一种面向64位DSP处理器的可重构ALU研究及设计

高向强,冯春阳,闫 鑫,杨 靓,曹 辉
(西安微电子技术研究所,陕西 西安 710065)

摘 要: 研究并实现了一种面向64位DSP处理器的可重构ALU,该ALU由4×4阵列的计算单元通过交叉开关互联构成,并支持32/64位定点数基本类型计算和可重构类型计算,32/40/64位浮点数基本类型计算和可重构类型计算.设计中采用复用64定点乘法器、64位左移/右移移位器等电路资源、统一定/浮点译码及计算模型等方法有效地降低了电路资源和设计复杂度.利用型号为xc6vsx315t-1ff1759的FPGA进行综合实现时,可重构ALU占用硬件资源为15 347个LUTs,时钟频率达到100 MHz.

关键词: DSP处理器;可重构计算;计算单元;ALU
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Research and Design of a Reconfigurable ALU for 64 bit Digital Signal Processor

GAO Xiang-qiang, FENG Chun-yang, YAN Xin, YANG Liang, CAO Hui
(Xi′an Microelectronics Technology Institute, Xi′an 710065, China)

Abstract: This paper researches and implements a reconfigurable arithmetic logic unit (RALU) on 64bit digital signal processor, which is made up of processing elements(PE) based on 4×4 2-Dimension array through changing the form of switch interconnection. It could execute 32 and 64bit fixed-point operations of basic and reconfigurable type, 32, 40 and 64 bit floating-point operations of basic and reconfigurable type. To reduce circuit resources and design complexity, RALU adopts primary technologies, including reusable 64 bit fixed-point multiplier, right and left shift shifter, uniform fixed/floating-point models of decoding and computing. When RALU is synthesized and implemented by FPGA with xc6vsx315t-1ff1759, its resource is 15347 LUTs and frequency is above 100 MHz.

Key words: DSP; reconfigurable computation; processing element; ALU

作者简介:

高向强 男,(1988-),硕士研究生.研究方向为集成电路设计.E-mail:gxiangqiang@qq.com.

冯春阳 男,(1980-),博士研究生.研究方向为集成电路设计.

闫 鑫 男,(1985-),硕士,工程师.研究方向为集成电路设计.

杨 靓 男,(1975-),博士生导师,研究员.研究方向为空间计算机体系结构设计.

曹 辉 男,(1984-),博士研究生.研究方向为集成电路设计.

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一种基于热噪声的真随机数发生器的设计与实现

金 杰[1],罗 敏[1,2],宫月红[1,2]
(1 哈尔滨工业大学(威海) 微电子中心,山东 威海 264209;
2 哈尔滨工业大学 微电子中心,黑龙江 哈尔滨 150001)

摘 要: 提出了一种新颖的真随机数发生器(TRNG)结构。该真随机数发生器基于MOS管沟道热噪声对沟道电流的影响.针对工艺、电源电压扰动和温度变化等因素引入的误差,采用粗粒度和细粒度二级校正,并通过有限状态机实现系统的动态平衡.为了验证该结构的有效性,采用chatered-0.18 μm-1.8 V工艺,设计并实现了总功耗为1.3 mW,面积为0.019 2 mm^2,输出速率可达125 Mb/s的真随机数发生器.产生的随机数序列通过NIST-SP 800-22测试.

关键词: 真随机数发生器;热噪声;二级校正;有限状态机;动态平衡
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Design and Implementation of a True Random Number Generator Based on MOSFET Thermal Noise

JIN Jie[1], LUO Min[1,2], GONG Yue-hong[1,2]
(1 Microelectronics Center, Harbin Institute of Technology at Weihai, Weihai 264209, China
2 Microelectronics Center, Harbin Institute of Technology, Harbin 150001, China)

Abstract: A novel true random number generator (TRNG) structure is proposed. This TRNG is on the basis of the influence of MOSFET thermal noise to channel current. In order to correct the errors introduced by process, supply voltage and temperature, this system uses coarse-grained and fine-grained tuning, and achieves dynamic balance through the finite state machine. In order to verify the effectiveness of the proposed structure, a TRNG is designed and implemented with chatered-0.18μm-1.8V process. Random bit throughput can reach up to 125 Mb/s with 1.3 mW total power consumption and 0.019 2 mm^2 core area. The generating random bit streams pass all NIST-SP 800-22 test.

Key words: true random number generator; thermal noise; 2-step correction; finite state machine; dynamic balance

作者简介:
金 杰 男,(1990-),硕士研究生.研究方向为模拟混合信号电路设计.E-mail:jaykinglyf@163.com.
罗 敏 男,(1978-),博士研究生,讲师.研究方向为模拟混合信号电路设计.
宫月红 女,(1982-),博士研究生.研究方向为模拟混合信号电路设计与数字信号处理.

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一种基于 In-Situ AVS 技术的低功耗处理器实现方法

王 敏[1,3]，秋 攀[1,2]，乔树山[2]，杨 浩[2]，李江涛[1]
(1 中国科学院大学，北京 100029；2 中国科学院微电子研究所，北京 100029；
3 南京中科微电子有限公司，江苏 南京 210000)

摘 要：为了进一步降低 ARM Cortex M0 处理器的功耗，提出了一种基于 In-Situ AVS(Adaptive Voltage Scaling)技术的低功耗电路实现方法.该方法通过电路的路径延时估算出监测窗口大小(ΔT)和电压调整的错误(pre-error)数量阈值(n_{limit})，将部分关键路径的触发器替换成实时延时检测电路，对重要的几条路径的延时和错误进行实时监测，经 AVS 控制单元和电压调整模块随着 PVTA 的变化自适应地调整电压，有效地降低电路功耗.在 SMIC 180 nm 工艺下设计了一款 ARM Cortex M0 处理器，将此方法应用于处理器的一个关键模块，即 AHB 到 APB 的桥接电路(AHB_to_APB).测试结果表明，在一个观测区间(N=1 000)内错误率为 8.9E-4 时，电路功耗降低了 28%.

关键词：低功耗；In-Situ AVS；监测窗口；实时延时检测电路
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A Low Power Implememtation Method on Processor Based on In-Situ AVS Technique

WANG Min[1,3], QIU Pan[1,2], QIAO Shu-shan[2], YANG Hao[2], LI Jiang-tao[1]
(1University of Chinese Academy of Sciences, Beijing 100029, China;
2 Institute of Microelectronics of Chinese Academy of Sciences, Beijing 100029, China;
3 Nanjing Zhongke Microelectronics Co. Ltd, Nanjing 210000, China)

Abstract: In order to excessively reduce power dissipation of the ARM Cortex M0 processor, we propose a Low power implememtation circiut based on In-Situ AVS Technique. The main process is to estimate the monitoring window(ΔT) and pre-error limit number(n_{limit}) which determings the voltage adjusting through the path delay of the circuit. Besides, the In-Situ Delay Monitor replaces the flip-flops at the end of critical paths. After detecting the path delay and pre-error using the In-Situ Delay Monitor, the circuit voltage could be adaptively adjusted through the AVS control unit and voltage regulator with the varying of PVTA, which is an efficient scheme to tune the supply voltage of digital circuits according to variations. We have designed a Arm Cortex M0 processor in the SMIC 180 ns process, and applied this method to a critical module(AHB to APB bridge). As a result, We simulated the power dissipation, and find that the circuit applied AVS technique has reduced 28% with the pre-error rate of 8.9E-4 during a observation interval compared to the design former.

Key words: ;low power dissipation; In-Situ AVS; monitoring window ; In-Situ Delay Monitor

作者简介：

王 敏 女，(1990-)，硕士研究生.研究方向为数字集成电路设计.E-mail：xiajinminyu1990@163.com.

秋 攀 男，(1990-)，硕士研究生.研究方向为数字集成电路设计.

乔树山 男，(1981-)，博士，副研究员.研究方向为数字集成电路设计、数字电视、绿色无线通信、电力线载波通信.

杨 浩 男，(1978-)，博士，副研究员.研究方向为射频/微波集成电路设计、微波模块设计、超高频射频识别技术及应用.

李江涛 男，(1989-)，硕士研究生.研究方向为数字集成电路设计.

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一种蝙蝠算法优化的云计算任务调度

曹欲晓,俞 翔,钱 瑛
(南京工程学院 计算机工程学院,江苏 南京 211167)

摘 要:针对云计算环境下的任务调度属于NP困难问题的特性,根据群体智能寻优的原理,提出了一种应用蝙蝠算法优化的云计算任务调度算法.首先给出了云计算任务调度的数学模型,定义了子任务的编号规则.接着提出了一种连续空间上的蝙蝠位置编码方案,并定义了适应值函数.最后应用蝙蝠算法完成了云计算任务的调度.仿真实验证明,此调度算法较其他算法减少了任务的总完成时间,提高了计算资源的利用率.

关键词:云计算;任务调度;蝙蝠算法;位置编码
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A Kind of Task Scheduling Optimized by Bat Algorithm in Cloud Computing

CAO Yu-xiao, YU Xiang , QIAN Ying

(School of Computer Engineering, Nanjing Institute of Technology, Nanjing 211167, China)

Abstract: To aim at the property that task scheduling in cloud computing environment is NP hard and according to the swarm intelligence theory, a kind of task scheduling algorithm optimized by bat algorithm is proposed. Firstly the model of task scheduling in cloud computing and the rule of subtask's number is is given. Then bat position coding program in continuous space is proposed, and fitness function is defined. Lastly subtask scheduling in cloud computing optimized by bat algorithm is implemented. The emulation result proves that task scheduling algrothrim optimized by bat algorithm given in this paper can decrease task's completion time obviously compared to other scheduling algrothrim and increase resource operating factor.

Key words: cloud computing; task scheduling; bat algrothrim; position coding

作者简介:

曹欲晓 男,(1971-),硕士,讲师.研究方向为智能算法、云计算、无线传感器网络.E-mail:caoyx@njit.edu.cn.

俞 翔 男,(1982-),博士,讲师.研究方向为数字信号处理、嵌入式系统.

钱 瑛 女,(1982-),博士研究生,讲师.研究方向为数字图像处理、嵌入式系统.

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基于数据字典的自适应的对象化数据库访问技术研究

雷明涛,何 赟
(中国电子科技集团第二十八研究所,江苏 南京 210007)

摘 要:提出了一种新的数据库访问技术.通过从数据库系统的数据目录中提取数据字典,并依据数据字典自动生成编程语言应用对象的数据结构,应用程序直接使用由这些数据结构定义的应用对象访问数据库,由数据字典自适应数据对象并进行对象化处理,在数据库与应用对象之间建立"动态耦合",从而实现了对数据库系统面向对象的通用访问,降低了数据库应用程序的开发难度,提高了其通用性和开发效率.

