

## ***OSP Student Projects from Previous Years***

Multiple RFID Detection Using Least Mean Square Error Criterion  
Effects of Channel Dispersion and Path Correlations in MIMO-Based Cellular Systems  
Adaptive Beamforming  
Canonical Correlation Analysis and Correlation Canceling  
Applying RLS Filter on Vectorial Time Series  
A Survey of Prediction In Financial Markets  
Optimizing Least Squares Estimation in Image Processing  
Spectrum Estimation Techniques  
CELP Speech Coding  
Location Estimation in Wireless Networks: Enhanced Linear Least Squares Method  
Blind Equalization Using the Constant Modulus Criterion  
Radar Clutter Removal Using Various Signal Estimation Techniques  
An SVD-Based Method of Obstacle Detection and Evasive Maneuvering for Unmanned Aerial Vehicles  
Optimal Spectrum Balancing for DSL Systems  
Signal Processing Methods for Evaluating Historical Stock Market Data  
Adaptive Channel Equalization  
Signal Processing Applications in CDMA Multiuser Detection  
Inertial Navigation System for the Autonomous Underwater Vehicle Using the Kalman Filter  
Image Segmentation Based on Graph-Theoretic Approaches  
Image Coding Using SVD and Variable Rate Quantization  
Kernel Principal Component Analysis with Fractional Power Polynomial Models for Face Recognition  
Image Restoration Using the Preconditioned Iterative Conjugate Gradient Method  
Towards Robust Estimation of Camera Geometry Using SVD  
Image Based Blood Cell Classification Using SVD  
Face Recognition Using Principal Component Analysis

Face Recognition Using Principal Component Analysis of Gabor Filter Responses  
Image Restoration and SVD Signal Enhancement  
Linear and Nonlinear Prediction Methods  
Kalman Filtering and its Generalizations with Applications to Motion Tracking  
LPC Based Vocoding  
Codeword Optimization in Uplink and Downlink CDMA  
Multiuser Detection in CDMA Using MMSE Criterion  
Independent Component Analysis: An Overview  
Face Recognition Using Principal Component Analysis  
Echo Canceling in Telephonic Environments  
K-Means, EM, and Spectral Projection Algorithms  
Channel Equalization  
Subspace Methods for Retrieval of Information from Musical Signals  
Study of Adaptive Antennas and their Performance Measures  
CELP-based analysis/synthesis of speech  
Residual Excited Linear Prediction (RELP) VOCODER  
Image Coding Using SVD and Variable Rate Quantization  
Blind Equalization Using the Constant Modulus Criterion  
Principal Component Analysis with Missing Data and Outliers  
Codeword Adaptation and Tracking for Distributed Interference Avoidance  
Wireless Link Bandwidth Estimation–Some Practical Considerations  
Transform-Domain Adaptive Filtering  
Introduction to Adaptive Antenna Arrays  
Subspace Approach to Speech Processing and Sunspot Problem  
Introduction to Adaptive Control and System Identification  
Adaptive Channel Equalization  
Overview of Kalman Filter  
Voice Coding

## Filters in Image Processing

Adaptive Linear Prediction of Base Station Transmission Power in Cdma2000 1X System.

Independent Component Analysis and Its Applications in Blind Source Separation.

Lossless Compression of Still Images Using Predictive Coding.

Study and Comparison of Various Reduced-Rank Signal Processing Methods: SVD, PCA, SSA, CCA.

Combined Adaptive Power Control and MMSE Interference Suppression for CDMA systems

The Use of Adaptive Antennas in the Mobile Radio Environment

Adaptive Channel Equalizers: Performance and Application to Time-Variant Multipath Channels

Thresholding in Wavelet-Based Denoising Schemes

A Review of Independent Component Analysis Techniques

Comparison of Methods of Channel Equalization

Study of the LMS, RLS, FAEST, GL, and RLSL Algorithms and Their Application to Image Processing

