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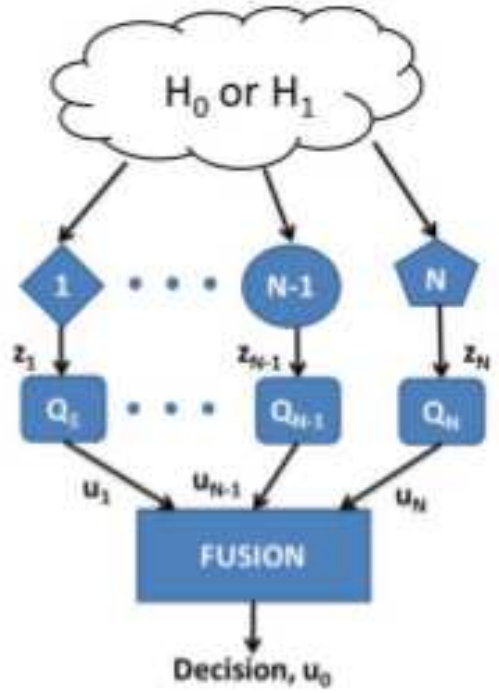
Fusing Dependent Decisions for Hypothesis Testing With Heterogeneous Sensors

Satish G. Iyengar, Ruixin Niu, and Pramod K. Varshney
Syracuse University and Virginia Commonwealth University

- Goal: Detect presence or absence of signal
- z_ns are iid over time,
  $H_0 : z_n \sim g_n(z_n; \psi_n)$,
  $H_1 : z_n \sim f_n(z_n; \lambda_n)$
- Approximation of joint pdf using copula theory

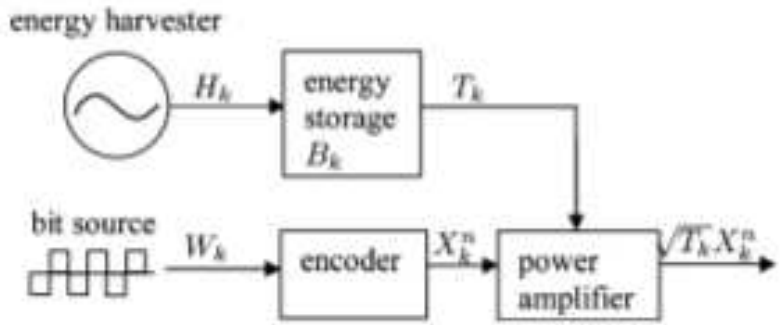


- Propose a GLRT based fusion rule
- Also, propose a computationally efficient fusion rule which is based on adding controlled noise to observations

Optimal Energy Allocation for Wireless Communications With Energy Harvesting Constraints

Chin Keong Ho and Rui Zhang
Institute for Infocomm Research, A *STAR, Singapore and NUS, Singapore

- Model: Point-to-point, flat fading, single-antenna comm. system
- Need to choose optimal T_k to maximize reliable transmission rate ($I(\gamma_k, T_k)$) over K slots



- Assumptions: Harvested energy H_k and γ_k follow first order Markov model, B_1 is known
- Causal side information: State $s_k = (H_{k-1}, \gamma_k, B_k)$, find a policy that maximizes sum throughput given s_1
  -Optimal solution through dynamic programming
- Full side information: H_K and γ_K are assumed known

Sparse Signal Reconstruction via ECME Hard Thresholding

Kun Qiu and Aleksandar Dogandzic
Iowa State University

- $y = Hz$, z is Gaussian vector with pdf $\mathcal{N}(z; s, \sigma^2 I)$, s is r-sparse
- H is under-determined
- The likelihood is maximized $P(y; Hs, \sigma^2 HH^t)$ to find parameters
- For any fixed s, the likelihood is maximized by $\hat{\sigma}^2(s)$, then find a s that maximizes $\hat{\sigma}^2(s)$
- Here, ML estimation is infeasible in practice
- EM based algorithm to find z

The Pros and Cons of Compressive Sensing for Wideband Signal Acquisition: Noise Folding versus Dynamic Range

Mark A. Davenport, Jason N. Laska, John R. Treichler and Richard G. Baraniuk
Georgia Institute of Technology, Dropcam, Inc., Applied Signal Technology, Inc., and Rice University

- Impact of white noise on CS based aquisition system
- $y = R\alpha + Rn + e$, α is sparse signal
- ISNR, MSNR, RSNR
- $ISNR/RSNR \approx 10\log(1/M)$
- Dynamic range of quantizer- ratio of maximum to the minimum signal power levels that can be handled with"full fidelity.â
- Dynamic range for conventional ADC and CS based ADC are same
- More bits can be used to represent a sample in case of CS based quantizer