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RESEARCH ARTICLE

Two Stage Sensing Model for Optimizing Communication over Cognitive Radio

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Abstract—Cognitive radio provides the effective communication model for wireless network. This communication is shared by primary and secondary users. The primary users are the registered licensed users whereas the secondary users are free users. As the load over the communication channel is increased, it is required to provide the effective communication slots to different users based on requirement analysis. In this present work, a two phase sensing model is defined under load analysis. The work is defined to provide the block adaptive signal optimization to reduce the communication error.

Keywords: Cognitive, Block Adaptive, Sensing, MSE, Equalization

I. INTRODUCTION

Cognitive radio is one of the most traditional communication model that provides the effective communication characteristics for wireless network. These kind of model can be applied in different wireless communication scenarios includes wimax, mobile communication etc. This network type does not have any centralized controller or the server. Such kind of communication network is also adaptive under signal level optimization and communication strength. The network is available in public domain so that the users over the network are also divided in two major categories called public users and private users. The private users are also called registered or licensed or primary users. These are paid users so that having the priority over the channel access or resource access. Whereas the other user type is global users or public users. These users are called secondary users available in public domain.

This network form is defined without the specification of controller node without reference to the communication scenario. This network is applied under communication type and relative parameters. These parameters include the specification of physical characteristics including the channel type, number of available channels, bandwidth, communication frequency etc. These all parameters collectively form the signal with specification of environmental and communication constraints. The features of this kind of system also provide the high speed communication under low price communication. The communication method is also based on the capabilities and the control mechanism defined under data adaptability. This kind of communication is based on the architectural constraints and specifications.

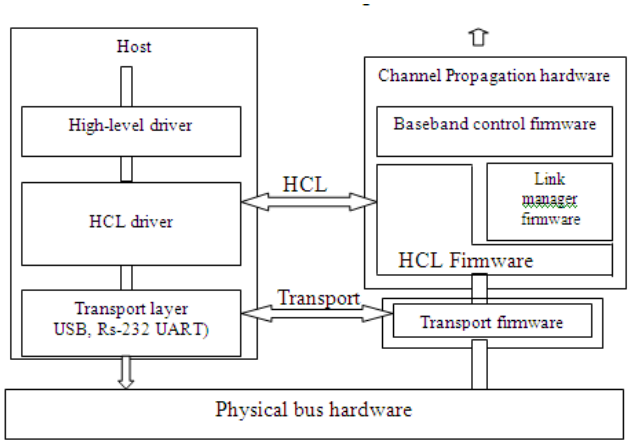

Figure 1 : Channel Propagation Architecture

This kind of open network or the architecture also associated with relative feature and limitations. These limitations include security level adaptation, communication efficiency and associated activities. The communication vector also includes the network level analysis to provide the specific communication form. The communication architecture is shown in figure 1.

This network form is defined with physical interfacing so that the communication is established. The communication is here formed under host adaptive communication. This network form is applied under host level specifications. The communication channel inclusive the broadband communication so that link adaptive communication is formed. The transport adaptive communication is formed under architectural specification. The physical constraints and the communication level constraints are applied to control the communication.

In this paper, method for cognitive radio adaptive network in which channel sensing and equalization is provided to optimize the heavy load communication over the network. In this section, an exploration to the cognitive radio model is provided. In section II, the work defined by earlier researchers is discussed. In section III, the proposed work methodology is discussed. In section IV, the results obtained from work are presented. In section V, the conclusion of work is presented.

II. EXISTING WORK

Lot of work is already done in the area of cognitive radio. Some of the earlier work is discussed and presented in this section. Sobia Baig[1] has presented a work on channel distribution and equalization under frequency adaptive analysis. The presented work includes the diagonalization with specification of associated communication vectors. The work also includes the identification of channel distortion with transmission adaptive analysis so that the effective of communication in time and frequency domain will be identified. Author defined the channel matrix based analysis in domain level equalization. Author provided the equalized signal communication under distance adaptive methods and provided the adaptive communication. E. Viterbo[2] has defined a work on channel level encoding and equalization. Author provided the powerful method for channel encoding. Author defined the two-fold approach for channel adaptive estimation so that the analytical behavior and communication under two fold method will be formed. Author defined the communication level analysis with performance consideration and interference analysis so that the communication equalization will be obtained. Author provided the restoration adaptive communication to improve the signal performance. Saeed Vaseghi[3] has provided a work on channel equalization to provide the communication in speech communication. Author provided the HMM adaptive method for improve the speech spectrum. The method is adaptive to analyze the amplitude so that the adaptive equalized communication will be formed.

