IOSR Journal of Engineering (IOSRJEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
PP 19-21

Hybrid throughput aware variable puncture rate coding for PHY-FEC in video processing

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Abstract: *It is attractive to be able to alter the coding rate, and hence the error correcting power, of a forward error correcting coder/decoder (codec) to provide a codec whose error correction capability can be matched to the requirements of the data communication system in which it is used. Punctured coding applied to convolutional encoding/Viterbi decoding offers a method of achieving this. And adoptive multi beam-forming alongside with MIMO diversity gain is used for considerable QOS enhancement in their Open Network Intermediate Data Rate system. This paper discusses the modification of a QoS constraint length 7, 1/2-rate codec to operate with punctured coding at rates up to 7/8. Following a brief discussion of the requirements for variable rate coding in communication systems the practical implementation of a prototype codec and considerations relating to performance characterization are discussed. Experimental results at various coding rates and MIMO are given, together with simulation of performance to demonstrate the sensitivity of performance to path history length at higher coding rates. It is concluded that the method is very suitable to provide variable coding rates and not suffers from increasingly severe practical limitations over high speed networks.*

I. Introduction

In telecommunications, 4G is the fourth generation of cellular wireless standards. It is a successor to 3G and 2G families of standards. Multi-band orthogonal frequency-division multiplexing (MB-OFDM) is one of 4G ultra wideband (UWB) radio standards, which provides high-speed connectivity in a wireless personal area network (PAN) [1] with specification of the data rates from 53.3 to 480 Mbps [2]. Due to the high data rates, the MB-OFDM standard requires to process large amount of computations in very short time; its modem has to compute one symbol that consists of 165 complex numbers in every 312.5 ns. Even though its performance requirement results in large hardware complexity, a low power design with small chip size is absolutely essential for applying this technology to portable handheld devices. Also, an operating frequency of a circuit is one of the dominant factors that determine power consumption.

In MB-OFDM, the standard specification defines a sampling frequency of 528 MHz Such high frequency is problematic when we use it as a system clock speed; it consumes too much power and it is hard to implement due to timing constraints. Therefore, parallel architectures have been proposed in an effort to reduce power consumption as well as to relax timing constraints. Exploiting parallelism with 4-way parallel architecture enables to keep throughput constraint at time, lower clock speeds, whereas it may increase the hardware resources by a factor.

Despite of the increased hardware resources, it is possible to reduce power consumption as well as to relax timing constraints due to two reasons. First, X way parallel architecture compensates for X times longer gate delays. Therefore, the parallel hardware can operate at reduced supply voltages and consequently consume less power. However, supply voltage scaling is beyond this paper’s scope: our work focused on high level resource optimization. Second, a resource efficient design, on which this paper focuses, is able to avoid the linear i.e., times, resource increments

II. Existing System

Ultra Wide Band (UWB) signaling is expected to play an important role in the future of communications systems. UWB uses extremely wide transmission bandwidths which is not compared with unique Alamouti based MIMO techniques.

FEC is the basic building blocks of any wireless product, is significantly dictated by the channel model corresponding to the communication scheme utilized. In existing method fixed rate codec was used for error correction leads poor Quality of services.

The conventional narrowband channel models are simply not applicable in the case of UWB due to the wide bandwidth of UWB pulses. Therefore new models have been developed to better explain an UWB multipath channel.

The elaborate framework of the PHY/FEC rate decision enables efficient and interference-resilient multicast service with minimal overhead. From extensive evaluation with prototype implementation, we demonstrate that InFRA enhances the multicast delivery, achieving 2.3x and 1.8x higher NSR with a contention interferer and a hidden interferer, respectively, compared with the state-of-the-art PHY/FEC rate adaptation scheme.

III. Proposed System

Along with modulation forward error correction (FEC) coding are also used to vary the data rates and Quality of services.The performance of proposed method is Analyzedwith Alamouticoder(2 X 1).In the proposed method the coded data is spread using a time-frequency code (TFC). There are three types of time-frequency codes (TFCs): here we used to code information in interleaved format over three bands, referred to as Time-Frequency Interleaving (TFI).

Space-time frequency encoder which encodes a single stream through space using all the transmit antennas and through frequency by sending each symbol at different frequencies. Spatial diversity can be achieved by transmitting several replicas of the same information through each antenna.