关键词:数据字典;自适应;对象化;数据库访问技术;动态耦合;面向对象
中图分类号:TP311,TP391 **文献标识码**:A **文章编号**:1000—7180(2015)10—0021—05

Research on Adaptively Objected Accessing Technology of Database Based on Data Dictionary

LEI Ming-tao, HE Yun
(The 28th Research Institute of China Electronics Technology Group Corporation, Nanjing 210007, China)

Abstract: A new accessing technology of database is proposed based on data dictionary. It can get data dictionary from data catalog of database and generates structures of program objects automatically. And then applications can access database by using objects defined by these structures directly. The data dictionary will make the objects adapting database itself, and also can accomplish objectification by transforming between applied objects and database structures each other. It performs a universal object-oriented accessing technology of database by building dynamic coupling between database and applications. This principle has advantage of development easily, good versatility and high efficiency.

Key words: data dictionary; adaption; objectification; accessing technology of database; dynamic coupling; object-oriented

作者简介:
雷明涛 男,(1978-),硕士,工程师.研究方向为数据存取技术、卫星导航应用技术和信息系统技术架构.
E-mail: mt_lei@163.com
何 赟 女,(1976-),高级工程师.研究方向为系统应用软件设计和卫星导航应用技术.

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基于CV音节的高效语种识别方法

胡 月,郭 英,张东伟,侯文林,李红光
(空军工程大学 信息与导航学院,陕西 西安 710077)

摘 要: 为了快速有效地识别语种,提出了基于元音起始点(Vowel Onset Points,VOP)检测的CV音节划分法,并据此研究了一种新的基于CV音节的语种识别方法.首先,给出一种能有效避免语音结束点错判的双边双门限端点检测法提取语音段;然后采用线性预测残差(Linear Prediction Residue Error,LPRE)检测语音段中的VOP,从而划分出CV音节;最后,提取各CV音节的特征矢量并利用支持向量机(Support Vector Machine,SVM)模型实现语种识别.通过对英语、汉语普通话及粤语三种语言的识别实验表明,所提VOP检测法可确保CV音节的精确划分;新方法识别率高,且识别结果对CV音节长度不敏感,模型训练时间短,可实现语种的高效识别.

关键词: 语种识别;CV音节;元音起始点检测;线性预测残差;支持向量机
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An Efficient Language Identification Method Based on CV-syllables

HU Yue, GUO Ying, ZHANG Dong-wei, HOU Wen-lin, LI Hong-guang
(Institute of Information and Navigation, Air Force Engineering University, Xi′an 710077, China)

Abstract: In order to identify language rapidly and effectively, a method for CV-syllable extraction based on the Vowel Onset Points (VOP) detection is proposed, on this basis, a new method for language identification based on CV-syllables is researched. First, a double-threshold endpoints detection from both sides is given to get speech segment, which could avoid great risk of wrong decision. Second, VOP are detected by Linear Prediction Residue Error (LPRE) and the CV-syllables from the speech segment are obtained exactly. At last, feature vectors for each CV-syllable are extracted. The Support Vector Machine (SVM) is adopted to realize language identification. The simulation experiment for English, Mandarin and Cantonese shows that VOP detection makes sure the precision of each CV-syllable extraction. The new method has the high correct response rate. The change of CV-syllable length almost has no effect on identification results. The training time for model is so short that language identification could complete efficiently.

Key words: Language identification; CV-syllables; Vowel Onset Points (VOP) Detection; Linear Prediction Residue Error (LPRE); SVM;

作者简介:
胡 月 女,(1990-),硕士研究生.研究方向为语种识别.E-mail:huyue_wuzhe1990@163.com
郭 英 女,(1961-),教授,博士生导师.研究方向为通信信号处理、语音信号处理等.
张东伟 男,(1987-),博士研究生.研究方向为跳频信号检测.
侯文林 男,(1986-),博士研究生.研究方向为阵列误差校正.
李红光 男,(1986-),硕士研究生.研究方向为语音信号处理.

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基于GPU的分块式光线追踪算法研究

刘春峰,邓仰东
(清华大学 微电子所,北京 100086)

摘 要:提出一种分块光线追踪算法流程,以系统化方法提取内存访问的潜在一致性.将光线追踪空间加速数据结构拆分成能够载入片上快速存储器的子树,并根据块内容主动选择具有一致性的光线进行搜索,从而提升光线追踪内存访问的一致性,有效降低图形处理器对于带宽的要求.实验结果证明,此算法能够将不规则光线(如漫反射光)的搜索速度提升至同一次光线相当的水平.

关键词:光线追踪;分块搜索;GPU
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Tile-Based Ray Tracing on GPU

LIU Chun-feng, DENG Yang-dong
(Department of Microelectronics and Nanoelectronics, Tsinghua University, Beijing 100086, China)

Abstract: In this paper, we develop a tiled-based ray tracing technique. This algorithm divides the acceleration data structure into tiles or tree-lets, which can fit onto GPU's on-chip memory, and traverses each part with corresponding rays. The coherence of rays and data structure can significantly reduce the demand for GPU bandwidth. Experiments prove that our algorithm improves the traversal efficiency of traversal of incoherent rays (e.g., diffuse rays) to a level that is comparable with that of highly coherent primary rays.

Key words: ray tracing; tiled-based traversal; GPU

作者简介:
刘春峰 男,(1986-),硕士研究生.研究方向为并行计算及图形学.E-mail:chefferchampion@163.com.
邓仰东 男,(1972-),副教授,博士研究生导师.研究方向为并行计算和仿真、众核体系架构.

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基于线性叠加特征和CNNs的图像分类方法

余 萍,赵继生
(华北电力大学 电子与通信工程系,河北 保定 071003)

摘 要:针对现有卷积神经网络(CNNs)训练时间长的问题,基于CNNs具有很强的空间信息特性,提出一种将图像线性叠加(LS)特征作为卷积神经网络输入的图像分类方法,重点研究了以原始图像特征作为输入和以LS特征作为输入的CNNs输出层的损失函数对权重的偏导数之间的关系,分析了连接权重的更新机理.在MNIST手写字体数据集上进行图像分类实验,试验结果表明,以LS特征作为CNNs输入的学习方法在保证识别率的基础上,可以显著减少模型的训练时间,而且无需复杂的工程技巧,LS特征在图像分类上是可行的.

关键词:深度学习;卷积神经网络;反向传播算法;线性叠加;图像快速分类
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Image Classification Method Based on Linear Superposition Features and Convolutional Neural Networks

YU Ping, ZHAO Ji-sheng
(Department of Electronics and Communication Engineering, North China Electric Power University, Baoding 071003, China)

Abstract: To solve the engineering skills problem that traditional Convolutional Neural Networks(CNNs) is of long training time, an image classification algorithm which makes linear superposition features as the input of CNNs is proposed, on the basis of CNNs has strong spatial information characteristics. In this algorithm, mainly researches the relation of derivative with respect loss function to weights between the output of CNNs with original image and LS features as its input, and analyses update mechanism of connection weights. The classification results of experiments on the MNIST database of handwritten digit database show that CNNs with LS features as its input not only reduces the training time of the model markedly but also requires no complex engineering tricks. It is thus concluded that the proposed method is viable in the image classification.

Key words: deep learning; convolutional neural networks; back propagation algorithm; linear superposition; fast image classification

作者简介:
余 萍 女,(1963-),副教授.研究方向为图像图形处理与模式识别.

赵继生(通讯作者) 男,(1988-),硕士研究生.研究方向为模式识别与智能信息处理.
E-mail: zhaojisheng66@163.com.

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面向多核的ECC加速阵列研究与设计

王 威[1],严迎健[1],李 博[1],李 伟[1,2]
(1 解放军信息工程大学,河南 郑州 450001;
2 复旦大学 专用集成电路与系统国家重点实验室,上海 201203)

摘 要: 为了使密码多核处理器支持ECC密码算法,提取ECC运算操作特征,设计了一种面向密码多核处理器的ECC加速阵列结构,可实现640 bit以内任意长度的双域(素域和二元域)ECC密码算法,有效支持高并行度的ECC加速算法和多ECC算法并行计算.在CMOS 0.18 μm工艺库下综合并布局布线,电路最大时钟频率238 MHz,和其他文献相比,此算法的运算速度有所提高,算法支持范围更广.

关键词: 密码多核处理器;ECC密码算法;加速阵列;双域可伸缩
中图分类号: TP309.7 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0041-05

Research and Design of ECC Acceleration Array for Multi-core

WANG Wei[1], YAN Ying-jian[1], LI Bo[1], LI Wei[1,2]
(1 PLA Information Engineering University, Zhengzhou 450004, China;
2 State Key Laboratory ofFudan University Special Integrated Circuit and System, Shanghai 201203, China)

Abstract: In order to make cipher multi-core processor support ECC cryptographic algorithms, the ECC arithmetic operation characteristics are extracted, and a ECC acceleration array structure for cipher multi-core processor is designed, which can realize dual-domain(prime field and binary field) ECC cryptographic algorithms of arbitrary length within 640 bit. It effectively supports high parallelism degree of ECC algorithms and multi-ECC algorithms parallel accelerating calculation. Implemented in CMOS 0.18 μm technology, circuit maximum clock frequency can reach at 238 MHz. Compared with other literatures, algorithms computing speed is improved and algorithms is supported for a wider range.

Key words: cipher multi-core processor; ECC cryptographic algorithms; acceleration array; length-scalable and dual-domain

作者简介:

王 威 男,(1989-),硕士研究生.研究方向为专用集成电路设计.E-mail:779874231@qq.com.

严迎建 男,(1973-),副教授.研究方向为专用集成电路设计、芯片安全防护及可靠性.

李 博 男,(1989-),硕士研究生.研究方向为专用集成电路设计.

李 伟 男,(1983-),讲师.研究方向为多核密码处理器设计.

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一种新型的网络实际流量预测算法

张 洪[1,2],魏 娟[3],胡 俊[4],铁 岭[1,2]

(1 成都大学 模式识别与智能信息处理四川省高校重点实验室,四川 成都 610106;
2 成都大学 信息科学与技术学院,四川 成都 610106;3 成都师范学院 教务处,四川 成都 611130;
4 成都师范学院 计算机系,四川 成都 611130)

摘 要: 为了验证当前网络节点失效而产生的流量衰减问题,提出一种基于离散时间的新型网络实际流量预测算法(Prediction algorithm based on Discrete-Time for FARIMA model,PDF).该算法首先利用离散时间理论推导节点数据包的排队情况,计算出存在失效节点时流量平均对长的数学公式,并结合FARIMA模型建立预测方法.最后,通过数学仿真深入分析平均对长与服务率等影响因素之间的关系.仿真结果表明,PDF算法具有较好的适应性,与原始流量标准差为10.23.

