Arindam Sengupta

Product Specialist - Google Play

Sunnyvale, CA - Email me on Indeed: indeed.com/r/Arindam-Sengupta/60a187fc9eb17401

Willing to relocate: Anywhere

WORK EXPERIENCE

Product Specialist

Google (Standav-Tech Mahindra) - Mountain View, AB - August 2015 to Present

- Responsible for development and maintenance of Machine Learning supported triage categories to identify various defects and feature requests
reported by Google customers and escalate them to product support.
- Responsible for development and maintenance of product expertise to work closely with support teams for Google Play products such as Google Play Store, Google Play Music, Google Play Books, Google Play Movies,
Google Play Newsstand, Google Play Games and Google Fit.
- Responsible for quality control and managing off-shore team to set policies and deliver effective support with high quality metrics.

Jr. Electronics Engineer

National Radio Astronomy Observatory - Greenbank, ON - January 2015 to August 2015

- Responsible for development and integration of several digital signal processing backend firmware using CASPER tool-flow. The designs were primarily aimed for implementation on ROACH-2.
- Responsible for preparation and circulation of high-level and low-level documentation for the firmware developed
and/or updated, in a timely manner.

Graduate Research Assistant

University of Akron - May 2013 to December 2014

May 2013 - December 2014
- Emphasis on novel 2D and 3D analog/digital/mixed filter design to support multidimensional signal processing techniques, using a linear/spatial array of antennas and emerging RF technology
- Design and testing digital fast algorithms on sophisticated FPGA prototyping boards - Xilinx Xtreme-DSP kit, Xilinx Virtex-4/Virtex 6, Achronix Speedster and BEE3, followed by ASIC synthesis, for an extensive resource consumption estimation

Graduate Teaching Assistant

University of Akron - August 2012 to May 2014

Course:Tools for Electrical and Computer Engineering August 2012 - May 2014
- Responsible for grading assignments, conducting labs and quizzes
- Responsible for assisting incoming freshmen and sophomores with the basics of programming languages and formatting tools, such as MATLAB, pBASIC, Google Sketchup, MS-Office. etc
- Responsible for assisting/motivating the students with building hands-on circuitry, based on the lectures offered

Research Intern

Defence Research and Development Organisation - May 2011 to June 2011

May 2011 - June 2011
- Study of the Architecture of Shared Common Random Access Memory Networks (SCRAMNET) and SCRAMNET+, and its applications in the field of Real Time Simulation used in the Testing of Ballistic Missiles and Satellite Launch Vehicles (SLVs).

EDUCATION

Master of Science in Electrical Engineering
University of Akron - Akron, OH
August 2012 to August 2014

Bachelor of Engineering in Electronics and Communication
Birla Institute of Technology
August 2008 to May 2012

SKILLS

Technical Proficiency Simulation Softwares/Languages: MATLAB, Simulink, CASPER tools, Xilinx ISE, PlanAhead, VHDL, Verilog, pBASIC, MultiSim, COMMsim, IE3D, CADENCE, NS2 Simulator, C, SQL, Basic Python Hardware: ROACH-2, BEE3, Xilinx Xtreme-DSP kit, Xilinx ML-402 Virtex-4, Xilinx ML-604 Virtex-6 FPGA prototyping boards; Vector Network Analyzer, RF signal generator Miscellaneous: Good troubleshooting and debugging skills, Experienced in technical report/presentations using LaTex/ Beamer

LINKS

https://www.linkedin.com/in/arindam-sengupta-571ba922

AWARDS

Award of Graduate Scholarship
August 2012
Full-Tuition Grant from the College of Engineering for outstanding academic/research scholar, for the period 2012-2013

Award of Graduate Scholarship
August 2013
Full-Tuition Grant from the College of Engineering for outstanding academic/research scholar, for the period 2013-2014

Director's Award of Excellence
March 2011
Recognized for the role of Head-Events Planning and Management and successfully leading a team of 75 students towards organizing Technika 2011, the annual techo-management festival.