The model requires four different parameters to describe an environment. The discrete input is convolved with a realization of the channel impulse response. This response can be one of 4 types (CM1, CM2, CM3 or CM4) described in the paper or a custom channel with user-defined parameters. Response terms that extend beyond one symbol period (ISI) are added to the output for the next symbol period.

IV. Architecture Diagram

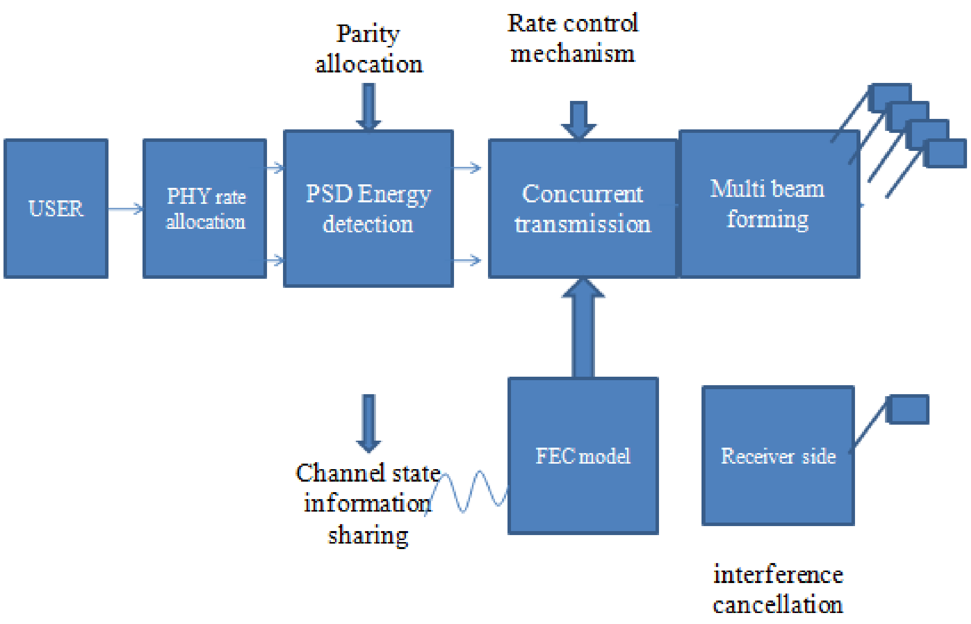


Fig Block Diagram