Multivariate Financial Time Series - Data Mining in Finance: A Study

Echo Cancellation

Angle of Arrival Estimation

Enhancement of NMR Spectra Using the SVD

System Identification Using Partial Gradient Lattice IIR Filter

Study of Reduced-Rank Signal Processing Techniques: SVD, PCA, CCA, SSA

Blind Adaptive Multiuser Detection

Interference Canceling in CDMA Wireless System

Intelligent RLS Processing of Source Location Estimates

Transform Methods for Data Compression

Comparing Adaptive Algorithms for an Acoustic Noise Canceling Application

Comparison of Various Spectrum Estimation Techniques

Non-stationary Tracking Capabilities of LMS, RLS, GL, and Double/Direct RLSL Adaptive Algorithms

## Signal Processing Techniques for Third Generation Wireless Systems

Acoustic Echo Cancellation

Angle of Arrival Estimation in CDMA Systems

RLS and LMS Tracking Analysis for Time-Variant Wideband Channels

Spectrum Estimation: Study of Multitaper and Parametric Methods

RLS ARMA Filter with Variable Forgetting Factor for Speech Signal Modeling

Cross-Language Speaker Identification Using Correlation Canceling

Times Series Analysis Using Linear and Nonlinear Methods

Speaker Identification Using LPC Features

Adaptive Techniques for Channel Equalization

Channel Equalization and Echo Cancellation Systems and Techniques

Conventional and Parametric Spectrum Estimation

Introduction to System Identification and Adaptive Control

Adaptive Algorithms for Tracking Non-Stationary Environment

Decision Making in Information Retrieval Systems

Conventional Spectrum Estimation Techniques

Channel Equalization Techniques

Parametric Spectrum Estimation of Interferometer Data.

Active Noise Control.

Study of the Gram-Schmidt Preprocessor as Used in a Modern Phased Array Radar System.

Application of Correlation Cancellers for Enhanced Reception in Wireless TDMA/CDMA Overlay Systems.

An Adaptive Linear Predictor to Extract the LPC Parameters of Speech.

Neural Networks for Time Series Prediction.

Improving Training Set Synthesis for Image Vector Quantization.

Introduction to System Identification and Adaptive Control.

The Use of Adaptive Antennas in the Mobile Radio Environment

Communication Network Traffic Prediction Using Levinson's Algorithm

Analysis-Synthesis of Speech Signals

Correlation Cancelers in Wireless TDMA/CDMA Overlay System

Speaker Identification Using LPC Features

QPSK Modem Simulator with Adaptive LMS Equalizer

Study adaptive control and system identification methods.

Investigate details of channel equalization and echo cancellation systems and techniques.

Study and compare data smoothing methods, such as wavelet, spline, and kernel smoothing methods.

### ***Other Suggested Projects***

Study the capabilities of LMS, RLS, GL, FAEST, and various versions of RLSL, in tracking a non-stationary environment.

Study MUSIC and Minimum-Norm Methods versus LP for angle-of-arrival estimation and harmonic retrieval (dependence on SNR, angular separation, etc.).

Study the performance of various adaptive eigenvector methods for tracking the signal and noise subspaces, including partial SVD methods and neural networks.

Study neural networks for time series prediction, and other non-linear LP-based models, such as threshold models.

Study convergence and tracking performance of adaptive antennas, Gram-Schmidt and modified Gram-Schmidt preprocessor arrays.

Study impulse response and pole/zero identification methods using eigenvector and SVD methods.

Study and compare various reduced-rank signal processing methods, such as SVD, PCA, singular spectral analysis, canonical correlation analysis.

Study adaptive algorithms for wide-band adaptive antennas, including constraints (e.g., Griffiths-Jim type.)

Study IIR adaptive filtering algorithms, their convergence and tracking properties.

Adaptive formulation of selective nulling array processing algorithms.

Study performance, convergence, and computational aspects of transform-domain adaptive filtering, such as DCT, or wavelet-based transforms.

Study ARMA methods of spectrum estimation, implemented adaptively and by block processing.

Active noise cancellation and adaptive loudspeaker systems.

Adaptive antennas for cellular communications systems.

Study adaptive blind deconvolution methods for channel equalization.

Develop dynamic predictive deconvolution design methods for broad-band reflectionless coatings or transmission line terminations, with prescribed reflection frequency response.