POWER CONTROL UNDER VARIOUS CONDITIONS IN RAYLEIGH FADING WIRELESS NETWORKS

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Abstract- The optimum power control scheme designed for code division multiple access systems and develops the upper bounds for all transmitter power control schemes. The minimum required signals to interference ratio thresholds are functions of the fading characteristics, data rates, and required quality of service. Systems with heterogeneous signals to interference ratio thresholds allow the base stations on the uplink to assign each channel a unique signal to interference ratio threshold. This allows each link to have the ideal minimum threshold which will improve quality of service, using adaptive optimized proportional controller reduce the power requirements on each node, and reduce the multiple access interference.

Keywords: *Energy efficiency, interference, optimum power control scheme, power minimization.*

I. INTRODUCTION

Wireless networks are computer networks that are not connected by cables. The use of a wireless network enables enterprises to avoid the costly process of introducing cables. Outage denotes a period in which power supply is unavailable. Outage probability is the probability that an outage occur within a specified time period. Rayleigh fading is a statistical model for the effect of a propagation environment on a radio signal. Rayleigh fading models assume that the magnitude of a signal that has passed through a transmission medium will vary randomly or fade. Power control refers to the strategies required to adjust, correct and manage the power in both uplink and downlink directions in an efficient manner.

In a general sense, wireless networks offer a vast variety of uses by both business and home users. Now, the industry accepts a handful of different wireless technologies. Each wireless technology is defined by a standard that describes unique functions at both the Physical and the Data Link layers of the OSI model. These standards differ in their specified signaling methods, geographic ranges, and frequency usages, among other things. Such differences can make certain technologies better suited to home networks and others better suited to network larger organizations. Each standard varies in geographical range, thus making one standard more ideal than the next depending on what it is one is trying to accomplish with a wireless network. The performance of wireless networks satisfies a variety of applications such as voice and video. The use of this technology also gives room for expansions, such as from 2G to 3G and, most recently, 4G technology, which stands for the fourth generation of cell phone mobile communications standards. As wireless networking has become commonplace, sophistication increases through configuration of network hardware and software, and greater capacity to send and receive larger amounts of data, faster, is achieved.

Space is another characteristic of wireless networking. Wireless networks offer many advantages when it comes to difficult-to-wire areas trying to communicate such as across a street or river, a warehouse on the other side of the premises or buildings that are physically separated but operate as one. Wireless networks allow for users to designate a certain space which the network will be able to communicate with other devices through that network. For homeowners, wireless technology is an effective option compared to Ethernet for sharing printers, scanners, and high-speed Internet connections. WLANs help save the cost of installation of cable mediums, save time from physical installation, and also create mobility for devices connected to the network. Wireless networks are simple and require as few as one single wireless access point connected directly to the Internet via a router.

System performance is improved by using a mix of higher-tier macrocells and lower-tier small cells to enhance performance and network coverage. As small cells utilize spectrum currently employed by macro-cellular networks and due to the broadcast nature of the wireless medium, interference is a major source of performance impairment. Also, small cells are deployed in an ad-hoc manner, and this can lead to undesirable interference between cells. Wireless resources thus need to be shared fairly in a collaborative and distributed manner. Wireless resource sharing under interference is however far from perfect. Maintaining a balanced operation in the macro-small cell heterogeneous wireless network is difficult, because interference rises rapidly with increasing small cell density. Without appropriate resource control, the network can become unstable or operate in a highly inefficient and unfair manner. Wireless transmission depends on other factors such as statistical channel fading that is typically modeled by a Rayleigh, a Ricean or a Nakagami distribution depending on the wireless environment.

II. RELATED WORK

A dynamic algorithm that adapts the outage probability specification in a heterogeneous wireless network to minimize the total energy consumption and to simultaneously provide fairness guarantees in terms of the worst outage probability. A numerical evaluation on the performance of the algorithms and the effectiveness of deploying closed-access small cells in heterogeneous wireless networks to address the tradeoff between energy saving and feasibility of users satisfying their outage probability specifications.

The proposed system minimizes the power consumption in the context of outage probabilities. The power consumption of all nodes in the network is not fixed and varies randomly which leads to the data transmission by using minimum power. First study the feasibility condition of a total power minimization problem, and propose a dynamic power control algorithm that adapts the outage probability specification to minimize the total energy. The geometrically fast convergent algorithm, free of parameter tuning. It solves an open problem of convergence in the interference-limited case. Wireless resource sharing under interference is however far from perfect. Maintaining a balanced operation in the macro-small cell heterogeneous wireless network is difficult, because interference rises rapidly with increasing small cell density. Without appropriate resource control, the network can become unstable or operate in a highly inefficient and unfair manner. In addition, wireless transmission depends on other factors such as statistical channel fading that is typically modeled by a Rayleigh, a Ricean or a Nakagami distribution depending on the wireless environment.