关键词: 离散时间;排队论;FARIMA模型;平均队长

中图分类号: TP393 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0046-04

A New Prediction Algorithm of Network Actual Traffic

ZHANG Hong[1,2], WEI Juan[3], HU Jun[4], TIE Ling[1,2]

(1 Key Laboratory of Pattern Recognition and Intelligent Information Processing, Chengdu 610106, China;
2 College of Information Science and Technology Chengdu University, Chengdu 610106, China;
3 Teching Affairs Office, Chengdu Normal University, Chengdu 611130, China;
4 Faculty of Computer Science, Chengdu Normal University, Chengdu 611130, China)

Abstract: In order to verify the network traffic decline because by node breakdown, this paper proposes a new type of prediction algorithm (Prediction algorithm based on Discrete-Time for FARIMA model, PDF). At first, the mathematic formula for queuing situation and average queue length in steady state is derived with queuing theory in this algorithm based on discrete time, and the prediction method is established by FARIMA Model. Then, a simulation was conducted to research on the relationships between average queue length and service rate. The result shows that it has good adaptability, and the standard deviation between prediction traffic and original traffic is 10.18.

Key words: discrete time; queuing theory; FARIMA model; the avarage queue length

作者简介:

张 洪 男,(1980-),博士研究生.研究方向为网络结构及算法.

魏 娟 女,(1983-).研究方向为流量管理.

胡 俊(通讯作者) 男,(1982-),博士.研究方向为网络优化.E-mail:hujun887423@126.com.

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50 MHz～2 GHz宽带低噪声放大器模块的研制

武丽伟,郝明丽,戴志伟,郑新年,王明华,尹军舰
(中国科学院 微电子研究所,北京 100029)

摘 要: 设计一款工作在50 MHz到2 GHz宽频带的负反馈低噪声放大器模块.分析放大器整体增益较低以及高频段增益显著下降的原因,提出了通过在放大器源级串联增益补偿网络来改善模块增益平坦度的方法.在超过5个倍频程的频带范围内,该放大器模块的测试结果:增益大于26.5 dB,平坦度≤±0.75 dB,噪声系数小于1.4 dB,平均1 dB压缩点功率为11.1 dBm,输入输出端驻波比良好.

关键词: 低噪声放大器;宽频带;增益平坦度;负反馈
中图分类号: TN722.3 **文献标识码:** A **文章编号:** 1000－7180(2015)10－0050－04

50 MHz-2 GHz Wide Band Low Noise Amplifier Module

WU Li-wei, HAO Ming-li, DAI Zhi-wei, ZHENG Xin-nian,
WANG Ming-hua, YIN Jun-jian
(Institute of Microelectronics of Chinese Academy of Sciences, Beijing 100029, China)

Abstract: This paper presents a 50 MHz ～ 2 GHz wide frequency band low noise amplifier (LNA) module with dual feedback loops. The reason for measured low overall power gain and serious gain degeneration in high frequency band is analyzed. To improve the gain flatness of the LNA, a gain compensation network is added to the source of the transistor. In this wide-band range which contains over 5 octaves, measurement results show that the overall gain is greater than 26.5dB with ±0.75 dB variation, noise figure (NF) is less than 1.4dB, the average 1dB compression point is about 11.1 dBm, and the VSWR is acceptable.

Key words: LNA; wide frequency band; gain flatness; negative feedback

作者简介:
武丽伟 男,(1990-),硕士研究生.研究方向为射频集成电路设计.E-mail:wuliwei@ime.ac.cn.

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AHB Matrix互连总线IP的设计与实现

罗惠文,吴 斌,尉志伟,叶甜春
(中国科学院 微电子研究所,北京 100029)

摘 要: 结合一款基于MIPS14K内核的SoC中AHB总线矩阵的设计需求,分析单层AHB总线的特性及不足,提出并实现了一种可配置、层次化、高效的AHB总线矩阵体系架构.该总线矩阵符合AHB lite协议标准,支持多路MASTER/SLAVE并行访问,减小了总线仲裁延迟,提高了系统带宽,应用高效的轮询仲裁机制,提高嵌入式SoC芯片的整体性能.本设计实现了5主5从的AHB总线矩阵,已应用于一款SMIC55 nm工艺条件下工作频率为160 MHz的轻量级嵌入式网络处理器SoC芯片,完成FPGA系统级验证并实现了流片设计.

关键词: AHB;AHB Matrix;AHB—Lite;互连总线
中图分类号: TP492 **文献标识码:** A **文章编号:** 1000—7180(2015)10—0054—04

Design and Implementation of Multi-layer AHB Matrix Interconnect Bus Based on AMBA 2.0

LUO Hui-wen, WU Bin, WEI Zhi-wei, YE Tian-chun
(Institute of Macroelectronics of Chinese Academy of Science, Beijing 100029, China)

Abstract: Analyses the characteristics and shortcomings of single-layer AHB bus, and proposes and implements an architecture of AHB bus matrix which is configurable, hierarchical and efficient according to the requirement of the design base on MIPS14K core. This bus matrix in accordance with the protocol standard of AHB Lite and support parallel access of multiple MASRER/SLAVE. This architecture could improve effectively the system bandwith, reduce the bus arbitration delay and improve the overall performance of embedded SoC chip. This AHB bus matrix has been applied to an lightweight embedded SoC chip, completed FPGA prototype verification and achieve the layout design.

Key words: AHB;AHB Matrix;AHB-Lite;FPGA

作者简介:

罗惠文 女,(1989-),硕士研究生.研究方向为宽带通信SoC设计.E-mail:ihw0709@126.com.

吴 斌 (1976-),博士,研究员,硕士生导师.研究方向为宽带通信SoC体系架构、实时信号处理VLSI体系架构.

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基于定点DSP的CORDIC算法研究

胡 坤[1,2],林心龙[1],黎 尧[2],纪荣祎[1],周维虎[1]
(1 中国科学院 光电研究院,北京 100094;
2 华中科技大学 光学与电子信息学院,湖北 武汉 430074)

摘 要: 高精度相位求解是飞秒激光跟踪仪中测距系统的关键,为了在定点DSP中满足相位精度的要求,研究了传统数字旋转坐标计算机(CORDIC)算法,在传统CORDIC算法反正切基的基础上提出了混合基算法.证明混合基算法的可行性,在TMS320VC5402上实现了两种算法并对两者的性能进行了比较.研究结果表明:混合基算法不仅能够在相同迭代次数的下实现与传统算法相同的精度,而且可以减少硬件开销与程序运行时间.

关键词: 测距;定点DSP;CORDIC算法
中图分类号: TN29 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0058-05

Study of CORDIC Algorithm Based on Fixed-DSP

HU Kun[1,2], LIN Xin-long[1], LI Yao[2], JI Rong-yi[1], ZHOU Wei-hu[1]
(1 Academy of Opto-Electronic, Chinese Academy of Sciences, Beijing 100094, China;
2 School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan 430074, China)

Abstract: The solution of high precision phase is a significant procedure in distance measurement system of femtosecond laser tracker. In order to match the requirement in precision of phase in fixed-DSP, hybrid radix algorithm was proposed on the basis of traditional coordinate rotation digital computer (CORDIC) after study on traditional CORDIC Algorithm. The feasibility of hybrid radix has been demonstrated and two different methods have been implemented on TMS320VC5402 showing that hybrid algorithm, which saves execution times and hardware spaces, can realize the same precision as traditional CORDIC algorithm.

Key words: distance measurement; fixed DSP; CORDIC algorithm

作者简介:
胡 坤 男,(1989-),硕士研究生.研究方向为光电精密测量等. E-mail:hukun@hust.edu.cn.

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基于小波的扇形束CT图像局部重建算法

郭 荣,乔志伟
(中北大学 计算机与控制工程学院,山西 太原 030051)

摘 要: 提出一种基于小波的扇形束局部重建算法,首先插值获得的的投影数据,然后求得待重建图像的尺度系数和小波系数,对插值后的投影进行滤波,最后进行小波重构得到感兴趣区域的局部图像,该算法不仅减少了对检测物体辐射剂量,而且缩短了重建时间;最后比较了不同小波的重建效果,Cofflet2小波能获得更高质量的重建图像.

关键词: 扇形束;小波重建;滤波反投影;局部重建
中图分类号: TP301.6 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0063-04

Local Reconstruction Algorithm of Fan-Beam CT Images Based on Wavelet

GUO Rong, QIAO Zhi-wei
(School of Computer and Control Engineering, North University of China, Taiyuan 030051, China)

Abstract: In this paper, it is puts forword a fan-beam local image reconstruction algorithm. Firstly, on the projection data interpolation. Secondly, seek to Scale coefficients and wavelet coefficient of the of the reconstruction image, then filter the projection of interpolation. Lastly, the wavelet reconstruction get interested in area of local image. This algorithm not only reduces the radiation dose detection object, and shorten the reconstruction time. Finally also compares the different wavelet reconstruction effect, Cofflet2 wavelet can obtain higher quality of reconstruction image.

Key words: fan beam; wavelet reconstruction; filtration backprojection (FBP); local reconstruction

作者简介:
郭 荣 女,(1988-),硕士研究生. 研究方向为工业CT图像重建. E-mail:GR2015@163.com.
乔志伟 男,(1977-),博士,副教授,硕士生导师. 研究方向为信息获取、重建和处理技术.

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DCA在数据库服务器异常检测中的应用

熊小庆,徐 立,刘 赛
(武汉大学 计算机学院,湖北 武汉 430072)

摘 要:针对现有数据库服务器异常检测方法存在计算量较大,系统资源消耗较大的问题,引入危险理论中的树突状细胞算法(DCA)进行检测.首先对数据库服务器的运行特征进行分析;其次建立数据库服务器异常检测的多维指标体系,并对指标进行归一化处理;最后应用树突状细胞算法对其运行状态进行异常检测.实验结果表明树突状细胞算法在数据库服务器的异常检测中消耗较少的系统资源,并具有较高的准确率和较低的误报率.

关键词:数据库服务器;人工免疫;树突状细胞算法;异常检测;指标体系
中图分类号:TP301.6 **文献标识码**:A **文章编号**:1000-7180(2015)10-0067-05

The Application of Dendritic Cells Algorithm on Database Server Anomaly Detection

XIONG Xiao-qing, XU Li, LIU Sai
(Computer School, Whuhan University, Whuhan 430072; China)

Abstract: The existing approaches of anomaly diagnose for database servers need a large amount of computation and consume a lot of system resources. This paper incorporated the dendritic cells algorithm(DCA), which was based on danger theory, into database servers' anomaly detection. Firstly, it analyzed runtime characteristics of database servers. Secondly, to evaluate server's characteristics, it built multidimensional metrics which were normalized between 1 and 10. Finally, it performed DCA on data that we collected from database servers. An empirical analysis on the dataset revealed that our approach performed well on improving detection accuracy and reducing false positive rate.

