-division multiple access (STDMA) mesh networks. It makes use of a simplified transmission model that also considers channel fading. The model then forms the basis of a node-based slot-assignment and scheduling algorithm. This algorithm enables the user to exploit multiuser diversity that results in optimizes network throughput. The presented algorithm shows significant improvement in the throughput when compared with existing slot-assignment methods
11	2013-02-28	A New TwIST: Two-Step Iterative Shrinkage/Thresholding Algorithms for Image Restoration
	Hwanchol Jang	In this paper, the authors introduces TwIST algorithms, exhibiting much faster convergence rate than IST for ill-conditioned problems. For a vast class of nonquadratic convex regularizers, they show that TwIST converges to a minimizer of the objective function, for a given range of values of its parameters.
12	2013-03-21	Scaling Up MIMO: Opportunities and challenges with very large arrays

	Woongbi	Very large MIMO systems, also known as massive MIMO, multiuser MIMO systems, or large-scale antennas systems is an emerging research area in antenna systems, electronics, and wireless communication systems. A base station with an antenna array serves a multiplicity of single-antenna terminals. In this presentation, the fundamental principle of massive MIMO technology and several issues are introduced.
13	2013-03-28	Shrinkage methods to linear regression problems
	Jaewook	In this chapter, we are interested in the linear regression with shrinkage methods. The shrinkage method have got attention to solve the problem of linear systems y=Ax because the method provides very flexible solver from dense signals to sparse signals. First, we will introduce basic concept of two shrinkage methods in the linear regression, Ridge and Lasso. Then, we move the focus to sparse recovery with Lasso and its variants for different problem setting such as Fused lasso and Elastic net.
14	2013-04-11	Efficient Design and Decoding of Polar Codes
	Jeongmin	Polar codes are shown to be instances of both generalized concatenated codes and multilevel codes. It is shown that the performance of a polar code can be improved by representing it as a multilevel code and applying the multistage decoding algorithm with maximum likelihood decoding of outer codes. Additional performance improvement is obtained by replacing polar outer codes with other ones with better error correction performance. In some cases this also results in complexity reduction. It is shown that Gaussian approximation for density evolution enables one to accurately predict the performance of polar codes and concatenated codes based on them.
15	2013-04-18	Aliasing-Free Wideband Beamforming Using Sparse Signal Representation
	J. Oliver	This paper considers the use of sparse signal representation for the wideband direction of arrival (DOA) or angle of arrival estimation problem. In particular, this paper discusses about the two ambiguities, namely, spatial and algebraic aliasing that arise in wideband-DOA. The authors of the paper suggest procedures to avoid the aliasing using multiple measurement vector and multiple dictionaries.
16	2013-05-09	Turbo Reconstruction of Structured Sparse Signal
	Hyeongho	This paper considers the reconstruction of structured-sparse signals from noisy linear observations. In particular, the support of the signal coefficients is parameterized by hidden binary pattern, and a structured probabilistic prior (e.g., Markov random chain/field/tree) is assumed on the pattern. Exact inference is discussed and an approximate inference scheme, based on loopy belief propagation (BP), is proposed. The proposed scheme iterates between

		exploitation of the observation-structure and exploitation of the pattern-structure, and is closely related to noncoherent turbo equalization, as used in digital communication receivers. An algorithm that exploits the observation structure is then detailed based on approximate message passing ideas.
17	2013-05-16	Compressive fluorescence microscopy for biological hyperspectral imaging
	Eunseok	The mathematical theory of compressed sensing (CS) asserts that one can acquire signals from measurements whose rate is much lower than the total bandwidth. Whereas the CS theory is now well developed, challenges concerning hardware implementations of CS-based acquisition devices—especially in optics—have only started being addressed. This paper presents an implementation of compressive sensing in fluorescence microscopy and its applications to biomedical imaging. Our CS microscope combines a dynamic structured wide-field illumination and a fast and sensitive single-point fluorescence detection to enable reconstructions of images of fluorescent beads, cells, and tissues with undersampling ratios (between the number of pixels and number of measurements) up to 32. We further demonstrate a hyperspectral mode and record images with 128 spectral channels and undersampling ratios up to 64, illustrating the potential benefits of CS acquisition for higher-dimensional signals, which typically exhibits extreme redundancy. Altogether, our results emphasize the interest of CS schemes for acquisition at a significantly reduced rate and point to some remaining challenges for CS fluorescence microscopy.
18	2013-05-30	Simplified Relay Selection and Power Allocation in Cooperative Cognitive Radio Systems
	Muhammad Asif	In this paper authors propose solution of a combined problem; relay selection and power allocation to secondary users under the constraint of limited interference to primary users in cognitive radio (CR) system. Objective of the joint problem was to maximize system throughput. A high complexity optimal solution and a low complexity suboptimal solution are proposed. The presented solutions show over 50% improvement in system throughput.
19	2013-06-13	Signal Recovery From Random Measurements Via Orthogonal Matching Pursuit
	Sangjun	This paper is to show that a sufficient condition on the number of measurements for a successful greedy algorithm called Orthogonal Matching Pursuit. We understand how the authors of this paper derive their sufficient condition.
20	2013-06-27	Link Status Monitoring Using Network Coding
	Jin-Taek	This work has presented a novel approach to link status monitoring based on a deterministic approach that exploits linear network coding at the internal nodes in a network. The key problem of

