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MAC Protocols for Cyber-Physical Systems Distributed Gossip-MAC protocol for sensor networks Distributed MAC Protocol for Networks with Multipacket Reception Capability and Spatially Distributed Nodes Wireless MAC Protocol Design and Analysis Medium Access Control (MAC) Protocol for Reconfigurable Wireless Networks Performance Evaluation of a Mac Protocol for Hybrid Wireless Networks Centralized MAC Protocol for Wireless Sensor Networks A Multichannel Wireless Sensor Networks MAC Protocol MAC Protocol for Wireless ATM Based on Power Priorities Dynamic Opportunistic Spectrum Access MAC Protocol for Cognitive Radio Reciever Initiated Mac Protocol for Wireless Sensor Network Energy Efficient Routing and Mac Protocol for Wireless Sensor Networks Cross Layer MAC Protocol for Wireless Ad-hoc Networks Using MIMO-OFDM A Novel MAC Protocol for Cognitive Radio Networks Energy-efficient MAC Protocol for Wireless Sensor Networks Cognitive MAC Designs for OSA Networks CL-MAC: Cross-layer MAC Protocol for Delay Sensitive Wireless Sensor Network Applications A Multimedia MAC Protocol for Distributed Direct-sequence Mobile Radio Networks Medium Access Control in Wireless Networks Efficient Mac Protocol for Smart Homes Enhanced Mac Protocol for Wireless Sensor Networks Energy Effectiveness in MAC Protocol for Wireless Body Area Network A New Multi-channel MAC Protocol for Wireless Ad Hoc Networks with Single Transceiver Composite Metric Based Multi-channel MAC Protocol for Ad-hoc Network Designing a MAC Protocol for Body Area Networks Control-channel Reuse-based Multi-channel MAC Protocol for Ad Hoc Networks MAC Protocol for Integrated Video/data Services in WLAN An

Adaptive Mac Protocol for Wireless Multi-hop Networks with Multiple Antennas An Energy Efficient MAC Protocol for Self-organizing Hierarchical Ad-hoc Wireless Sensor Networks Energy-rate Based MAC Protocol for Wireless Sensor Networks and Key Pre-distribution Schemes Distributed MAC Protocol for Full-duplex Wireless Networks MAC Protocols for Cooperative Diversity in Wireless Sensor Networks A MAC Protocol for Multihop RP-CDMA Ad Hoc Wireless Networks A MAC Protocol for IP-based CDMA Wireless Networks Design and Analysis of Opportunistic MAC Protocols for Cognitive Radio Wireless Networks An Efficient Multichannel Wireless Sensor Networks MAC Protocol Based on IEEE 802.11 Distributed Co-ordinated Function A MAC Protocol for Wireless Networks with QoS Guarantees EX-MAC: An Adaptive MAC Protocol for Energy Saving in Wireless Sensor Networks Feedback Based Real-time MAC (RT-MAC) Protocol for Data Packet Streaming in Wireless Sensor Networks Design of an Autonomous Decentralized MAC Protocol for Wireless Sensor Networks

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Wireless networks are becoming very common due to their advantages such as rapid deployment and support for mobility. In this dissertation, we design and analyze the Medium Access Control (MAC) protocol for two popular wireless networks: Wireless Sensor Networks (WSNs) and Wireless Local Area Networks (WLANs). For WSNs, we design and analyze an energy efficient MAC protocols. Energy efficiency is a key design factor of a MAC protocol for WSNs. Existing preamble-sampling based MAC protocols have large overheads due to their preambles and are inefficient at large wakeup intervals. Synchronous scheduling MAC protocols minimize the preamble by combining preamble sampling and scheduling techniques; however, they do not prevent energy loss due to overhearing. In this dissertation, we present an energy efficient MAC protocol for WSNs, called AS-MAC, that avoids overhearing and reduces contention and delay by asynchronously scheduling the wakeup time of neighboring nodes. We also provide a multi-hop energy consumption model for AS-MAC. To validate our design and analysis, we implement the proposed scheme on the MICAz and TELOSB platforms. Experimental results show that AS-MAC considerably reduces energy consumption, packet loss and delay when compared with other energy efficient MAC protocols. For WLANs, we present a saturation throughput