Optimal power control for wireless resource sharing under Rayleigh fading that is relevant to in-building coverage model and urban environments where small cells are mostly deployed. Optimal wireless resource sharing requires that the performance gain is not outweighed by interference and unfairness. Power control problems to minimize the worst case outage probability and the total power consumption in interference limited system. As a by-product, resolve an open issue of convergence for a previously proposed algorithm and its fixed-point existence in for the interference-limited special case. Wireless networks have to be adaptive in order to be spectral and energy efficient. When the system is infeasible, resource allocation has to be adapted to resolve the infeasibility issue. Tight relationship between the worst outage probability problem and its certainty-equivalent margin counterpart, and utilize the connection to find useful bounds and insights. A by-product of analysis resolves an open issue of convergence for a previously proposed algorithm in for a max-min weighted SINR problem without fading.

The feasibility condition of the total power minimization problem with both outage specification and individual power constraints, and provide useful feasibility bounds. Based on the established feasibility conditions, a dynamic algorithm is proposed for the graceful handling of infeasibility in the network. In particular, the algorithm optimizes the overall energy consumption by adapting the outage probability specification based on our proposed worst outage probability algorithm. The total power minimization problem subject to both outage specification and individual power constraints, and address its feasibility conditions.

III. PROPOSED SYSTEM

The AOPC design is that it overcomes the problem where the estimation model becomes uncontrollable (at regions of the state space where the actual system is controllable). However, the resulted Adaptive Optimized Proportional Control design is Very Fast, Reliable. The main advantage of the proposed Adaptive Optimized Proportional control design is that it can produce arbitrarily good transient performance outside. The parameters to be optimized which correspond to the controller parameters are modified so as to both lead to a decrease of the function to be minimized and satisfy a persistence of excitation condition.

3.1 PRESCRIPTIVE DATA MODEL

The objective is to maintain acceptable tracking accuracy for each node. Therefore, regard the acceptable tracking accuracy as the reference input in the Model Reference Adaptive Power Control framework. Based on the acceptable tracking accuracy, the prescriptive reference model produces the target or desired network state according to the current data density from the real-world. The prescriptive reference model first collects the state from the real-world traffic, and then evaluates the current data density and provides a desired reception probability of packets for the acceptable tracking accuracy.

3.2 ADAPTIVE POWER CONTROL MODEL

In the framework, the adaptive power control model produces the real-time power control strategy based on the difference between the desired reception probability from the prescriptive reference model and the current real reception probability from the real data process, in order to make the response of the data transfer accuracy the same as that of the reference model.

3.3 REAL DATA TRANSACTION PROCESS

The produced power strategy from the adaptive power control model will be finally implemented to guide the real network behavior towards the desired reception probability of packets, so that accurate data transaction can be achieved under various traffic conditions and interference factors.

