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Electronics & Embedded Systems

Research Area

Communications and Telecommunications

- Radio resource management for cellular networks/WLANs
- Wireless/Computer network design
- Free-Space optical transceivers for Gbpsdata communications
- 1-V micropower continuous-time complex IF filter for wireless transceiver in CMOS technology
- 2.4GHz synthesizer for wireless transceiver in CMOS technology
- Study and design a dual-band rectenna
- Design patch antenna operating at 1.8 GHz and 2.45 GHz

Power & Power Electronics

- Power system stability and control
- Power electronics and motor drives
- Amplitude variation for reduction THD in multi-cell converters
- Energy harvesting for WSN converters hybrid energy integrated system
- Multiple input dc/dc converter
- Solar MPPT and battery charger

- Battery monitoring system
- Renewable energy circuits

Digital Signal Processing& Image Processing

- Image processing and computer vision
- Pattern recognition and machine learning
- Signal and image analysis for industrial applications
- Breast cancer microscopic image analysis
- ECG signal analysis
- EMG signal analysis
- Deep learning

Electronics & Embedded System

- Design methodologies for hardware/software co-design on FPGAs
- Adaptive algorithm applications
- Design of analog front-ends for Gbpsoptical receiver in digital CMOS technology
- Current-feedback transconductance-capacitor continuous-time filter
- RF IC design for modern wireless communications
- Sensor circuit design

Instrumentation & Control

- Interdigital capacitive sensor for chemical and physical measurement
- Model of conductive rubber as a flexible tactile sensor
- Modeling and characterization of micro-actuator
- Control system identification and controller design
- Development of online monitoring and control system

Rehabilitation & Biomedical Engineering

- Rehabilitation using Image processing and computer vision
- EMG and biofeedback based rehabilitation

Wireless Sensor Networks

- Network designs/communication protocols for wireless ad hoc and sensor networks
- Low-cost, wide-area wireless sensing network
- Indoor localization
- FPGA-WSN-node for multi-channel multi-interface and high-performance wireless node
- Study of convergence delay of distributed time-space division multiple access protocol for wireless networks
- Study of distributed time-frequency-space division multiple access protocol for wireless networks
- Study and design the multiple access protocol for wireless networks
- Wireless camera network system
- Monitoring / control of things in wireless sensor networks

Smart Farm

<u>Pre-Harvest</u>

- Microwave power transfer technique for wireless sensor network applied to smart farm
- Chlorophyll analysis from aerial image
- Implementation of drone-wireless sensor communication link for precision cultivation
- Phenotyping technique for smart farm
- Simple ripeness determination algorithm for palm fruit on mobile computing

<u>Post-Harvest</u>

- Microwave technique for determining drc in cup lump
- Fusion technique for classifying ripeness of palm bunch
- Rapid and high-efficiency microwave heating for palm bunch