model for IEEE 802.11, the standard of WLAN, for a simple infrastructure scenario with hidden stations. Despite the importance of the hidden terminal problem, there have been a relatively small number of studies that consider the effect of hidden terminals on IEEE 802.11 throughput. Moreover, existing models are not accurate for scenarios with the short-term unfairness. In this dissertation, we present a new analytical saturation throughput model for IEEE 802.11 for a simple but typical infrastructure scenario with small number of hidden stations. Simulation results are used to validate the model and show that our model is extremely accura. This research aimed to create new knowledge and pioneer a path in the area relating to future trends in the WSN, by resolving some of the issues at the MAC layer in Wireless Sensor Networks. This work introduced a Multi-channel Distributed Coordinated Function (MC-DCF) which takes advantage of multi-channel assignment. The backoff algorithm of the IEEE 802.11 distributed coordination function (DCF) was modified to invoke channel switching, based on threshold criteria in order to improve the overall throughput for wireless sensor networks. This work commenced by surveying different protocols: contention-based MAC protocols, transport layer protocols, cross-layered design and multichannel multi-radio assignments. A number of existing protocols were analysed, each attempting to resolve one or more problems faced by the current layers. The 802.15.4 performed very poorly at high data rate and at long range. Therefore 802.15.4 is not suitable for sensor multimedia or surveillance system with streaming data for future multichannel multi-radio systems. A survey on 802.11 DCF - which was designed mainly for wireless networks - supports and confirm that it has a power saving mechanism which is used to synchronise nodes. However it uses a random back-off mechanism that cannot provide deterministic upper bounds on channel access delay

and as such cannot support real-time traffic. The weaknesses identified by surveying this protocol form the backbone of this thesis The overall aim for this thesis was to introduce multichannel with single radio as a new paradigm for IEEE 802.11 Distributed Coordinated Function (DCF) in wireless sensor networks (WSNs) that is used in a wide range of applications, from military application, environmental monitoring, medical care, smart buildings and other industry and to extend WSNs with multimedia capability which sense for instance sounds or motion, video sensor which capture video events of interest. Traditionally WSNs do not need high data rate and throughput, since events are normally captured periodically. With the paradigm shift in technology, multimedia streaming has become more demanding than data sensing applications as such the need for high data rate protocol for WSN which is an emerging technology in this area. The IEEE 802.11 can support data rates up to 54Mbps and 802.11 DCF was designed specifically for use in wireless networks. This thesis focused on designing an algorithm that applied multichannel to IEEE 802.11 DCF back-off algorithm to reduce the waiting time of a node and increase throughput when attempting to access the medium. Data collection in WSN tends to suffer from heavy congestion especially nodes nearer to the sink node. Therefore, this thesis proposes a contention based MAC protocol to address this problem from the inspiration of the 802.11 DCF backoff algorithm resulting from a comparison of IEEE 802.11 and IEEE 802.15.4 for Future Green Multichannel Multi-radio Wireless Sensor Networks. This SpringerBrief presents recent advances in the cognitive MAC designs for opportunistic spectrum access (OSA) networks. It covers the basic MAC functionalities and MAC enhancements of IEEE 802.11. Later chapters discuss the existing MAC protocols for OSA and classify them based on characteristic features. The authors provide new research in