Key words: database servers; artificial immunity; dendritic cells algorithm; anomaly detection; metrics system

作者简介:
熊小庆 女,(1990-),硕士研究生.研究方向为人工免疫学.
Email: xiaoqing_xiong@163.com.
徐 立 女,(1990-),硕士研究生.研究方向为人工免疫学.
刘 赛 男,(1978-),博士研究生.研究方向为人工免疫学.

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可重构阵列中容错结构的设计与仿真

徐卫芳[1],邓军勇[2],蒋 林[2],谢晓燕[1],冼子雨[2]
(1 西安邮电大学 计算机学院,陕西 西安 710121;
2 西安邮电大学 电子工程学院,陕西 西安 710121)

摘 要:针对可重构阵列中处理单元PE(processing elements)的可能故障,提出了一种实用的容错方案.通过分析推导PE阵列的故障概率和硬件开销,得出对于4×4的PE阵列,每行只需设计一个备用PE即可满足容错要求的结论,并提出了一种有效的容错方案,完成了功能仿真与FPGA验证,结果表明该方案可以充分利用备用PE达到容错效果.可重构阵列在SMIC 0.13 μmCMOS工艺下工作频率可达203 MHz.

关键词:可重构阵列;处理单元;故障;硬件开销
中图分类号:TP302 **文献标识码**:A **文章编号**:1000-7180(2015)10-0072-05

The Design and Simulation of a Fault-Tolerant Array Structure in Reconfigurable Circuit

XU Wei-fang[1], DENG Jun-yong[2], JIANG Lin[2],
XIE Xiao-yan[1], XIAN Zi-yu[2]
(1 School of Computer, Xi'an University of Posts and Telecommunications, Xi'an 710061, China;
2 School of Electronics Engineering, Xi'an University of Posts and Telecommunications, Xi'an 710061, China)

Abstract: To solve the fault of PE (processing element) on reconfigurable circuit, presents a practical fault-tolerant solutions. By analyzing and deriving the error probability of PE array and hardware cost, the conclusions is obcaired that only one spare PE is needed in each row for dealing with the error in 4×4 PE array, then an effective fault-tolerant program is prooosed and the functional simulation and FPGA verification to the circuit are completed. The result show that this design can make full use of spare PEs and repair the fault, and its integrated frequency is up to 203 MHz when using Design Compiler in SMIC 0.13 μm CMOS process standard cell library.

Key words: reconfigurable circuit ; processing elements; fault-tolerant; hardware cost

作者简介:

徐卫芳 女,(1988-),硕士.研究方向为计算机体系结构与VLSI. E-mail:flora_xuf@126. con.

邓军勇 男,(1981-),博士,副教授.研究方向为视频及图形处理电路与系统.

蒋 林 男,(1970-),博士,教授.研究方向为集成电路设计、计算机体系结构.

谢晓燕 女,(1972-),硕士,副教授.研究方向为计算机网络.

冼子雨 男,(1989-),硕士.研究方向为专用集成电路设计与系统集成.

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基于视觉注意力变化的视频质量评估模型

郭 倩,李 凡
(西安交通大学 电子与信息工程学院,陕西 西安 710049)

摘 要:建立一种基于视觉注意力变化的视频质量评估模型,从编码特性和视频内容特性两个方面进行研究.编码方面研究了量化步长的影响;视频内容方面,根据不同视频内容中的突发事件的突发程度—突发参数来衡量视频内容对人的吸引力的大小,最终建立与量化参数和突发参数有关的质量评估模型.实验结果表明,该模型的预测结果和主观测试MOS值的相关系数为0.974 0,均方根误差为0.157 5.该模型能准确评价不同视频内容的视频质量,具有良好的性能.

关键词:视频感知质量;编码参数;视频内容;突发事件
中图分类号:TP391 **文献标识码**:A **文章编号**:1000—7180(2015)10—0077—05

A Perceptual Video Quality Model Based on Visual Attention Variation

GUO Qian, LI Fan
(School of Electronic and Information Engineering, Xi′an Jiaotong University, Xi′an 710049, China)

Abstract: This article establishes the video quality assessment model based on variation in visual attention, from coding features and video content characteristics of the two aspects. We explore the impact of the quantization parameter in the respect of coding and surprising parameters to measure the attraction for human in the respect of human visual system according to the extent of the surprising events in different content video, then establish the eventual quality assessment model related to the quantization step and surprising parameter based on content. Experimental results show that the Pearson Correlation coefficient between objective score obtained from the model calculations and subjective MOS scores is as high as 0.9740 and the Root Mean Square Error of them is 0.1575. The proposed model has a great accuracy on predicting users′ QoE(quality of experience) of videos of different content account with its good performance.

Key words: QoE; quantization parameter; video content; surprising parameter

作者简介:

郭 倩 女,(1990-),硕士研究生.研究方向为视频处理与通信.

李 凡(通讯作者) 男,(1981-),博士,副教授.研究方向为视频处理与通信.E-mail:lifan@mail.xjtu.edu.cn.

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高压LDMOS总剂量辐射效应研究

王丹辉，赵元富，岳素格，边 强，莫艳图
（北京微电子技术研究所，北京 100076）

摘 要：在太空环境中，辐射会造成电源管理电路严重漏电和性能下降. LDMOS相比于CMOS，具有更高的工作电压，作为大尺寸的功率管被广泛应用于电源管理电路中. 针对一种0.25 μm BCD工艺LDMOS进行总剂量辐射效应研究. 实验表明，总剂量辐射会造成LDMOS的阈值电压漂移，以及N沟道直栅LDMOS的较大漏电流. 同时也观察和记录到总剂量辐射导致P沟道直栅LDMOS的漏电. 环栅加固方法能有效抑制总剂量辐射引起的N沟道直栅LDMOS的边缘漏电. 在100 krad(Si)辐照剂量时，N沟道环栅LDMOS和P沟道直栅LDMOS的阈值电压漂移分别为0.02 V和－0.02 V.

关键词：LDMOS；总剂量辐射；环栅加固；边缘漏电；阈值电压漂移
中图分类号：TN4 **文献标识码**：A **文章编号**：1000－7180(2015)10－0082－05

Total Dose Radiation Effects Studies of High Voltage LDMOS

WANG Dan-hui, ZHAO Yuan-fu, YUE Su-ge, BIAN Qiang, MO Yan-tu
(Beijing Research Institute of Micro-Electronics, Beijing 100076, China)

Abstract: In space environment, radiation may induce the leakage and capability degeneration of power management circuits. Compared to CMOS, LDMOS has higher working voltage, so it is widely used as large size power transistors in power management circuits. In this paper, total ionizing dose(TID) radiation effects of LDMOS are studied in a 0.25 μm BCD process. TID radiation induces LDMOS threshold voltage shifts and, in n-channel straight gate LDMOS, leakage current. The p-channel straight gate transistor's leakage current caused by TID radiation is also observed and recorded. ELT hardening technique can effectively limit the radiation-induced eage leakage of n-channel LDMOS. When radiation dose is 100 krad(Si), the threshold voltage shifts of n-channel ELT LDMOS and p-channel straight gate LDMOS are respectively 0.02 V and -0.02 V.

Key words: LDMOS; TID radiation; ELT hardening; edge leakage; threshold voltage shift

作者简介：

王丹辉 男，(1990-)，硕士研究生. 研究方向为抗辐射加固电源管理电路设计. E-mail：danhui90com@126. com.

赵元富 男，(1962-)，博士，研究员，硕士生导师. 研究方向为抗辐射加固集成电路与器件设计.

岳素格 女，(1969-)，研究员，研究生导师. 研究方向为抗辐射加固集成电路设计.

边 强 男，(1978-)，研究员. 研究方向为抗辐射加固集成电路设计.

莫艳图 男，(1982-)，硕士研究生. 研究方向为抗辐射加固集成电路设计.

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基于电容耦合技术的快瞬态高稳定性LDR设计

李少峰,刘润民,范世全,苟 伟,谢 毅,耿 莉
(西安交通大学 微电子学系,陕西 西安 710049)

摘 要: 设计了一种具有快速瞬态响应能力的低压差线性稳压器(Low Dropout Regulator,LDR).该LDR采用基于电容耦合技术的改进型电压缓冲器,在空载(I_{load}=0)和满负载(I_{load}=100 mA)之间跳变时,改进型电压缓冲器可动态地改变对调整管栅极的充电和放电电流,使得LDR的过冲或欠冲电压被迅速抑制,缩短瞬态恢复时间.通过采用电流缓冲器和等效串联电阻(Equivalent Series Resistance,ESR)零点频率补偿技术,确保了LDR在全负载范围内的稳定.设计的LDR采用标准0.18 μm CMOS工艺进行了仿真验证,结果显示,LDR空载下静态电流为35 μA,满负载时的静态电流为80 μA.输出电容为2.2 μF,负载电流由100 mA到0跳变时,瞬态响应时间和过冲电压分别为438 ns和4.2 mV;负载电流由0到100 mA跳变时,瞬态响应时间和欠冲电压分别为385 ns和12.9 mV.

关键词: 低压差稳压器;负载瞬态响应;电容耦合;自适应电流
中图分类号: TN432 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0087-06

A Fast-Transient and High Stability LDR Based on Capacitive-Coupling Method

LI Shao-feng, LIU Run-min, FAN Shi-quan, GOU Wei, XIE Yi, GENG Li
(Department of Microelectronics, Xi'an Jiaotong University, Xi'an 710049, China)

Abstract: A fast transient response Low Dropout Regulator (LDR) is designed, which is based on Capacitive-Coupling Method (CCM). When the load currents step between no load and full load, the improved voltage buffer can dynamically change the current to charge or discharge the gate of the regulation transistor to rapidly inhibit overshoots or undershoots of the LDR and shorten the recovery time. By employing the current-buffer and Equivalent Series Resistance (ESR) compensation methods, the stability of the LDR can be ensured in a wide range of the load currents. The LDR is designed with 0.18 μm standard CMOS process. Simulation results show that the regulator dissipates 35 μA at no load and 80 μA at full load. The output capacitor of designed LDR is 2.2 μF. The LDR reveals the step-down transient response time of 438 ns and the overshoot of 4.2 mV at the load stepping from 100 mA to 0. The step-up transient response time and undershoot voltage are 385 ns and 12.9 mV, respectively, at the load stepping from 0 to 100 mA.

Key words: low-dropout regulator; load transient response; capacitive-coupling; adaptive current

作者简介:
李少峰 男,(1987-),硕士研究生,微电子学与固体电子学专业.研究方向为模拟/混合信号集成电路设计.
E-mail:lsf_saut@163.com.