		identifiability for such approaches was highlighted and various insights provided regarding this concept. New sufficient conditions were derived for successfully identifying a congested link in any logical network, and tradeoffs between length of training slots and size of the network coding alphabet established.
21	2013-07-11	A sparse signal reconstruction perspective for source localization with sensor arrays
	J.Oliver	In this paper, the authors present a source localization method based on sparse representation of sensor measurements. In particular, they use SVD of the data matrix obtained from the sensors to summarize the multiple measurements. The SVD summarized data is then sparsely represented in order to detect the sources. The authors also proposed grid refinement in order to mitigate the effects of limiting estimates to a grid of spatial locations. They demonstrate the superior resolution ability with limited time samples of their method over the existing methods via various experiments
22	2013-07-18	Enhancing Iterative Decoding of Cyclic LDPC Codes Using Their Automorphism Groups
	Jeongmin	In this paper they focus on cyclic LDPC codes defined by a circulant parity-check matrix and consider two known subgroups of the automorphism group of a cyclic code. For the large class of idempotent-based cyclic LDPC codes in the literature, they show that the two subgroups only provide equivalent parity-check matrices and thus cannot be harnessed for iterative decoding. Towards exploiting the automorphism group of a code, they propose a new class of cyclic LDPC codes based on pseudo-cyclic MDS codes with two information symbols,for which nonequivalent parity-check matrices are obtained. Simulation results show that for our constructed codes of short lengths, the automorphism group can significantly enhance the iterative decoding performance
23	2013-07-25	Multiuser detection of sparsely spread CDMA
	Jaewook	Abstract: This paper has discussed about design and analysis of multiuser detection (MUD) using sparsely spread CDMA systems. The objective of the MUD problem is how to detect multiple user signals simultaneously at the low computational cost. The main obstacle is multiple-access interference (MAI). These multiple user signals are interference for each user detection one another. The MAI problem arise in most CDMA systems, and optimal detection in such systems requires exponentially growing computation as the number of user increases. But a good news is that the simultaneous users in time is very few. Therefore, this paper investigates a suboptimal MUD detection using sparse CDMA systems. The key idea of the proposed system is to encode the transmitted waveforms using sparse spread CDMA codes and detect the signal using a linear-complexity belief propagation (BP) algorithm. We summarize the contributions of this work is following:

		- Description the sparse CDMA system - Properties of the sparsly spread CDMA codes for the convergence of the BP algorithm - Design of the BP algorithm for the MUD problem - Asymptotic analysis of performance of the BP algorithm based MUD detection In this report, we aim to sketch the key point of each contribution of this paper.
24	2013-08-01	Compressive Sensing for Spread Spectrum Receivers
	Hyeongho	This paper investigates the use of Compressive Sensing(CS) in a general Code Division Multiple Access (CDMA) receiver. They show that when using spread spectrum codes in the signal domain, the CS measurement matrix may be simplified. Furthermore, they numerically evaluate the proposed receiver in terms of bit error rate under different signal to noise ratio conditions and compare it with other receiver structures.
25	2013-08-08	Active illumination single-pixel camera based on compressive sensing
	Eunseok	This paper is organized as follows. After a brief introduction (Section 1), some mathematical back- ground essential to the understanding of CS is shown (Section 2). Then, in Section 3, CS is presented along with some of its principal properties. Section 4 explains why the ℓ1-norm is such a good option for com- pressive sensing. Some insights about the robustness of CS in the presence of noise are given in Section 5. Next, in Section 6, the single-pixel camera developed at Rice University is discussed. Subsequently, the innovative active illumination single-pixel camera developed in the scope of the current work is described. Following that, experimental results from the single-pixel cameras are presented. In the end, the main conclusions of this work are exposed.
26	2013-08-29	Resource Allocation in Cognitive Radio Relay Networks
	Muhammad Asif	In this paper authors formulate the problem of Resource Allocation (RA) in Cognitive Radio (CR) networks with relay stations. The problem takes into account the issues like: fluctuations of usable spectrum resource, channel quality variations caused by frequency selectivity, and interference caused by different transmit power levels. They propose easy to implement heuristic algorithms. The simulation results reveal that presented solutions show good proportional fairness among CR users and improvement in system throughput by power control.
27	2013-09-16	Multipath Matching Pursuit
	Hwanchol Jang	In this paper, they propose an algorithm referred to as multipath matching pursuit that investigates multiple promising candidates to recover sparse signals from compressed measurements. Their method is inspired by the fact that the problem to find the candidate