adaptive carrier sensing-based MAC designs tailored for OSA, which optimize spectrum utilization and ensure a peaceful coexistence of licensed and unlicensed systems. Analytically devised via optimization and game-theoretic approaches, these adaptive MAC designs are shown to effectively reduce collisions between both primary and secondary network users. Researchers and professionals working in wireless communications and networks will find this content valuable. This brief is also a useful study guide for advanced-level students in computer science and electrical engineering. Ad hoc networks have become a popular type of wireless network in the present world. In order to match with the increasing demand of ad hoc networks, a lot of research is being done towards solving the issues related to the design of ad hoc networks. The design of a Medium Access Control (MAC) protocol for ad hoc networks is one such issue. Traditional MAC protocols involve the use of a single channel as the wireless medium. However, throughput of a single channel MAC degrades as the node traffic in the system increases. One of the interesting approaches towards alleviating this problem is the use of more than one channel as the underlying medium. The use of multiple channels allows more than one communication to take place simultaneously thereby improving the throughput of the system. Multiple channels have been mostly used in the literature by assigning one of the channels as the control channel used only for control packet transfer and the rest of the channels as data channels used for Data packet transfer. Using such an approach towards designing a multi-channel MAC protocol leads to a poor utilization of the available bandwidth. In this thesis, we propose a multi-channel MAC protocol called as Control-channel Reuse based Multi-channel MAC (CRM-MAC) which aims at improving the overall bandwidth utilization. We illustrate the efficacy of our protocol through elaborate

simulations. As more and more wireless applications/services emerge in the market, the already heavily crowded radio spectrum becomes much scarcer. Meanwhile, however, as it is reported in the recent literature, there is a large amount of radio spectrum that is under-utilized. This motivates the concept of cognitive radio wireless networks that allow the unlicensed secondary-users (SUs) to dynamically use the vacant radio spectrum which is not being used by the licensed primary-users (PUs). In this dissertation, we investigate protocol design for both the synchronous and asynchronous cognitive radio networks with emphasis on the medium access control (MAC) layer. We propose various spectrum sharing schemes, opportunistic packet scheduling schemes, and spectrum sensing schemes in the MAC and physical (PHY) layers for different types of cognitive radio networks, allowing the SUs to opportunistically utilize the licensed spectrum while confining the level of interference to the range the PUs can tolerate. First, we propose the cross-layer based multi-channel MAC protocol, which integrates the cooperative spectrum sensing at PHY layer and the interweave-based spectrum access at MAC layer, for the synchronous cognitive radio networks. Second, we propose the channel-hopping based single-transceiver MAC protocol for the hardware-constrained synchronous cognitive radio networks, under which the SUs can identify and exploit the vacant channels by dynamically switching across the licensed channels with their distinct channel-hopping sequences. Third, we propose the opportunistic multi-channel MAC protocol with the two-threshold sequential spectrum sensing algorithm for asynchronous cognitive radio networks. Fourth, by combining the interweave and underlay spectrum sharing modes, we propose the adaptive spectrum sharing scheme for code division multiple access (CDMA) based cognitive MAC in the uplink communications over the asynchronous cognitive radio

networks, where the PUs may have different types of channel usage patterns. Finally, we develop a packet scheduling scheme for the PU MAC protocol in the context of time division multiple access (TDMA)-based cognitive radio wireless networks, which is designed to operate friendly towards the SUs in terms of the vacant-channel probability. We also develop various analytical models, including the Markov chain models, M=GY =1 queuing models, cross-layer optimization models, etc., to rigorously analyze the performance of our proposed MAC protocols in terms of aggregate throughput, access delay, and packet drop rate for both the saturation network case and non-saturation network case. In addition, we conducted extensive simulations to validate our analytical models and evaluate our proposed MAC protocols/schemes. Both the numerical and simulation results show that our proposed MAC protocols/schemes can significantly improve the spectrum utilization efficiency of wireless networks. The scarcity of bandwidth in the radio spectrum has become more vital since the demand for wireless applications has increased. Most of the spectrum bands have been allocated although many studies have shown that these bands are significantly underutilized most of the time. The problem of unavailability of spectrum bands and the inefficiency in their utilization have been smartly addressed by the cognitive radio (CR) technology which is an opportunistic network that senses the environment, observes the network changes, and then uses knowledge gained from the prior interaction with the network to make intelligent decisions by dynamically adapting transmission characteristics. In this thesis, recent research and survey about the advances in theory and applications of cognitive radio technology has been reviewed. The thesis starts with the essential background on cognitive radio techniques and systems and discusses those characteristics of CR technology, such as standards, applications and challenges

