Signal Processing

The field of signal processing has greatly changed during the past 20 years and is expected to change even more in the coming years. What was earlier viewed as digital signal processing – for instance enhancement of signal quality – now only forms a small part of the entire field. Modern signal and image processing, aims at analyzing, manipulating, and mining information in signals and images to extract useful information for human decision making, human perception, mechanical machine control etc.: it is the important and ongoing challenge of making sense of signals, based on mathematical modeling and subsequently converting this into practical applicable electronic devices and technologies.

FACULTY

Video analysis, Object tracking, Pattern recognition
Geophysical Signal Processing, Audio DSP
Medical Image Processing & Computer Vision

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Elektronic signal processing

RESEARCH

BioSystems Signal Processing

Automatic Recognition of Wildlife Behavior

Purpose
Automatic identification, tracking, and behavioral analysis of wildlife, based on video and vocal input.

Signal Processing
Feature extraction, Optical flow, Pattern recognition.

Motion Analysis of Domestic Animals

Purpose
Tracking pig motion to predict behavioral characteristics such as eating patterns and illness.

Signal Processing
Multi-camera algorithms and sensor fusion, Video Surveillance Algorithms.

Video Analysis for Agricultural Machines

Purpose
Control and decision support for automatic control of Agricultural Machines

Signal Processing
Video Analysis, Obstacle avoidance, Soil surface sensing, Crop and Weed classification


Medical Image Processing

Purpose
Image acquisition
• Automated scan planning
• Real-time motion compensation

Image reconstruction
• Reconstruction from sparsely sampled data
• Superresolution

Image analysis
• Statistics-based anatomical models
• Computer-generated diagnostic reports

Research directions: Medical Image Processing & Computer Vision. Keywords: Image acquisition, reconstruction, and analysis.

Geophysical Signal Processing

Magnetic resonance sounding (MRS)
• Direct and noninvasive ground-based measurements of groundwater

Airborne transient EM (TEM)
• Fast mapping of sub-surface resistivity over vast areas
• Resistivity is correlated with groundwater content

Research directions: Geophysical instrumentation and applied signal processing, optimized and adaptive noise reduction methods, model-based signal processing.