CERTIFICATIONS/LICENSES

Machine Learning
April 2016 to Present

PUBLICATIONS

Wide-Band Aperture Array Using a Four-channel Manifold-Type Planar Multiplexer and Digital 2-D IIR Filterbank

http://onlinelibrary.wiley.com/doi/10.1002/cta.2213/abstract;jsessionid=9F2A40293AC73D63FAD131743E85D137.f02t03?userIsAuthenticated=false&deniedAccessCustomisedMessage=

May 2016

Emerging wide-band communications and spectrum-sensing systems demand support for multiple electronically-scanned beams, while maintaining a frequency independent, constant far-field beamwidth. Realizing existing phased-array technology on a digital scale is computationally intensive. Moreover, digitizing wide-band signals at Nyquist rate requires complex high-speed analog-to-digital converters (ADCs), which is challenging for real developments driven by the current ADC technology. A low-complexity alternative proposed in this paper is the use of RF channelizers for spectrum division followed by sub-sampling of the RF sub-bands, which results in extensive reduction of the necessary ADC operative frequency. The RF-channelized array signals are directionally filtered using 2-D digital filterbanks. This mixed-domain RF/digital aperture array allows sub-sampling, without utilizing multi-rate 2-D systolic arrays, which are difficult to realize in practice.

Simulated examples showing 14-19 dB of rejection of wide-band interference and noise for a processed bandwidth of 1.6 GHz are demonstrated. The sampling rate is 400 MHz. The proposed VLSI hardware uses a single-phase clock signal of 400 MHz. Prototype hardware realizations and measurement using 65nm Xilinx FPGAs, as well as Cadence RTL synthesis results including gate counts, area-time complexity, and dynamic power consumption for a 45nm CMOS circuit operating at VDC = 1.1 V, are presented.

A 3-D Spatially- FIR RF Frustum Digital Filter with Microwave Channelization for FPAs

http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=6875815&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D6875815

May 2014

A novel low-complexity simplified mixed-microwave-digital 3-D frustum filter is proposed, for FPA based wideband receivers. The use of FPA instead of horn feed on conventional parabolic-dish receivers results in highly directional, electronically scanned multiple beams, instead of a single pixel feed. FPA receivers together with 3-D frustum filters have been shown to enhance signals that are reflected off the dish surface while rejecting both noise as well as interference from off-dish sources. The wide-band signals are channelized using a microwave three-channel channelizer, or a triplexer, where the signals are temporally split into narrower bands, before subjecting it to the 2-D purely-spatial digital FIR filters. The directional selectivity of proposed design was verified by generating a desired signal and multiple off-dish interfering signals at various DOAs. The FPA signals were generated by an in-house FPA simulator, developed by the University of Calgary. The proposed architecture finds several potential applications in the field of radar, microwave imaging and UWB communications.

Wideband aperture array using RF channelizers and massively-parallel digital 2D IIR filterbank

http://proceedings.spiedigitallibrary.org/proceeding.aspx?articleid=1878615

May 2014

A novel massively-parallel mixed-microwave-digital beamformer for wideband applications is proposed, by combining a passive microwave channelizer and 2-D IIR SBP digital filter. The microwave four-channel channelizer, or quadruplexer, is designed using a manifold-type planar technology, with the internal channels designed using a third-order Chebyshev-type parallel-coupled-resonator configuration. The wide-band signal is temporally channelized into four subbands,

using the quadruplexer, which are then digitized using sub-sampled ADCs. Sub-sampling operation results in simultaneous down-sampling and down-conversion operations, which explains the need for the SBP filters, in this architecture. We also alleviate the need for ADCs operating at a very high frequency of operation, by using subsampled ADCs.

Bio-Inspired Multi-Dimensional Multi-Beam Aperture Arrays: Theory, Design and Simulation for EM Remote Sensor Systems

August 2014

Novel 2-D bio-inspired multibeam filters were developed from the 1-D electrical model of a mammalian cochlea. A Cochlea is a bio-electro-mechanical transducer with approximately 3000 channelizers, to distinguish frequencies. We realize ten such channels, using passive network elements. The elements were chosen using a mechanical-electrical analogy. The 2-D multibeam filters were first realized in the continuous-space continuous-time (CSCT) domain, and were also extended to discrete-space discrete-time (DSDT) domain, for potential digital signal processing applications.