that all can help make software radio more personal. It then presents advanced level material by extensively reviewing the work done so far in the area of cognitive radio networks and more specifically in medium access control (MAC) protocol of CR. The list of references will be useful to both researchers and practitioners in this area. Also, it can be adopted as a graduate-level textbook for an advanced course on wireless communication networks. The development of new technologies such as Wi-Fi, cellular phones, Bluetooth, TV broadcasts and satellite has created immense demand for radio spectrum which is a limited natural resource ranging from 30KHz to 300GHz. For every wireless application, some portion of the radio spectrum needs to be purchased, and the Federal Communication Commission (FCC) allocates the spectrum for some fee for such services. This static allocation of the radio spectrum has led to various problems such as saturation in some bands, scarcity, and lack of radio resources to new wireless applications. Most of the frequencies in the radio spectrum have been allocated although many studies have shown that the allocated bands are not being used efficiently. The CR technology is one of the effective solutions to the shortage of spectrum and the inefficiency of its utilization. In this thesis, a detailed investigation on issues related to the protocol design for cognitive radio networks with particular emphasis on the MAC layer is presented. A novel Dynamic and Decentralized and Hybrid MAC (DDH-MAC) protocol that lies between the CR MAC protocol families of globally available common control channel (GCCC) and local control channel (non-GCCC). First, a multi-access channel MAC protocol, which integrates the best features of both GCCC and non-GCCC, is proposed. Second, an enhancement to the protocol is proposed by enabling it to access more than one control channel at the same time. The cognitive users/secondary users (SUs) always have access to one

control channel and they can identify and exploit the vacant channels by dynamically switching across the different control channels. Third, rapid and efficient exchange of CR control information has been proposed to reduce delays due to the opportunistic nature of CR. We have calculated the pre-transmission time for CR and investigate how this time can have a significant effect on nodes holding a delay sensitive data. Fourth, an analytical model, including a Markov chain model, has been proposed. This analytical model will rigorously analyse the performance of our proposed DDH-MAC protocol in terms of aggregate throughput, access delay, and spectrum opportunities in both the saturated and non-saturated networks. Fifth, we develop a simulation model for the DDH-MAC protocol using OPNET Modeler and investigate its performance for queuing delays, bit error rates, backoff slots and throughput. It could be observed from both the numerical and simulation results that when compared with existing CR MAC protocols our proposed MAC protocol can significantly improve the spectrum utilization efficiency of wireless networks. Finally, we optimize the performance of our proposed MAC protocol by incorporating multi-level security and making it energy efficient. In recent years, due to basic features of MANETs and bandwidth constraint at MAC layer the throughput, delay and maintaining connectivity has been a major focus for research. Here, different issues of MAC protocols and TCP connectivity have been surveyed in detail. Further, channel utilization can be maximized by employing spatial reuse of the wireless channel at the MAC layer. A high throughput MAC protocol called Multiple-Beam Antenna Array MAC (MBAA-MAC) is proposed and analyzed for MANETs. Proposed MBAA-MAC protocol has been simulated to evaluate its performance in terms of throughput and delay under different network topology scenarios. Again, using this protocol, multiple concurrent transmissions are scheduled to