Christos Komninakis[4] has provided the channel adaptive estimation and equalization under fading communication model. Author provided the kalman filter based predictive approach to analyze the time variation over the channel and provide the mean square error. Author provided the communication delay adaptive analysis so that the frequency change so that communication adaptive so that frequency change is formed. The communication model is analyzed under time variation. Rim Amara[5] has provided the kalman filter so that the filter so that the equalized communication will be formed. The kalman filter based model for linear communication adaptation is provided over the channel. Author defined the learning based convergence property analysis so that the equalized signal will be formed. Author provided the signal level estimation

and equalization so that the communication will be formed under multiple communication vectors.Christos Komninakis[6] has provided the MIMO signal analysis under fading vector so that the channel estimation and equalization will be formed. Author analyzed the communication behavior and provided the signal level tracking so that the multi user analysis sand the fading communication will be formed. Author provided the adaptive algorithmic approach for controlling the communication with fading property. Author provided the behavior adaptive communication so that the adaptive communication will be formed. Guoxiang Gu[7] has defined so that the channel equalized will be formed. Author defined the optimal fileration over the communication so that the performance adaptive communication will be formed. Author achieved the effective performance adaptive communication under energy reduction with optimized communication form.
S. Venkatesh[8] has provided a work on control framework so that the channel equalization will be obtained. Author provided the ICI reduction model under the error adaptive analysis so that the equalized communication will be obtained. The noise adaptive communication is analyzed under different SNR values so that the reduced communication will be formed. Thomas Zemen[9] has provided a variation analysis so that the equalized communication will be formed. Author provided the sequence adaptive analysis under equalization scheme so that the communication equalization. Author provided the optimized communication under subspace analysis in different frequency bands. T. C. Hewavithana[9] has provided a work on channel equalization under cyclic prefix formation and channel analysis. Author defined the phase adaptive analysis to achieve multipath communication. Author provided the interchannel communication to optimize the communication without delay. Author reduced the error rate and maximize the communication. Author[10] has provided the algorithmic approach with inclusion of pilot to equalize the communication to reduce the error rate. Fabrizio Pancaldi[11] has provided a domain adaptive communication under channel adaptive form. Author provided the equalized communication with reduction of relative error. Jin Wang[12] has provided the error decoding under different noise channel. Author provided the ICI reduction model to improve the communication over the environment.

III. RESEARCH METHODOLOGY

In this section, an optimized model to provide the improvement to the cognitive radio communication is provided. In first stage of this model, the estimation over the signal is performed using sensing model. In this work, two phase sensing is provided adaptive to user type. Based on this sensing, the adaptive slot allocation to different kind of users is provided. Once the communication is performed under sensing model, the block adaptive analysis is provided to equalize the signal. The presented work is robust against the noise type and distortion. The signal is here defined under noise inclusion and phase variation. The optimized signal communication is achieved to provide the equalized communication. The presented work model is shown in figure 2.

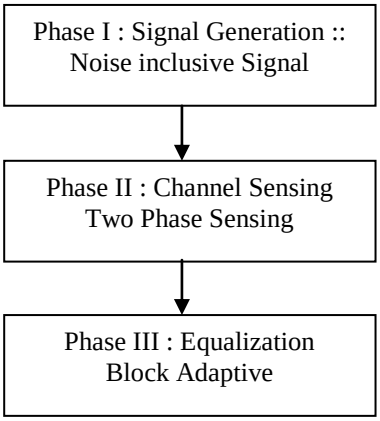

Figure 2 : Proposed Model

The figure shows that the work is divided in three sub stages. Each stage itself provide the effective communication modeling. The stages are defined here under

A) Signal Generation

The first stage of this work model is to generate the signal. The signal is defined under the physical characteristics specifications. These characteristics includes the number of channels, channel length, bandwidth parameters. The user

adaptive communication, noise adaptive communication and the communication parameters are defined to generate the optimized signal form. The parameters considered are shown here in figure 3