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融合SIFT和尺度方向自适应的Mean shift目标跟踪算法

文 武[1,2],姜 涛[1,2]
(1 重庆邮电大学 通信新技术应用研究中心,重庆 400065;
2 重庆信科设计有限公司,重庆 400065)

摘 要: 由于传统Mean shift跟踪算法固定了椭圆核的带宽和方向,对尺度和方向变化的目标跟踪定位不准或跟踪丢失.针对这一不足,提出一种尺度方向自适应的目标跟踪算法.首先用SIFT特征跟踪目标,并通过对SIFT特征点尺度和方向的实验分析,发现SIFT特征点的尺度变化和目标的尺度变化成正比、特征点主方向变化角度与目标旋转角度一致,提出目标尺度和方向的计算方法;其次引入相似性变换,利用带方向、可变带宽的椭圆核改进传统Mean shift跟踪算法,使其能跟踪尺度和方向变化的目标.最后,融合SIFT特征跟踪结果和改进Mean shift的跟踪结果.实验表明:提出的算法能有效地跟踪具有尺度和方向变化的目标,获得的目标尺度、旋转方向参数精度较高,定位也更准确.

关键词: 目标跟踪;SIFT;尺度和方向;Mean shift
中图分类号: TP391.4 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0093-05

Object Tracking Algorithm Fusing SIFT and Scale-orientation Adaptive Mean Shift

WEN Wu[1,2], JIANG Tao[1,2]
(1 Research Centre for Application of New Communication Technologies, Chongqing University of Posts and Telecommunications, Chongqing 400065, China;
2 Chongqing Information Technology Designing Co. Ltd, Chongqing 400065, China)

Abstract: For the traditional Mean shift algorithm fixed bandwidth and direction of the ellipse kernel, so the location of object tracking is inaccurate or lost . For this shortage, this thesis puts forward a kind of scale-orientation adaptive object tracking algorithm. First of all, tracked the object with the SIFT features. And then analysis of the SIFT feature's scale and orientation, found that the scale change of the SIFT feature point is proportional to that of the object, the Angle change of the SIFT feature point is the same as that of the object, puts forward the calculation method of object scale and orientation. Furthermore introduce the similarity transformation, use variable-bandwidth and orientation ellipse to improve the traditional Mean shift algorithm, let it can track the object that scale and orientation changes. Finally, the algorithm utilizes linear weighted method to fuse the tracking results of SIFT and improved Mean shift, obtaining the final tracking results. Experiment shows that the proposed algorithm can effectively track the object that the scale and orientation change, the scale and orientation parameter of object is higher, and the localization is more accurate.

Key words: object tracking; SIFT; scale and orientation; Mean shift

作者简介:
文 武 男,(1970-),博士,高工,硕士生导师.研究方向为移动通信、通信新技术及应用.
E-mail:wenwu_0530@263.net
姜 涛 男,(1988-),硕士研究生.研究方向为视频图像处理及应用.

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基于压缩感知的空间稀疏目标成像方法研究

迪可新,魏 平,柯 钧,蒋作琛,王 雅
(北京理工大学 光电学院,北京 100081)

摘 要: 提出一种快速有效的空间稀疏目标检测与成像方法.把图像的每行相加得到列向量,图像的每列相加得到行向量,然后对行向量和列向量进行压缩采样.由测量数据、测量矩阵、稀疏基恢复行、列向量,再根据重心法求出稀疏目标的位置坐标.然后以目标为中心获取目标图像.它的优点是不需要获取整幅图就能得到目标的位置,大大节省了时间.实验结果表明,系统能够准确地对目标进行检测与成像.该成像方法可以利用红外点源探测器完成高分辨率的红外目标成像,获取所需要的红外图像信息.

关键词: 压缩感知;稀疏目标;目标检测;DMD
中图分类号: TP393 **文献标识码:** A **文章编号:** 1000－7180(2015)10－0098－07

Research on pace Space Sparse Target Imaging Method Based on Compressed Sensing

DI Ke-xin, WEI Ping, KE Jun, JIANG Zuo-chen, WANG Ya
(School of Optoelectronics, Beijing Institute of Technology, Beijing 100081, China)

Abstract: This paper presents a fast and efficient sparse target detection and imaging methods. Column vector is obtained by adding each row of the an image, and row vector is obtained by adding each column of the an image, and row and column vectors is compressed and sampled. Row and column vectors were restored From the measured data, the measurement matrix, sparse group, sparse target location coordinates are determined in accordance with the center of gravity method. Then get the target image at the center of the target. The advantage is that the whole image is not required and target location can be get, so it takes less time. Experimental results show that the system can accurately detect the target and image. The imaging method can complete high-resolution infrared target imaging using infrared point source detecter, and obtain the information of infrared images they need.

Key words: compressed sensing; sparse target; target detection; DMD

作者简介:
迪可新 男,(1989-),硕士,研究方向为光电成像.
E-mail:kexindi@126.com.
柯 钧 女,(1974-),博士,副教授.研究方向为计算成像、光电成像.

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一种基于代理的假名证书颁发策略

沈明玉,赵 培,赵 皎,王正彬,石 雷
(合肥工业大学 计算机与信息学院,安徽 合肥 230009)

摘 要: 为提高车辆假名证书颁发的安全性,减少假名证书的颁发延迟,探讨一种基于代理机制的假名证书颁发策略——APCI,重点研究了CA系统的初始化、RSU代理的授权;利用RSU代理实现车辆假名证书的跨区域申请与吊销;采用短群签名与双线性对等技术实现了RSU代理的安全授权及假名证书的安全颁发.仿真实验结果和分析表明了此方法是有效的,可以提高车辆假名证书颁发的安全性、减少假名证书的颁发延迟.

关键词: 车载网;RSU代理;安全授权;假名证书安全颁发
中图分类号: TP393 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0105-06

A Pseudonym Certificate Issuance Policy Based on Agent

SHEN Ming-yu, ZHAO Pei, ZHAO Jiao, WANG Zheng-bin, SHI Lei
(School of Computer and Information, Hefei University of Technology, Hefei 230009, China)

Abstract: In order to improve the issuing security of pseudonym certificate to On-board Units(OBU), and reduce the issuing delay of pseudonym certificate, a pseudonym certificate issuance policy(APCI) based on agent is explored in this paper. The main work focuses on the initialization of Certification Center(CA) system, authorization of RSU agent. Using RSU agent to achieve cross-regional application and certificate revocation of vehicle pseudonym, and achieving security authorization of RSU agent and security issuing of pseusonym certificate of OBU based on the short group signature and bilinear pairing technologies. According to the simulation results and analysis, the proposed policy achieves secutity issuing of pseudonym certificate to vehiches and reducing the issuing delay of pseudonym certificate.

Key words: VANETs; security authorized of RSU agent; the security issuing of pseudonym certificate

作者简介:

沈明玉 男,(1962-),博士,副教授,硕士生导师,中国计算机学会高级会员(E200005452S).研究方向为网络与信息安全.

赵 培 女,(1986-),硕士研究生.研究方向为车载网安全认证与隐私保护技术.
E-mail:zhaopeifiery@163.com.

赵 皎 女,(1990-),硕士研究生.研究方向为车载网组网及路由策略.

王正彬 男,(1991-),硕士研究生.研究方向为车载网安全技术.

石 雷 男,(1980-),博士.研究方向为无线网络、网络与通信.

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基于单核DSP实时多任务宏观并行软件架构

周敬东,黄云朋,周明刚,李敏慧,程 钗
(湖北工业大学 农机工程研究设计院,湖北 武汉 430068)

摘 要:现有单核嵌入式系统大多采用的是串行任务执行方式,系统在复杂任务执行过程中,不能快速有效地响应其他任务.通过对复杂任务的拆分以限制单个任务执行时间,减少系统延时程序的使用,以及使用查询任务标志调度任务等方法,设计并实现了一种基于单核DSP的实时多任务宏观并行软件架构.实际应用系统的试验验证了该软件架构在复杂多任务系统中任务响应快,可满足系统实时性要求,能够保证系统稳定运行.

关键词:单核;DSP;多任务;宏观并行;软件架构
中图分类号:TP368.1 **文献标识码**:A **文章编号**:1000-7180(2015)10-0111-04

Real-time Multitasking Macro Parallel Software Architecture Based on Single-core DSP

ZHOU Jing-dong, HUANG Yun-peng, ZHOU Ming-gang,
LI Min-hui, CHENG Chai
(Research and Design Institute of Agricultural Mechanical Engineering,
Hubei University of Technology, Wuhan 430068, China)

Abstract: The serial task execution mode is used in most of the existing single-core embedded systems. The system can not respond to other tasks quickly and effectively, during the execution of complex tasks. A real-time multitasking macro parallel software architecture based on single-core DSP is designed by splitting for the complex task, reducing the use of system latency program and querying task marks to scheduling task. The experiment test show that rapid task responding in complex multitasking system can meet the request of instantaneity, stability of the system and multitask parallel at the macroscopic level.

Key words: single-core; DSP; multitask; macro parallel; software architecture

作者简介:
周敬东 男,(1973-),博士,副教授,硕士生导师.研究方向为机电一体化技术研究.
E-mail:oldwiner@163.com

黄云朋 男,(1990-),硕士研究生.研究方向为机电一体化技术研究.

周明刚 男,(1969-),博士,教授.研究方向为机电一体化技术方面的研究.

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基于AODV的农田无线传感器网络路由和休眠算法

刘大勇[1],赵春江[2,3]
(1 北京工业大学 计算机学院,北京 100022;
2 国家农业信息化工程技术研究中心,北京 100097;
3 农业部农业信息技术重点开放实验室,北京 100097)

摘 要: 在AODV路由协议的基础上,改进了一种农田无线传感器网络路由和休眠算法.算法首先通过剩余能量进行路由节点的筛选,然后通过路由中节点的采集周期长短和之间的比例关系进行路径的选择,确定路由后根据节点所在路径中其他节点的采集周期确定休眠周期.通过路径选择和适时休眠达到减少总体能耗和避免的局部节点能量过度消耗的目的.仿真结果表明该算法能提高网络总体能量利用效率,从而达到延长网络寿命的目标.

关键词: 无线传感器网络;路由算法;节点休眠;间断性采集;AODV
中图分类号: TP393 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0115-06

A Wireless Sensor Network Routing and Sleeping Algorithm in Agriculture Based on AODV

LIU Da-yong[1], ZHAO Chun-jiang[2,3]
(1 College of Computer Science and Technology, Beijing University of Technology, Beijing 100022, China;
2 National Engineering Research Center for Information Technology in Agriculture, Beijing 100097, China;
3 Key Laboratory for Information Technologies in Agriculture, Ministry of Agriculture, Beijing 100097, China)

Abstract: This paper improved the AODV routing protocol and get an energy effective routing and sleeping algorithm for farmland wireless sensor network. This algorithm establishes routing depends on residual energy of each nodes and data collection interval of the destination node. After the data routing is established, the nodes sleeping cycle is determined depends on the data collection cycle of the nodes in the routing. The simulation results shows that by path selection and timely sleeping, this algorithm reduces overall energy consumption and avoids excessive local node energy consumption, So as to achieve the goal to extend the network lifetime.