improve the aggregate throughput of the network. The conventional MANETs provide communication in a limited geographical area. This was one of the major limitations of MANETs. A hybrid model is also proposed which is a combination of static & mobile nodes. The MBAA-MAC operates on static nodes. A grid topology consisting of chain of nodes has been simulated for different concurrent transmissions The primary goal of this research work is to implement a new energy-aware TDMA(Time Division Multiple Access) based MAC protocol for WSNs. With the scheduling algorithms developed for the proposed MAC, it is intended to achieve relatively better end to end message delay results for especially time critical application traffics as well as to fulfill the lower energy consumption requirement. Computer modeling and simulation of the new approach and its application for a WSN scenario are realized using OPNET Modeler software. Simulation results are also presented together with comparisons those of a WSN counterpart employing classical IEEE 802.11 DCF (Distributed Coordination Function) MAC protocol. The last part of this work includes an example WSN scenario, consisting of several SNs and a central access point all incorporate with the proposed MAC, which has been modeled and simulated under different networking conditions. CHAPTER 1 INTRODUCTION TO WIRELESS SENSOR NETWORKS This Chapter briefs the challenges and mechanisms of Wireless Sensor Networks. Various Routing and MAC Protocols related to WSN are analyzed in this Chapter. Some important applications of WSN are also revealed in this Chapter. 1.1 INTRODUCTION A Wireless Sensor Network (WSN) consists of spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and to cooperatively pass their data through the network to the main location. On the other hand, modern

networks are bidirectional, also enabling control of sensor activity. The development of wireless sensor networks have been used by military applications, industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on. This book provides a literature review of various wireless MAC protocols and techniques for achieving real-time and reliable communications in the context of cyber-physical systems (CPS). The evaluation analysis of IEEE 802.15.4 for CPS therein will give insights into configuration and optimization of critical design parameters of MAC protocols. In addition, this book also presents the design and evaluation of an adaptive MAC protocol for medical CPS, which exemplifies how to facilitate real-time and reliable communications in CPS by exploiting IEEE 802.15.4 based MAC protocols. This book will be of interest to researchers, practitioners, and students to better understand the QoS requirements of CPS, especially for healthcare applications. Although IEEE 802.11a/b/g standards allow use of multiple channels, only a single channel is popularly used, due to the lack of efficient protocols that enable use of Multiple Channels. There are some papers challenging this problem. Some of them have requirements that will increase the cost, like requirement of multiple transceivers. Some others address the problem with single transceivers, but are very hard to be employed in highly mobile Ad Hoc networks due to network-wide synchronization requirements. In this Thesis, multiple channel use in a wireless network with single transceiver nodes is addressed, and attempted to be solved with a new efficient Ad Hoc network MAC protocol, which intends to remove the requirement of network-wide synchronization. Nowadays, due to rapid growth in wireless communication technologies, the smart home concept has become very popular, with an aim to establish a better quality of life by deploying fully automated

control of appliances and providing assistive support to users. In a smart home, users and appliances are interconnected by an enhanced communication network comprising transmission media, such as twisted pair cable and optical fiber, which transfer digital signals per a communication protocol. In this work, a smart home area sensor network (SHAN) is simply known as a home area network and comprises all the mechanical, electrical and digital devices that are interconnected to form a network and can communicate with each other as well as the user to create an interactive space. Such a network has a central utility gateway that enables occupants to control home appliances remotely over the Internet. [Author's abstract] Recent technology advances have opened a new spectrum of communication networks called ad hoc networks. In an ad hoc network, the Media Access Control (MAC) protocol of IEEE 802.11 Distributed Coordination Function (DCF), designed to share a single channel between nodes. This thesis presents a protocol that facilitates use of more than one channel and analytical analysis for the throughput of the network. One of the functions of a MAC layer is to scan all channels. A composite metric (CM) has been proposed for each available channel. The CM depends on the signal to noise ratio, the battery power remaining and the mobility of each node with respect to other nodes in the network. The channels with three higher CMs are selected at each node and are used to build a Preferred Channel List (PCL). During Announcement Traffic Indication Message (ATIM), the PCL is sent by the node intended to communicate with another node. If the PCL of the receiver node has non interfering channels with the PCL of the sender node, it responds with an ATIM ACK with its PCL. If the PCL of both nodes have appropriate channels, then the sender node replies with an ATIM RES indicating that at the end of the ATIM window, the RTS/CTS/DATA/ACK handshake will begin. A