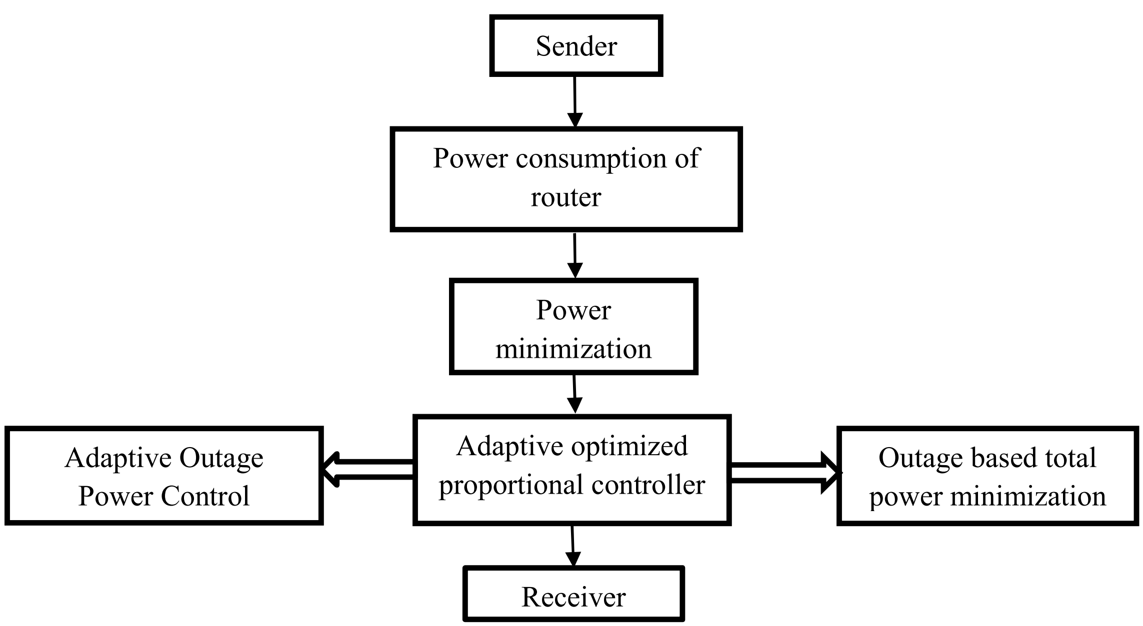

Figure 1: .Architecture diagram

The Figure shows that, the sender sends data to the receiver, several routers present between them. Each router has sub routers and its own power consumption to send data. The worst outage probability is minimized by finding the adaptable node that is the node which has low power consumption and maximum capacity to send data is done by random order value which is depend on the bandwidth of every node that are participant in data transmission. Before sending the data through router, bandwidth of router will be increased which improves the performance of the router.

IV. RESULT & DISCUSSION

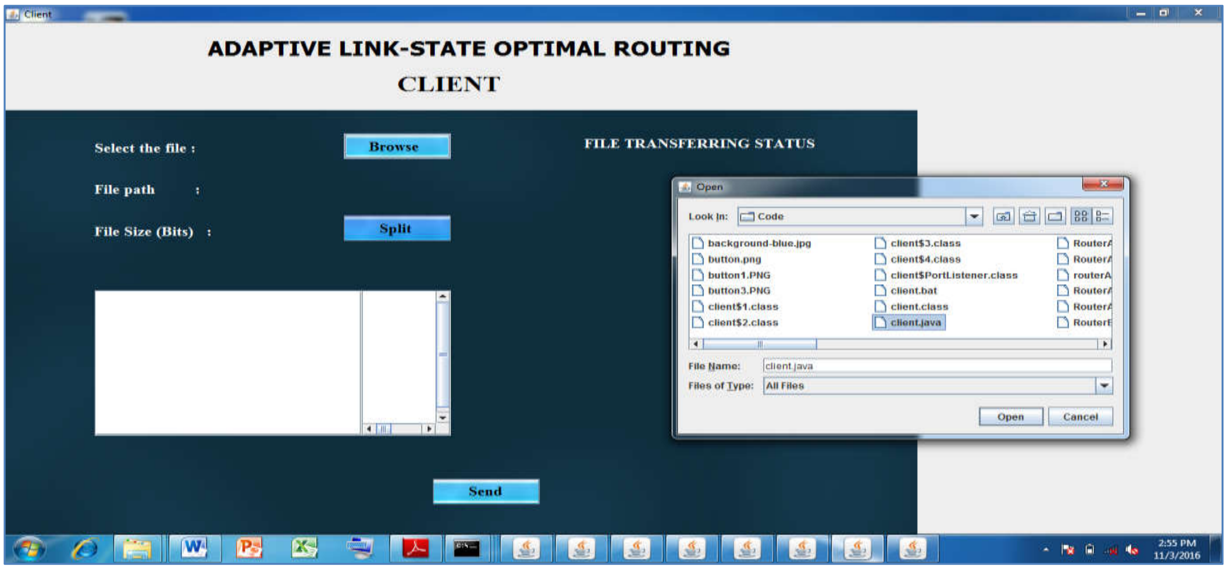

Figure 2: Snapshot of Load the file

The above snapshot shows that, the client selects a file from the list of file which is send to the receiver. To send a file the client calculates the file size, power consumption and bandwidth of each router.

Figure 3: Snapshot of File transfer status

The above snapshot shows that, the client shows all the files are transferred successfully.

V. CONCLUSION

The worst outage probability problem that have power constraints in a multiuser Rayleigh-faded network using tools from the nonnegative matrix theory. The optimal value and solution can be characterized by the spectral property of matrices induced by a particular positive mapping. Proposed a geometrically fast convergent algorithm, free of parameter tuning, to solve it optimally in a distributed manner. As a by-product, we solved an open problem of convergence for a previously proposed algorithm in the interference-limited case. Established a tight relationship between the worst outage probability problem and its certainty-equivalent margin counterpart, and utilized the connection to find useful bounds and to evaluate the fairness of resource allocation. Address a total power minimization problem with outage specification constraints and its feasibility condition. A dynamic algorithm is proposed that adapt its outage probability specification to minimize the total power in a heterogeneous wireless network. Numerical results showed that the dynamic algorithm can be effective for deploying closed-access small cells in a macrocell in terms of total power consumption and the percentage of users satisfying their outage probability specification.

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