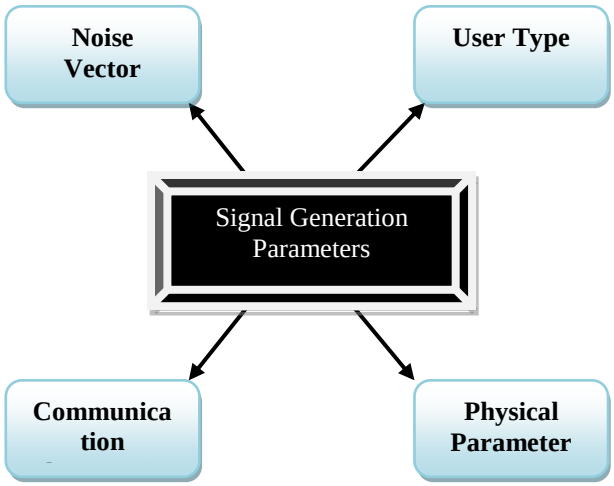

Figure 3 : Signal Parameters

B) Channel Sensing

The work is here defined to provide the optimized communication by performing the channel sensing at two level. The first analysis on the requirement phase is done to identify the user type and the requirement. The allocated slot sensing is here performed under parallel method and the sequential method. If the load is heavier the parallel observation is performed whereas where the load is lesser the sequential sensing is performed. The channel sensing is on the key aspects used to optimize the cognitive radio communication. The main associated aspect here is to analyze all the associated opportunities and provide the analysis on the interference analysis so that the operational communication will be performed over the network. This network form is able to provide the hybrid communication so that the optimized communication form will be achieved. The parallel and the sequential communication form is also defined under various threshold limits so that the optimized communication will be performed. The change adaptive analysis is required. The number of requests performed by primary users and the secondary users also affects the sensing process.

C) Equalization

In this work, the final stage of the work optimization is the equalization model. The equalization is here achieved to provide the relatively effective communication. The block adaptive model is applied. This model is defined to divide the signal in sub blocks. Each block is analyzed relative to the errors.

IV. RESULTS

The work is here implemented in matlab environment to provide the optimized signal. The work is defined without using any tool and by using the basic commands of matlab. According to this the random signal is generated under the parameter specifications. These parameters include the channel level parameters, communication level parameters and user adaptive parameters. The equalized results are shown in figure 4

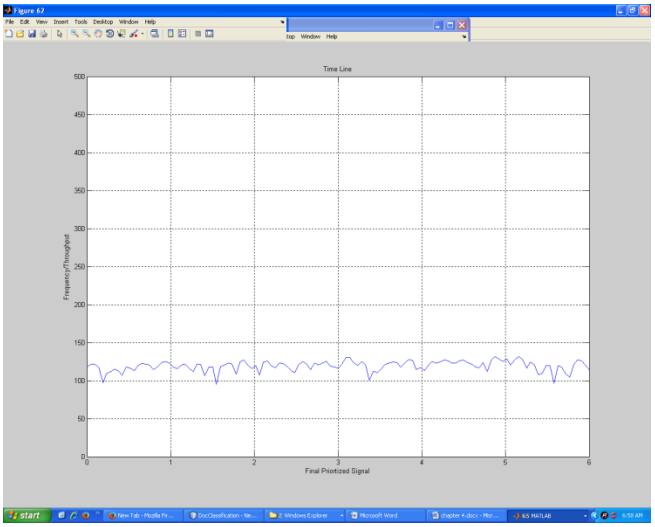

Figure 4: Equalized Signal

Here figure 4 is showing the equalized signal communication over the network. This communication is here formed under the specification of sensing with hybrid mechanism and the improving the signal form under block adaptive analysis. The figure is showing the equalized signal form.

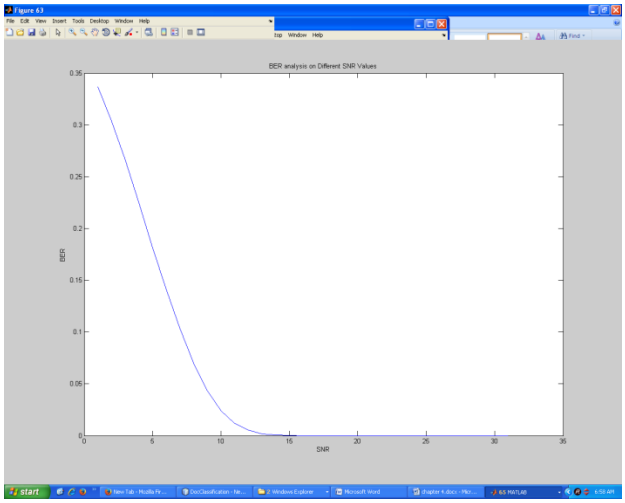

Figure 5 : BER Analysis

Here figure 5 is showing the BER analysis under different SNR values. The figure shows that as the SNR value is increased, the error is reduced. The figure shows that the work has provided the optimized communication over the channel.

V. CONCLUSION

In this paper, An adaptive communication model is presented under sensing and equalization approach. The work include two phase communication sensing along with block adaptive equalization. The results shows that the work has optimize the communication and provided the error reduction over the channel.

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