mathematical model based on Markov chain process is designed to derive an expression for saturation throughput and evaluate the performance of Composite Metric (CM) based Multi channel MAC (MMAC) against IEEE 802.11 MAC Distributed Co ordination Function (DCF) and Dynamic Channel Allocation (DCA) protocol. IEEE 802.11 MAC, DCA and CM based MMAC protocol works better for large data packets than for small data packets. Simulation results show enhancement of 35 to 95 percent in the overall throughput of the network when the proposed CM based MMAC protocol used over IEEE 802.11 MAC and DCA protocols. The physical layer of future wireless networks will be based on novel radio technologies such as Ultra-Wideband (UWB) and Multiple-Input Multiple-Output (MIMO). One of the important capabilities of such technologies is the ability to capture a few packets simultaneously. This capability has the potential to improve the performance of the MAC layer. However, we show that in networks with spatially distributed nodes, reusing MAC protocols originally designed for narrow-band systems (e.g., CSMA/CA) is inefficient. It is well known that when networks with spatially distributed nodes operate with such MAC protocols, the channel may be captured by nodes that are near the destination. We show that when the physical layer enables multi-packet reception, the negative implications of reusing the legacy protocols include not only such unfairness but also a significant throughput reduction. We present a number of simple alternative backoff mechanisms that attempt to overcome the throughput reduction phenomenon. We evaluate the performance of these mechanisms via exact analysis, approximations, and simulation, thereby demonstrating that they usually outperform the legacy backoff mechanisms. We then discuss the implications of the results on developing realistic MAC protocols for networks with a multi-packet reception capability and in particular for

UWB networks. Medium Access Control (MAC) protocols plays very important role in Cognitive Radio (CR) networks. CR enables the Secondary (unlicensed) Users (SU) to opportunistically access the spectrum unused by the Primary (licensed) Users (PU). The two main functions of the CR MAC are interference control and avoidance for PUs and collision avoidance among SUs. This book is the case of overlay spectrum sharing mode of contention based, distributed, non cooperative spectrum sharing access mode protocol. In order to devise efficient CR MAC protocol, it will be efficient to use CSMA/CA based protocol as it helps in overcoming the major challenges of hidden terminal problem and exposed terminal problem in cognitive radio networks. This book presents a novel opportunistic MAC protocol for single channel which opportunistically utilizes the spectrum unused by the PUs. In case of collision, a dynamic backoff scheme is applied. Results of the Opportunistic Spectrum Access (OSA) MAC for single channel are compared with dynamic OSA MAC scheme. The results show that throughput and access delay of our proposed scheme are better than the OSA MAC scheme. Wireless technologies and applications are becoming one of the fastest growing and most promising areas in recent years. To accommodate data transmission by multiple stations sharing the scarce wireless bandwidth, a medium access control (MAC) protocol plays a crucial role in scheduling packet transmission fairly and efficiently. The emerging wireless networks, such as ad-hoc networks, sensor networks or mesh networks, are mostly multi-hop based and in distributed manner, which brings a lot of problems and challenges in designing fine-tuned MAC protocols tailored for modern wireless network. In this book, the authors give complete and in-depth overviews to the classic medium access control algorithms and the related protocols, as well as their applications in various wireless data networks especially