Key words: wireless sensor network; routing algorithm; node sleep; intermittent data collection; AODV

作者简介:
刘大勇 男,(1973-),博士生.研究方向为无线传感器网络.
E-mail: liudyliudy@126.com.
赵春江 男,(1964-),研究员,博士生导师.研究方向为农业信息化、人工智能技术研究.

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低照度图像去雾算法的FPGA实现

蒲 坤，张家树
（西南交通大学 信息科学与技术学院，四川 成都 611756）

摘 要：为了实现对低照度有雾视频图像的增强，建立了一套基于FPGA的实时增强去雾系统.对该系统所采用的低光照增强、图像去雾、跨时钟域转换等模块进行了并行优化设计.首先，提出了一种移位操作实现图像亮度增强的逻辑结构.接着，详细分析了暗通道先验去雾算法的特点，将该算法拆分为大气光值估计和透射率计算两个并行模块.最后，图像恢复模块根据已知参数计算无雾图像，并直接在LCD屏幕显示.实验结果表明：输出图像质量明显改善，且每秒最高可处理65帧大小为640×480的视频图像；满足提高图像质量、处理速度快、实时性高等要求.

关键词：低照度增强；并行优化；图像去雾；实时处理
中图分类号：TN919 **文献标识码**：A **文章编号**：1000－7180(2015)10－0121－04

FPGA Implementation of Low-light Enhancement and Defogging for Video Images

PU Kun, ZHANG Jia-shu
(School of Information Science & Technology, Southwest Jiaotong University, Chengdu 611756, China)

Abstract: In order to realize the enhancement of low-light and foggy video images, a real-time enhancement defogging system based on FPGA is established. Low-light enhancement, image defogging and clock converter modules adopted in this design are optimized using parallel criteria. Firstly, we adopted a structure with shift operation to achieve low-light enhancement. Then we divide the algorithm into two parallel progresses of light value estimation and transmissivity calculation based on the deep analysis of dark channel prior defogging algorithm. Last, the image recover module calculates the recovered images based on the known parameters. Experiments indicate that, the quality of output image has been significantly improved, and the system can handle 65 frames video image with size 640×480 per second. It can satisfy the system requirements of enhancing image qualities, fast processing, and real time.

Key words: low-light enhancement; parallel optimized; defogging; real-time

作者简介：
蒲 坤 男，(1990-)，硕士研究生.研究方向为嵌入式图像处理技术.E-mail：pukun2012@163.com.

张家树 男，(1965-)，博士，教授，博士生导师.研究方向为现代信号处理、生物特征识别及数字版权保护等.

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并行数据库中异常数据优化分类挖掘方法研究

杨秀荣
(运城学院 计算机科学与技术系,山西 运城 044000)

摘 要:提出一种考虑语义特征聚类紧密性与分离性特征分析的并行数据库中异常数据优化分类挖掘算法.构建并行数据库异常数据的语义特征分离性度量模型,设计语义映射网络结构,实现对异常数据的噪点初步分离,设计面向语义特征聚类的紧密性与分离性特征提取算法,对含有噪点和野值的并行数据库环境进行干扰抑制,实现对异常数据库优化分类挖掘.仿真结果表明,该算法提高了对并行数据库中异常数据搜索过程中的挖掘查准率,分类挖掘紧密度和准确度较高.

关键词:并行数据库;异常数据;挖掘;聚类
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Research on Method of Optimizing Mining Method of Abnormal Data in Parallel Database

YANG Xiu-rong
(School of Computer Science and Technology, Yuncheng University, Yuncheng 044000, China)

Abstract: Considering semantic feature clustering closely and separation of parallel abnormal data in the database optimization classification algorithm is presented in this paper. Constructing parallel database anomaly data semantic feature separability measure model is obained, design semantic mapping network structure to achieve noise of abnormal data preliminary separation, design semantic features clustering compactness and separation algorithm, to contain noise and outliers in the parallel database system for interference suppression, mining classification of abnormal database optimization. Simulation results show that the algorithm improves the parallel database abnormal data search the mining process of precision and classification mining compactness and high accuracy.

Key words: parallel database; abnormal data; mining; clustering

作者简介:
杨秀荣 女,(1978-),硕士.研究方向为数据挖掘、算法分析.E-mail:yxrcatherine0010@sina.com

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基于 WSRFCM 聚类的局部离群点检测算法

王丽娜[1,2],许 朴[1],谢亚琴[1]
(1 南京信息工程大学 电子与信息工程学院,江苏 南京 210044;
2 南京航空航天大学 计算机科学与技术学院,江苏 南京 210016)

摘 要:针对局部离群度量计算量大的缺点,在 LDOF 算法的基础上,提出一种新颖的基于聚类的离群点检测算法 WSRFCM-LDOF.该算法采用集成粗糙集和阴影集的簇特征加权模糊聚类(WSRFCM)技术作为减少计算量的方法;簇特征加权的聚类算法可以有效处理分布不均匀的簇划分,在此基础上应用粗糙集和阴影集,使得簇特征加权模糊聚类算法可以有效划分交叠的簇,尤其对噪声和异常数据的处理具有高效性.实验表明,所提算法在降低时间复杂度的同时,提高了检测精度.

关键词:特征加权;阴影集;阴影粗糙模糊聚类;局部离群度;离群点检测
中图分类号:TP391 **文献标识码**:A **文章编号**:1000-7180(2015)10-0129-05

Local Outlier Detecting Algorithm Based on WSRFCM Clustering

WANG Li-na[1,2], XU Pu[1], XIE Ya-qin[1]
(1 College of Electronic and Information Engineering, Nanjing University of Information Science and Technology, Nanjing 210044, China; 2 College of Computer Science and Technology, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China)

Abstract: To reduce the amount of calculation for local outlier factor, on the basis of the LDOF algorithm, this paper proposed a novel outlier detect algorithm WSRFCM-LDOF. The algorithm adopted the integration of rough set and shadowed set into feature weighted fuzzy clustering, as a method of reducing the computational effort of local outliers. Associating feature with weights for each cluster is a common approach in clustering algorithms, and it can handle the different distribution of clusters effectively. The experimental results show the proposed algorithm has reduced the time complexity, meanwhile has improved the accuracy of detecting outliers.

Key words: feature weights; shadowed set; shadowed rough-fuzzy clustering; local outlier degree; outlier detection

作者简介:
王丽娜 女,(1979-),博士研究生.研究方向有数据挖掘、机器学习、人工智能.E-mail:wangllna@163.com.

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一种变游程编码的 *X* 位填充压缩方法

颜学龙，熊杰超
（桂林电子科技大学 电子工程与自动化学院，广西 桂林 541004）

摘 要：解决数据容量大的问题是当前SOC测试中的一个主要挑战.对此提出了一种基于无关位填充的变游程编码测试数据压缩方案，该方案利用变长到变长的编码方式对任意长度游程进行编码.理论分析和实验结果表明：该填充方法在不增加测试功耗的同时，能取得较高的压缩率，同时还提出了一种基于有限状态机的解码结构.

关键词：*X* 位填充；测试数据压缩；测试功耗
中图分类号：TP31 **文献标识码**：A **文章编号**：1000－7180(2015)10－0134－03

A Varible-run-length Coding Compression Method of *X*-filling

YAN Xue-long, XIONG Jie-chao
(College of Electronic Engineering and Automation, Guilin University of Electronic Technology, Guilin 541004, China)

Abstract: Solving the problem of large data capacity is a major challenge in SOC test. In this paper, a kind of filling way is presented, which based on don ′t-care-bit of varible-run-length coding test data compression scheme. The scheme used variable-to-variable run-length coding way to compress the data. Theoretical analysis and experimental results show that the X-filling method can obtain high compression rate without any increase in test power. A decompressiom structure based on FSM is proposed at the same time.

Key words: *X*-filling; test data compression; test power

作者简介：
颜学龙 男，(1962-)，博士，教授.研究方向为集成电路测试、可测性设计等.E-mail：xiongjiechaode@163.com.

熊杰超 男，(1987-)，硕士研究生.研究方向为集成电路可测性设计研究。

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基于物联网技术的智能电能监测系统设计

张慧颖[1],黄南天[2]
(1 吉林化工学院 信息与控制工程学院,吉林 吉林 132022;
2 东北电力大学 电气工程学院,吉林 吉林 132022)

摘 要:提出了基于物联网和3G技术相结合的智能电能监测系统.采用电能检测专用芯片搭载Zigbee无线通信模块设计无线采集节点,将采集到的电能信息通过Zigbee无线网络传输到集中器设备,借助于3G技术实现远程监测.实验表明该系统可以准确检测电能参数,并可以进行电能参数的分析管理,从而实现电能质量的测量.系统具有实时性好,智能性高等特点.

关键词:电能检测;物联网;3G;Zigbee
中图分类号:TP273 **文献标识码**:A **文章编号**:1000-7180(2015)10-0137-06

Design of Intelligent Power Monitoring System Based on IOT

ZHANG Hui-ying[1], HUANG Nan-tian[2]
(1 College of Information and Control Engineering, Jilin Institute of Chemical Technology, Jilin 132022, China;
2 College of Electrical Engineering, Northeast Dianli University, Jilin 132022, China)

Abstract: This paper proposed an intelligent power quality monitoring system based on 3G technology. The system used ATT7758 and Zigbee wireless communication module to design wireless collection node, and making the collected energy information transmitted via Zigbee wireless network to a centralized device, using 3G technology enables remote monitoring. The results shows that the system can accurately detect power parameters and analysis, realizing the power quality measurement, and It is treal-time, high intelligence.

Key words: energy detection; IOT; 3G; Zigbee

作者简介:
张慧颖 女,(1982-),博士研究生.研究方向为检测技术及自动化、物联网及无线通信技术等研究.
E-mail:yingzi1313@163.com.
黄南天 男,(1981-),博士,副教授.研究方向为电能参数检测及畸变.

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1.25 GHz高效率F类射频功率放大器

李玉龙，宋树祥，岑明灿，蒋品群
（广西师范大学 电子工程学院，广西 桂林 541004）

摘 要：传统F类射频功放由于功放管寄生参数影响造成LC输出匹配电路二阶阻抗不为零而导致效率下降，对此采用补偿功放管寄生参数和优化调节二次谐波阻抗的方法，设计了一款结构可调而稳定的输出回路单元，获得了较高的效率和带宽.经过ADS仿真验证后得知，功率放大器工作在1.25 GHz时，该功率附加效率达到74.3%以上，输出功率为47.6 dBm，带宽为240 MHz.