		that minimizes the residual is readily modeled as a combinatoric tree search problem and the greedy search strategy is a good fit for solving this problem. In the empirical results as well as the restricted isometry property (RIP) based performance guarantee, they show that the proposed MMP algorithm is effective in reconstructing original sparse signals for both noiseless and noisy scenarios.
28	2013-10-14	The Exact support recovery of sparse signals with noise via orthogonal matching pursuit
	Oliver	This letter derives sufficient conditions for the OMP to recover the support set of a sparse vector from noise corrupted measurements. In particular, the conditions are given in terms of the minimum absolute values of the signal amplitudes. That is, if the minimum values of the non-zero coefficient of the signal satisfies certain conditions then OMP guarantees exact support recovery.
29	2013-10-21	Hierarchical and High-Girth QC LDPC codes
	Jeongmin Ryu	They present an approach to designing capacity approaching high-girth low-density parity-check (LDPC) codes that are friendly to hardware implementation, and compatible with some desired input code structure defined using a protograph. The approach is based on a mapping of any class of codes defined using a protograph into a family of hierarchical quasi- cyclic (HQC) LDPC codes. Next, they present a girth-maximizing algorithm that optimizes the degrees of freedom within the family of codes to yield a high-girth HQC LDPC code, subject to bounds imposed by the fact that HQC codes are still quasi-cyclic. Finally, they discuss how certain characteristics of a code protograph will lead to inevitable short cycles and show that these short cycles can be eliminated using a "squashing" procedure that results in a high-girth QC LDPC code.
30	2013-10-26	Ultra-Wideband Compressed Sensing : Channel Estimation
	JuSung Kang	In this paper, they have introduced two novel ultra-wideband (UWB) channel estimation approaches based on compressive sensing (CS). The proposed approach relies on the fact that transmitting an ultra-short pulse through a multipath UWB channel leads to a received UWB signal that can be approximated by a linear combination of a few atoms from a pre-defined dictionary which means sparse representation of the received signal. The key in the proposed approach is in the design of a dictionary of parameterized waveforms (atoms) that closely matches the information-carrying pulse shape leading thus to higher energy compaction and sparse representation, and, therefore higher probability for CS reconstruction. In the first approach, the CS reconstruction capabilities are exploited to recover the composite pulse-multipath channel from a reduced set of random projections. This reconstructed signal is subsequently used as a referent template in a correlator-based detector. In the second approach, from a set of random projections of the received pilot signal, the Matching Pursuit

		algorithm is used to identify the strongest atoms in the projected signal that are related to the strongest propagation paths that composite the multipath UWB channel.
31	2013-11-18	Missing-Area Reconstruction in Multispectral Images Under a Compressive Sensing Perspective
	Hyeongho Baek	The intent of this paper is to propose new methods for the reconstruction of areas obscured by clods. They are based on compressive sensing theory, which allows finding sparse signal representations in underdetermined linear equation systems.
32	2013-11-25	Power and Channel Allocation for Cooperative Relay in Cognitive Radio Networks
	Muhammad asif	In this paper authors mention that cognitive radio relay channels can be divided into three categories: direct, dual-hop, and relay channels. The relay node involves both dual-hop and relay diversity transmission. They develop power and channel allocation approaches for cooperative relay networks. They also develop a low complexity approach that can obtain most of the benefits from power and channel allocation with minor performance loss.
33	2013-12-09	Robust Compressive Data Gathering in Wireless Sensor Networks
	Jongmok Shin	In this paper, authors investigate the impact of outlying sensor readings and broken links on high-fidelity data gathering, and propose approaches based on the compressive sensing theory to identify outlying sensor readings and derive the corresponding accurate values, and to infer broken links in Wireless Sensor Networks.