the most successful Wireless Local Area Networks (WLAN). The book consists of three major parts. Part I of this book, including Chapters 1-7, is emphasising on the fundamentals of medium access control algorithms and protocols. Chapter 1 provides an introduction to the wireless networks, such as overview of wireless networks, problems and challenges of the wireless networks, and the classifications of MAC protocols as well as the performance metrics. Chapter 2 introduces important collision resolution algorithms applied in medium access controls, for example, the splitting algorithm and the backoff algorithm. Chapter 3 reviews the hybrid access control algorithms that combine both contention and allocation schemes. A series of important collision avoidance schemes are introduced in Chapters 4-7 respectively, with a specific design goal covered in each chapter. Chapter 4 focuses on the multi-channel MAC protocols for collision avoidance; Chapter 5 introduces the concepts of power control and power management in medium access control and how they can be applied in MAC protocol design; Chapter 6 presents how to provide Quality-of- Service (QoS) to multimedia wireless networks, in either centralised or distributed manner; and Chapter 7 explains how the smart antennas can be applied in the medium access control to provide high channel throughput and low packet collision. This book introduces multichannel with single radio as a new paradigm for IEEE 802.11 Distributed Coordinated Function (DCF) in wireless sensor networks (WSNs). Traditionally WSNs did not need high data rate and throughput with the shift in technology, multimedia streaming, mobility of sensing nodes and vehicular traffic has become the trend for gathering sensing data as such the need for high data rate protocol for WSNs. This book focused on designing an algorithm that applied multichannel to IEEE 802.11 DCF back-off algorithm to reduce the waiting time of a node and increase throughput when

attempting to access the medium. Firstly, the MAC sublayers for IEEE 802.15.4 and IEEE 802.11 MAC protocol were studied to aid the understanding of 802.11 and 802.15.4 CSMA/CA scheme. The performance of both have been investigated and evaluated through simulation results. Secondly the proposed MC-DCF backoff algorithm for multi-channel access based on the 802.11 DCF protocols was examined. This algorithm allows node to have access to multiple non-overlapping channels by accessing channels dynamically through channel switching after a set threshold has been met.

Network
- Energy Efficient Routing And Mac Protocol For Wireless Sensor Networks
- Cross Layer MAC Protocol For Wireless Ad hoc Networks Using MIMO OFDM
- A Novel MAC Protocol For Cognitive Radio Networks
- Energy efficient MAC Protocol For Wireless Sensor Networks
- Cognitive MAC Designs For OSA Networks
- CL MAC Cross layer MAC Protocol For Delay Sensitive Wireless Sensor Network Applications
- A Multimedia MAC Protocol For Distributed Direct sequence Mobile Radio Networks
- Medium Access Control In Wireless Networks
- Efficient Mac Protocol For Smart Homes
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- Energy Effectiveness In MAC Protocol For Wireless Body Area Network
- A New Multi channel MAC Protocol For Wireless Ad Hoc Networks With Single Transceiver
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- MAC Protocol For Integrated Video data Services In WLAN
- An Adaptive Mac Protocol For Wireless Multi hop Networks With Multiple Antennas
- An Energy Efficient MAC Protocol For Self organizing Hierarchical Ad hoc Wireless Sensor Networks
- Energy rate Based MAC Protocol For Wireless Sensor Networks And Key Pre distribution Schemes
- Distributed MAC Protocol For Full duplex Wireless

Networks

- MAC Protocols For Cooperative Diversity In Wireless Sensor Networks
- A MAC Protocol For Multihop RP CDMA Ad Hoc Wireless Networks
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- Design And Analysis Of Opportunistic MAC Protocols For Cognitive Radio Wireless Networks
- An Efficient Multichannel Wireless Sensor Networks MAC Protocol Based On IEEE 80211 Distributed Co ordinated Function
- A MAC Protocol For Wireless Networks With QoS Guarantees
- EX MAC An Adaptive MAC Protocol For Energy Saving In Wireless Sensor Networks
- Feedback Based Real time MAC RT MAC Protocol For Data Packet Streaming In Wireless Sensor Networks
- Design Of An Autonomous Decentralized MAC Protocol For Wireless Sensor Networks