关键词：射频功率放大器；F类；高效率；ADS；寄生参数
中图分类号：TN721 **文献标识码**：A **文章编号**：1000－7180(2015)10－0143－04

A 1.25 GHz High Efficiency Class-F of RF Power Amplifier

LI Yu-long , SONG Shu-xiang, CEN Ming-can, JIANG Pin-qun
(College of Electronic Engineering, Guangxi Normal University, Guilin 541004, China)

Abstract: In view of the traditional class F RF power amplifier caused by parasitic parameters of power amplifier affect LC output second-order impedance matching circuit is not zero and cause of the decline of the efficiency, In this paper, using compensated amplifier tube parasitic parameters and optimizing adjustment of second harmonic impedance method, designed an adjustable structure and stable output circuit unit, then get the higher efficiency and bandwidth; Through the ADS simulation power amplifier working at 1.25 GHz, power added efficiency more than 74.3%, the output power of 47.6 dBm, bandwidth of 240 MHz.

Key words: RF power amplifier; F class; High efficiency; ADS; Parasitic parameters

作者简介：

李玉龙 男，(1989-)，硕士研究生.研究方向为模拟集成电路设计.

宋树祥 男，(1970-)，博士，教授.研究方向为模拟集成电路设计.E-mail：songshuxiang@mailbox.gxnu.edu.cn

岑明灿 男，(1987-)，硕士研究生.研究方向为模拟集成电路设计.

蒋品群 男，(1970-)，博士，副教授.研究方向为信号检测与自动控制.

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IEEE 1149.7标准两线星型扫描格式研究

杨 轲,颜学龙
(桂林电子科技大学 电子工程与自动化学院,广西 桂林 541004)

摘 要:针对目前现代测试系统集成度越来越高,IEEE 1149.7标准提出了两线星型扫描拓扑的测试方法以满足需要较少的引脚来实现边界扫描的现状.以IEEE 1149.7标准为依据,在深入研究该标准的基础上,利用Quartus II仿真开发平台设计了基于该标准的两线星型扫描控制器,并进行了仿真验证.结果表明测试控制器能够产生符合标准要求的Mscan扫描格式及Oscan扫描格式两线星型扫描测试信号.

关键词:IEEE 1149.7标准;两线星型扫描;Mscan;Oscan
中图分类号:TN407 **文献标识码**:A **文章编号**:1000-7180(2015)10-0147-04

Star-2 Scanning Format Research Based on IEEE 1149.7 Standard

YANG Ke, YAN Xue-long
(College of Electronic Engineering and Automation, Guilin University of Electronic Technology, Guilin 541004, China)

Abstract: On account of the integration of modern test system is becoming more and more complex, the IEEE 1149.7 Standard puts forwards the test method of star-2 scan topology to meet the needs of using fewer pins to achieve boundary scan at present. On the basis of on the IEEE 1149.7 standard and in-depth study on the standard, the platform of Quartus II was used to design the star-2 scanning controller, which is validated by simulation. The results indicate that the test signal can be generated by the controller, which can meet the provisions of star-2 scanning signal of IEEE 1149.7 standard and the specified Mscan format and Oscan format.

Key words: IEEE 1149.7 standard; star-2 scanning; Mscan; Oscan

作者简介:
杨 轲 男,(1990-),硕士研究生.研究方向为计算机辅助测试.E-mail:187325205@qq.com.
颜学龙 男,(1962-),教授,研究生导师.研究方向为集成电路测试理论与测试仪器.

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一种低功耗亚阈值CMOS带隙基准电压源

邢小明，李建成，郑礼辉
（国防科技大学 电子科学与工程学院，湖南 长沙 410073）

摘 要： 提出了一种新型的低功耗亚阈值型CMOS带隙基准电压电路.该电路在不增加工作电源电压的情况下具有低功耗、低温度系数和高可靠性的优越性能，采用TSMC 0.18 μm工艺仿真实现.该设计电路由MOS管、双极型晶体管和电阻组成，并且所有MOS管均工作在亚阈值状态，从而实现了较低的功耗.该带隙基准电压源的工作电压为1.1 V，输出电压0.59 V，消耗功耗约为68 nW，在0.8～3 V电压下均能稳定工作.在电源电压为1.1 V和－40～80℃的工作温度下，电压基准的温度系数为14.8×10^{-6}/℃，具有优良的温度稳定性.

关键词： 低功耗；低温度系数；亚阈值；CMOS
中图分类号： TN 432 **文献标识码：** A **文章编号：** 1000－7180(2015)10－0151－04

A Low-Power Bandgap Voltage Reference Based on Subthreshold CMOS

XING Xiao-ming, LI Jian-cheng, ZHENG Li-hui
(School of Electronic Science and Engineering, National University of Defense Technology, Changsha 410073, China)

Abstract: This paper proposes a low-power bandgap voltage reference base on subthreshold CMOS. This circuit has superior performance such as low-power, low-temperature coefficient and reliability while the supply voltage hold the line. The simulation based on the 0.18 μm-CMOS process of TSMC. The design consists of MOSFETs, the bipolar transistor and resistors. All of MOSFETs work in subthreshold region, as a result, a low-power is achieved. The supply voltage of the voltage reference is 1.1 V, the output voltage is 0.59 V, which can operate with a supply voltage ranging from 0.8 V to 3 V and the power dissipation of Bandgap Voltage Reference is about 68 nW. When operating at a 1.1 V supply voltage within the temperature range from －40 ℃ to 80 ℃, the circuit has temperature coefficient of 14.8×10^{-6}/℃, which has a better temperature stability.

Key words: low-power; low-temperature coefficient; subthreshold region; CMOS

作者简介：
邢小明 男，(1989-)，硕士生.研究方向为专用集成电路设计系统应用.E-mail:13298657014@163.com.
李建成 男，(1971-)，博士.研究方向为专用集成电路设计与系统应用.
郑礼辉 男，(1989-)，硕士生.研究方向为专用集成电路设计与系统应用.

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IP测试壳的量子蚁群优化

杨 刚,颜学龙
(桂林电子科技大学 电子工程与自动化学院,广西 桂林 541004)

摘 要: 针对片上系统(SoC)的IP核扫描链分配问题,提出量子蚁群算法对SoC测试壳(Wrapper)进行优化,以有效地解决陷入局部最优解的问题,快速地寻找扫描链的最佳分配方式,从而缩短最长扫描链,减少单个IP核的测试时间.以ITC'02 Test benchmarks中的典型IP核为实验对象,实验结果表明量子蚁群算法能有效快速地解决IP测试壳的优化问题.

关键词: 扫描链;量子蚁群算法;测试壳
中图分类号: TP31 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0155-04

IP Test Wrapper Scheduling Based on Quantum Ant Colony Algorithm

YANG Gang, YAN Xue-long
(School of Electronic Engineering and Automation, Guilin University of Electronic Technology, Guilin 541004, China)

Abstract: To cope with the problem of scan chain distribution of system-on-chip (SoC) IP core, this paper proposes quantum ant colony algorithm as an optimization scheme, which can effectively solve the problems that the results easily fall into local optimal solution, and quickly find the best distribution of scan chain, thereby shortening the longest scan chain, reducing test time for a single IP core. Typical IP core of ITC'02 Test benchmarks is adopted, and the experimental results show that the quantum ant colony optimization algorithm can effectively and fastly solve the problem of the scheme.

Key words: scan chain; quantum ant colony algorithm; test wrapper

作者简介:
颜学龙 男,(1964-),教授,硕士研究生导师.研究方向为可测性设计与故障诊断、测试信号处理.

杨 刚 男,(1988-),硕士研究生.研究方向为SoC测试优化.E-mail:yg19880418@163.com.

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基于改进 Apriori 算法的铁路轨道质量分析与评价

朱付保,白庆春,汤萌萌,朱颢东
(郑州轻工业学院 计算机与通信工程学院,河南 郑州 450002)

摘 要: 设计了一种基于改进 Apriori 算法的铁路轨道质量分析与评价系统.首先对原始病害数据进行预处理,消除冗余数据,建立有效数据仓库;然后将数据进行分块处理,并对对应的决策表约简;最后利用改进 Apriori 算法减少扫描候选频繁项集的次数,寻找相应关联规则.通过对工务段线路病害进行评价,验证了该系统设计方案的合理性和有效性.

关键词: 关联规则;评价系统;质量分析;铁路病害;数据挖掘
中图分类号: TP39 **文献标识码:** A **文章编号:** 1000－7180(2015)10－0159－04

Quality Analysis and Evaluation of Tracks Based on Improved Apriori Algorithm

ZHU Fu-bao, BAI Qing-chun, TANG Meng-meng, ZHU Hao-dong
(School of Computer and Communication Engineering, Zhengzhou University of Light Industry, Zhengzhou 450002, China)

Abstract: A design scheme of quality analysis and evaluation system of tracks based on improved Apriori algorithm is proposed. The initial data is preprocessed to build the efficient data warehouse firstly. Then reduction is interpreted in a consistent decision table which we have preprocessed. To capture the association rules, the proposed methods are used to reduce the times of scanning candidate frequent item sets. Experiments show that the proposed method is reasonable and effective.

Key words: association role; evaluation system; quality analysis; railway defects; data mining

作者简介:
朱付保 男,(1974-),博士,副教授,硕士生导师.研究方向为智能信息处理、空间数据库、地理信息系统.
白庆春 女,(1990-),硕士研究生.研究方向为智能信息处理、数据挖掘.
汤萌萌 女,(1989-),硕士研究生.研究方向为智能信息处理、数据挖掘.
朱颢东 男,(1980-),博士,副教授,硕士生导师,CCF 会员 E200012527M.研究方向为智能信息处理、智能计算等.
E-Mail:zhuhaodong80@163.com.

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层次分析法和神经网络的信息系统风险评估

赵保华
(阿坝师范学院,四川 汶川 623002)

摘 要: 为了提高信息系统风险评估的准确性,提出一种层次分析法和神经网络的信息系统风险评估模型(AHP—BP).结果表明,此模型有效避免了人为确定评估指标权重的缺陷,可以准确描述信息系统风险变化特点,提高了信息系统风险的评估精度,能够为信息安全管理人员提供有价值的参考信息.

关键词: 信息系统;层次分析法;神经网络;评估模型
中图分类号: TP393 **文献标识码:** A **文章编号:** 1000—7180(2015)10—0163—04

Risk Evaluation of Information System Security Based on Neural Network and Analytic Hierarchy Process

ZHAO Bao-hua

(Aba Teachers University, Wenchuan 623002, China)

Abstract: In order to improve the accuracy of the risk assessment of the information system, a new method for risk assessment of information system based on analytic analysis process and neural network e is proposed. The experimental results show that the proposed model can avoid the defect of determining weights of evaluation indexes artificially, accurately describe the information system risk characteristics, enhance the accuracy of the information system risk assessment, and can provide valuable reference information for the information systems security management personnel.