Multi-beam RF aperture using multiplierless FFT approximation

http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=6969234&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D6969234

August 2014

Multiple independent radio-frequency (RF) beams find applications in communications, radio astronomy, radar and microwave imaging. An N-point fast Fourier transform (FFT) applied spatially across an array of receiver antennas provides N-independent RF beams at N/2 log2 N multiplier complexity. Here, a low-complexity multiplierless approximation for the 8-point FFT is presented for RF beamforming, using only 26 additions. The algorithm provides eight beams that closely resemble the antenna array patterns of the traditional FFT-based beamformer albeit without using multipliers. The proposed FFT-like algorithm was verified on-chip using a Xilinx Virtex-6 Lx240T field programmable gate array (FPGA) device. The FPGA implementation indicated bandwidth of 369 MHz for each of the independent receive-mode RF beams.

Aperture-array directional sensing using 2-D beam digital filters with doppler-radar front-ends

http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=7112357&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D7112357

April 2015

A directional sensing algorithm is proposed employing doppler radar and low-complexity 2-D IIR spatially bandpass filters. The speed of the scatterer is determined by the frequency shift of the received signal following down-conversion. The downconversion is done by mixing it with the instantaneous transmitted signal. The direction of the scatterer is determined by the means of 2-D plane-wave spectral characteristics, using 2-D IIR beam filters. The proposed architecture was simulated for three scatterers at 10,° 30,° 60° from array broadside, traveling at speeds of 31 m/s, 18 m/s and 27 m/s, respectively. A doppler radar module was used to transmit and receive reflected signals, that has a carrier frequency of 2.4 GHz. Simulations show both direction and doppler information being enhanced.

Applications of RF aperture-array spatially-bandpass 2-D IIR filters in sub-Nyquist spectrum sensing, wideband doppler radar and radio astronomy beamforming

http://link.springer.com/article/10.1007/s11045-016-0423-2

June 2016

The application of two-dimensional (2-D) infinite impulse response (IIR) spatially-bandpass (SBP) filters as a digital beamformer for a wide spectrum of practical applications spanning wireless cognitive radio communications, doppler radar, and radio astronomy instrumentation is discussed. The paper starts with an introduction of the recently proposed 2-D SBP filter. The first application is a spectrum sensing scheme for dynamic spectrum access based cognitive radios. A 2-D IIR SBP filter is used in conjunction with a sub-Nyquist

wideband signal reconstruction technique to achieve aperture-array directional spectrum sensing using sub-Nyquist sparse sampling based on the recently reported Eldar algorithm. The second application is related to wideband pulse and continuous-wave frequency modulated Doppler radar sensing. The SBP filter is integrated with a wideband radar back-end connected to an electronically-steerable aperture antenna. A a low-complexity directional localization algorithm is presented, which estimates the range and angle of a target scatterer with a signal to interference ratio improvement of 10 dB. We also present applications of 2-D IIR SBP in the fields of classification and remote sensing of unmanned aerial vehicles. Finally, a digital aperture-array wideband beamforming model using the 2-D IIR SBP filters is presented for radio telescope systems based on dense aperture arrays and time-domain beamforming. A well-known example is the study of pulsar astrophysics using a highly-directional aperture antenna system. The 2-D IIR SBP beamformer is simulated as the digital backend of the time-domain beamforming system with array signals synthesized using measured time-domain signatures from the Crab pulsar obtained from the GAVRT. The SBP filter shows a gain of 12.3 dB with an order of magnitude lower circuit complexity compared to traditional phased-array digital beamformers. To obtain comparable levels of SINR improvement, the wideband phased-array beamformers require 48-point FFTs per antenna. Assuming the optimum three real-multiplications per complex multiplication for the Gauss algorithm, it is discovered that the proposed 2-D IIR SBP beamformers are more than 97 % lower in digital multiplier complexity compared to traditional FIR phased-array FFT-beamformers.

ADDITIONAL INFORMATION

Technical Proficiency
Simulation Softwares/Languages: MATLAB, Simulink, CASPER tools, Xilinx ISE, PlanAhead, VHDL, Verilog, pBASIC, MultiSim, COMMsim, IE3D, CADENCE, NS2 Simulator, C, SQL, Basic Python
Hardware: ROACH-2, BEE3, Xilinx Xtreme-DSP kit, Xilinx ML-402 Virtex-4, Xilinx ML-604 Virtex-6 FPGA prototyping boards; Vector Network Analyzer, RF signal generator
Miscellaneous: Good troubleshooting and debugging skills, Experienced in technical report/presentations using LaTex/
Beamer