Key words: information system; analytic hierarchy process; neural network ; Evaluation model

作者简介:
赵保华 男,(1968-),硕士,副教授.研究方向为计算机及应用,网络技术、高校信息化.

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可配置 WOLA 滤波器组的设计

郝康利[1,2],洪 缨[1]
(1 中国科学院 声学研究所,北京 100190;2 中国科学院大学,北京 100190)

摘 要:针对多通道数字信号处理领域的应用,设计了一种参数可配置的 WOLA 滤波器组.在分析 WOLA 滤波器组工作原理的基础上,设计了分析和综合滤波器组的硬件实现结构,说明了各个子模块的设计.在子模块的设计中采用了高效简便的方法以减少硬件开销和降低功耗,同时采用模块复用简化了设计.仿真结果表明该滤波器组具有较好的分解和重建性能,SMIC90 nm 标准工艺下综合后的电路规模约为 267 kgate,5 MHz 时钟下功耗为1.211 mW.

关键词:可配置;滤波器组;加权叠接相加;WOLA
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Design of a Configurable WOLA Filterbank

HAO Kang-li[1,2], HONG Ying[1]
(1 Institute of Acoustics, Chinese Academy of Sciences, Beijing 100190, China;
2 University of Chinese Academy of Sciences, Beijing 100190, China)

Abstract: A configurable WOLA filterbank is proposed in this paper for multi-channel digital signal processing. The WOLA filterbank mainly contains analysis and synthesize filterbank. In this paper, the design and implementation of sub-modules is presented in detail. And some efficient and simplified methods are adopted to reduce the hardware costs and power consumption. Simulation results show that the WOLA filterbank can analysis and reconstruct the wideband signal effectively. There are 267 kgates when the design is synthesized with SIMC90 nm standard cell library. And the power consumption is 1.211 mW at a clock frequency of 5 MHz.

Key words: configurable; filterbank; WOLA

作者简介:
郝康利 男,(1991-),硕士研究生.研究方向为数字集成电路设计. E-mail:haokangli91@163.com

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多媒体海量数据的合理调度方法的仿真

陈文庆
(中国劳动关系学院 计算机应用技术教研室,北京 100038)

摘 要:提出一种基于改进粒子群算法的多媒体海量数据合理调度方法,依据优先级对请求多媒体数据片集合进行确定,将调度时间看作是调度策略的目标参数,对最优节点集进行求解,使得调度时间达到最短.分析了一般粒子群算法,引入压缩因子对学习因子的性能进行优化,给出改进粒子群算法个体适应度评价函数,通过多媒体数据片优先级的大小选择优先级最高的多媒体数据片,将其添加至调度窗口.利用改进粒子群算法获取最优节点集合,将其看作是一次最优调度策略,从而实现多媒体海量数据的合理调度.仿真实验结果表明,所提方法可充分利用节点带宽资源,大大减少了多媒体的启动延迟与服务器负载,加强了系统的整体性能.

关键词:多媒体;海量数据;调度
中图分类号:TP393 **文献标识码**:A **文章编号**:1000-7180(2015)10-0172-04

The Reasonable Scheduling Method of Multimedia Data Simulation

CHEN Wen-qing
(Application Research of Computer Room, China Institute of Industrial Relations, Beijing 100038, China)

Abstract: Puts forward an improved particle swarm optimization (pso) algorithm based on multimedia data reasonable scheduling method, according to the priority of the request of multimedia data collection to determine, the scheduling time as target parameter of scheduling policy, to solve the optimal node set, to achieve the shortest scheduling time. General particle swarm optimization (pso) algorithm is analyzed, introduced to optimize the performance of the compression factor of learning factor and improved particle swarm algorithm is given individual fitness evaluation function, through the multimedia data pieces the size of the priority to choose the highest priority multimedia data, add it to the scheduling window. Using improved particle swarm algorithm to obtain the optimal node set, see it as an optimal dispatching strategy, so as to realize the reasonable scheduling of multimedia data. The simulation results show that the proposed method can make full use of the node bandwidth resources, greatly reduces the startup delay of multimedia and the load on the server, to strengthen the overall performance of the system.

Key words: multimedia; huge amounts of data; scheduling

作者简介:
陈文庆 男,(1981-),硕士.研究方向为计算机网络与多媒体教学. E-mail:wwwsheying11@126.com

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车联网中汽车位置管理策略研究

王海鑫[1],陈科佳[2]
(1电子科技大学 电子科学技术研究院,四川 成都 611731;2南京吉额美科技有限公司,江苏 南京 210000)

摘 要: 针对车联网拓扑结构,研究分析部署环境复杂度,将车联网拓扑划分为城镇二维拓扑结构和非城镇一维拓扑结构,针对两种拓扑结构特点,分别对其制定相应位置更新策略以减少更新开销,对城镇二维拓扑提出基于位置区的分层管理的位置更新策略,对非城镇一维拓扑提出相邻位置区重叠更新策略.本管理策略在适应车联网结构的同时减小了位置管理的开销.

关键词: 车联网;位置管理;拓扑结构;开销分析
中图分类号: TP391 **文献标识码:** A **文章编号:** 1000-7180(2015)10-0176-05

Research on Automobile Location Management Strategies in Vehicle Network

WANG Hai-xin[1], CHEN Ke-jia[2]
(1Research Institute of Electronic Science and Technology, University of Electronic Science and Technology of China, Chengdu 611731, China;
2 Jiemei Technology Co. Ltd of Nanjing, Nanjing 21000, China)

Abstract: According to the topology of the vehicle network, research and analysis of the complexity of the deployment environment, the vehicle network topology is divided into two dimensional topological structure of urban and non-urban one dimensional topological structure. Aiming at the characteristics of two kinds of topology structure, respectively, to formulate the corresponding location update strategy to reduce the cost of update, according to the two dimensional topological structure of urban is proposed for update strategy based on hierarchical location management, and put forward the update strategy of adjacent location areas overlap each other in non-urban one dimensional topology structure. The management strategies can meet vehicle network structure and reduce the location management cost.

Key words: vehicle network; location management; topology; analysis cost

作者简介:
王海鑫 男,(1988-),硕士研究生.研究方向为卫星导航、车联网.

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云计算环境中负载均衡技术的研究与应用

闫兴亚[1]，韩 萍[2]
(1 西安邮电大学 数字艺术学院，陕西 西安 710061；
2 西安邮电大学 计算机学院，陕西 西安 710061)

摘 要：为了解决传统负载均衡技术应用到云计算环境中引发的新的问题，提出改进方案，该方案基于开源LVS(Linux Virtual Server)中的轮转算法，增加地理位置控制信息，参照CLBDM(Central Load Balancing Decision Model)集中式的负载均衡模型的思想，针对真实服务器在两个不同的地理位置做了测试验证，该算法优先选择离客户端位置近的服务器处理请求，这样的改进算法不仅缩短处理请求的时间还增强了服务器处理请求的能力.

关键词：负载均衡；云计算；LVS;CLBDM
中图分类号：TP311 **文献标识码**：A **文章编号**：1000－7180(2015)10－0181－04

Research and Application of Load Balance Technology in Cloud Computing Environment

YAN Xing-ya[1], HAN Ping[2]
(1 Deartment of Digital Art, Xi′an University of Posts and Telecommunications, Xi′an 710061, China;
2 Institute of Computer Science and Technology, Xi′an University of Posts and Telecommunications, Xi′an 710061, China)

Abstract: In order to solve the new problems caused by the traditional load balance technology application to the cloud computing environment, the algorithm based on Round-Robin Scheduling in LVS(Linux Virtual Server) is give out, which adds control information of location, due to the characteristic of distributed in cloud computing. The thought of the algorithm comes from CLBDM(Central Load Balancing Decision Model). By simulating, the scheme can effectively improve the processing capacity of load balancer , and the number of active connections real servers which closer to the client is higher than the ones far away.

Key words: Load Balance;Cloud Computing; LVS;CLBDM

作者简介：
闫兴亚 男，(1974-)，教授. 研究方向为数字媒体理论与应用、虚拟现实技术应用和增强现实技术应用.
E-mail:595271601@qq.com.
韩 萍 女，(1990-)，硕士研究生. 研究方向为云计算、负载均衡、TCP/IP技术.

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一种用于串行 Rapid IO 接口的差分接收机设计

苏鹏洲[1],黄 鲁[1],张步青[2]
(1 中国科学技术大学 电子科学与技术系,安徽 合肥 230027;
2 中国科学院自动化研究所,北京 100190)

摘 要:基于串行 Rapid IO 2.0 规范,设计了一种用于串行 Rapid IO 接口的差分接收机.该接收机均衡电路的频率补偿点以及补偿强度可调,以满足 Rapid IO 2.0 规范规定的不同传输数据率的传输要求;采用共模稳定与偏移调整电路,以减小工艺和温度对接收机的影响.基于 SMIC 40 nm CMOS 工艺对电路进行设计.仿真结果显示,该差分接收机满足 Rapid IO 2.0 规范,在 6.25 Gb/s 的最大数据率下,平均功耗为 1.3 mW.

关键词:Rapid IO 2.0;接收机;CTLE;均衡器
中图分类号:TN432 **文献标识码**:A **文章编号**:1000－7180(2015)10－0185－04

Design of a Differential Receiver Used in Serial Rapid IO Interface

SU Peng-zhou[1], HUANG Lu[1], ZHANG Bu-qing[2]
(1 Department of Electronic Science and Technology, University of Science and Technology of China, Hefei 230027, China; 2 Institute of Automation, Chinese Academy of Sciences, Beijing 100190, China)

Abstract: A differential receiver used in Serial Rapid IO Interface was designed, which is based on Rapid IO 2.0 specification. The compensation frequency and strength of receiver can be adjustable to meet the requirements of different transmission data rates which are stipulated in Rapid IO 2.0 specification, and common-voltage stabling and offset adjusting circuit was also designed to reduce the influence of process and temperature on the receiver. The differential receiver was designed in SMIC 40 nm CMOS process. Simulation results showed that the differential receiver meets Rapid IO 2.0 specification, the average power consumption is 1.3 mW at 6.25 Gb/s maximum data rate.

Key words: Rapid IO 2.0; receiver; CTLE; equalizer

作者简介:
苏鹏洲 男,(1989-),硕士研究生.研究方向为模拟集成电路设计.E-mail:supengzhou ahu@126.com.
黄 鲁 男,(1961-),副教授,硕士生导师.研究方向为混合信号 IC 芯片设计.
张步青 男,(1981-),高级工程师.研究方向为混合信号 IC 芯片设计.

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