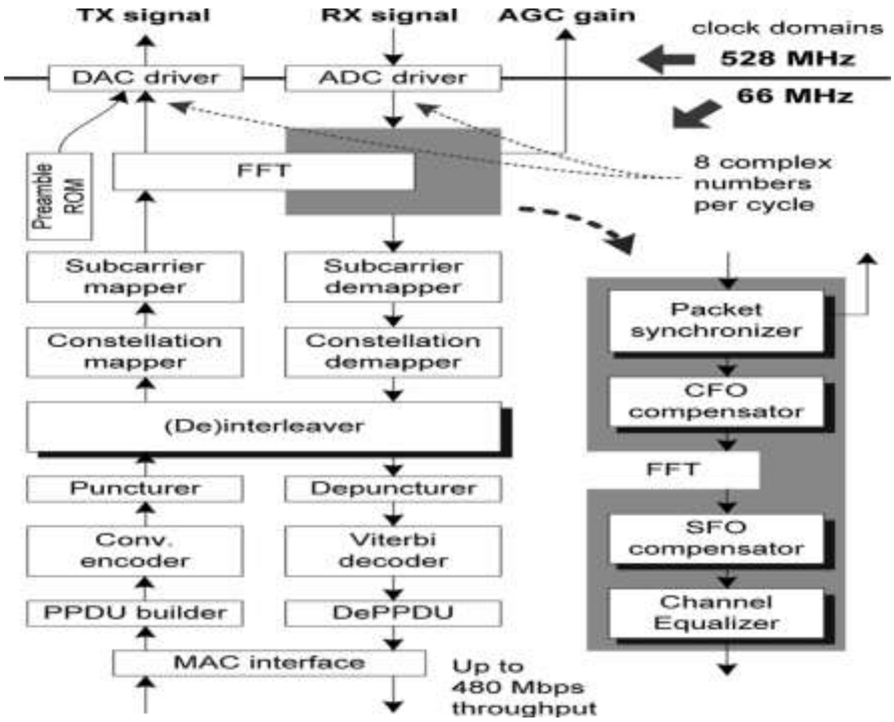


Fig . Overall architecture of our MB-OFDM PHY baseband modem

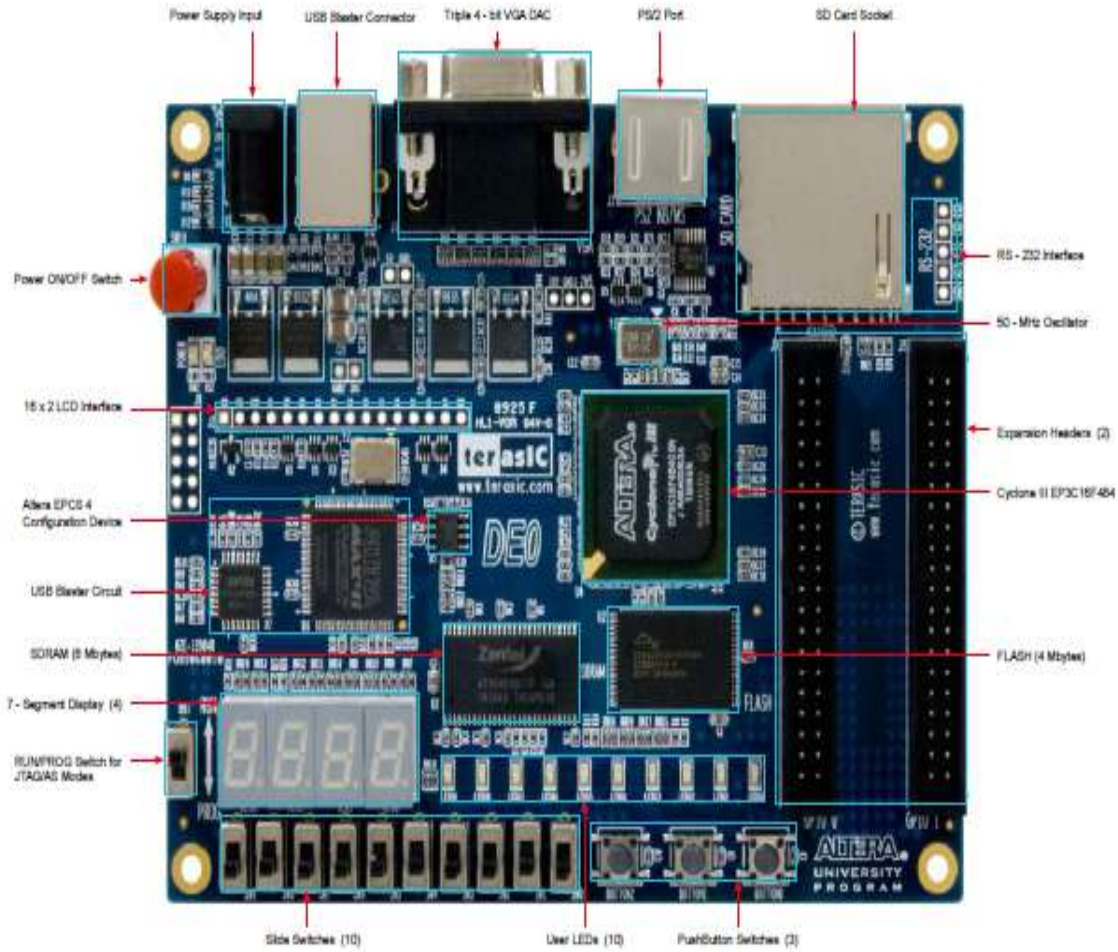
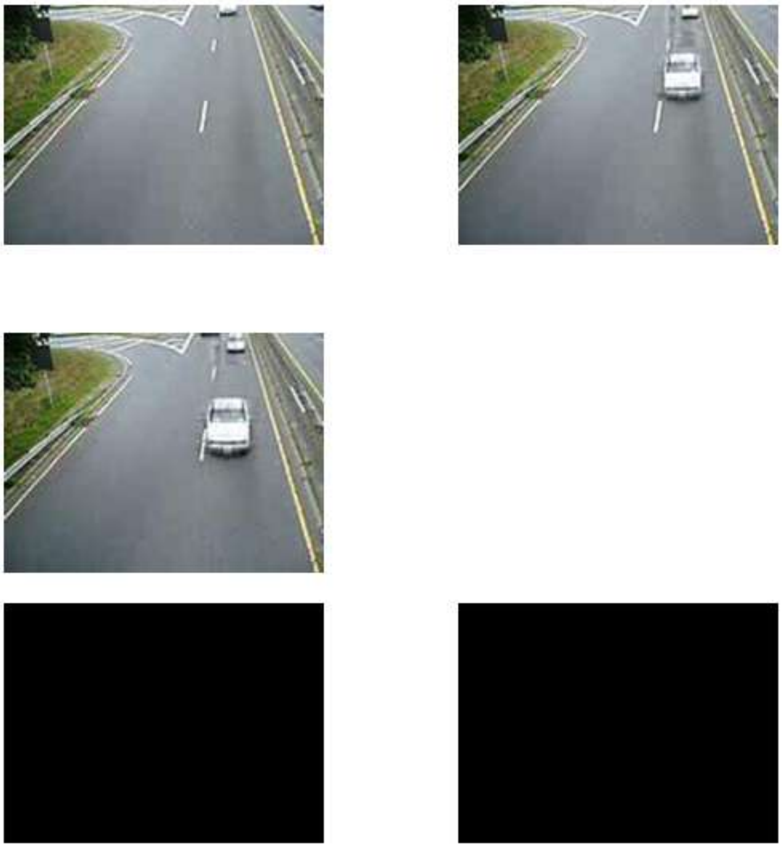
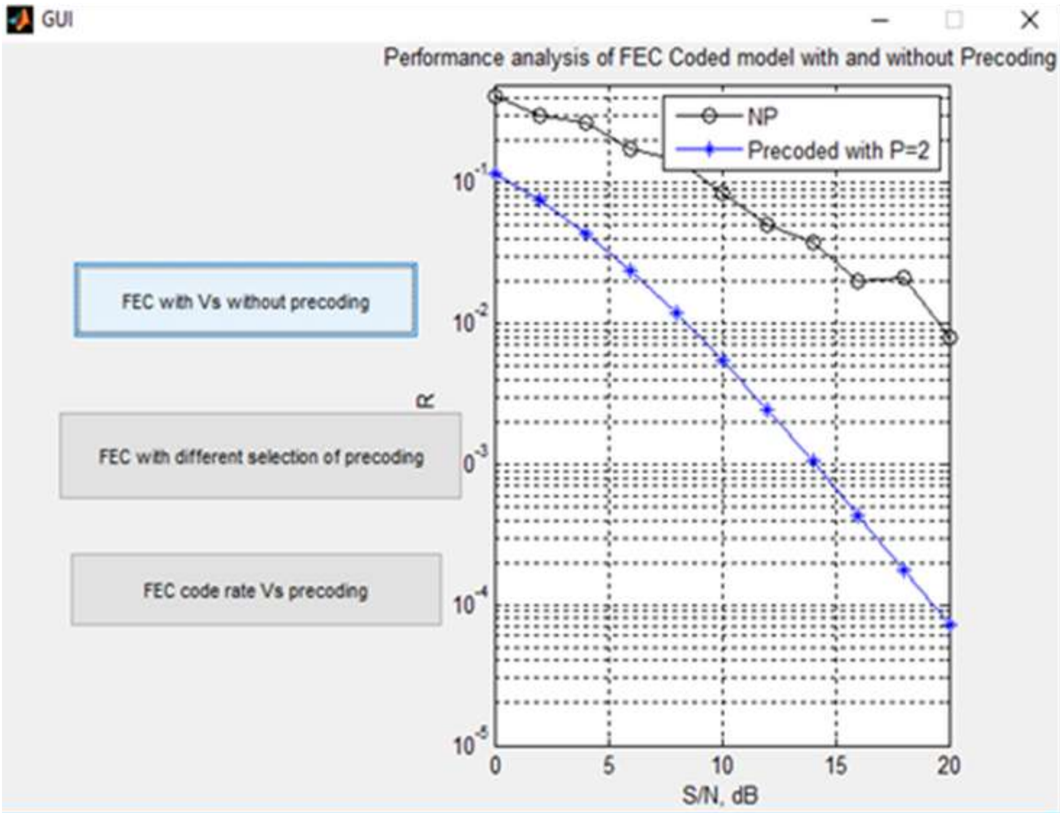


Fig . The Deo Board

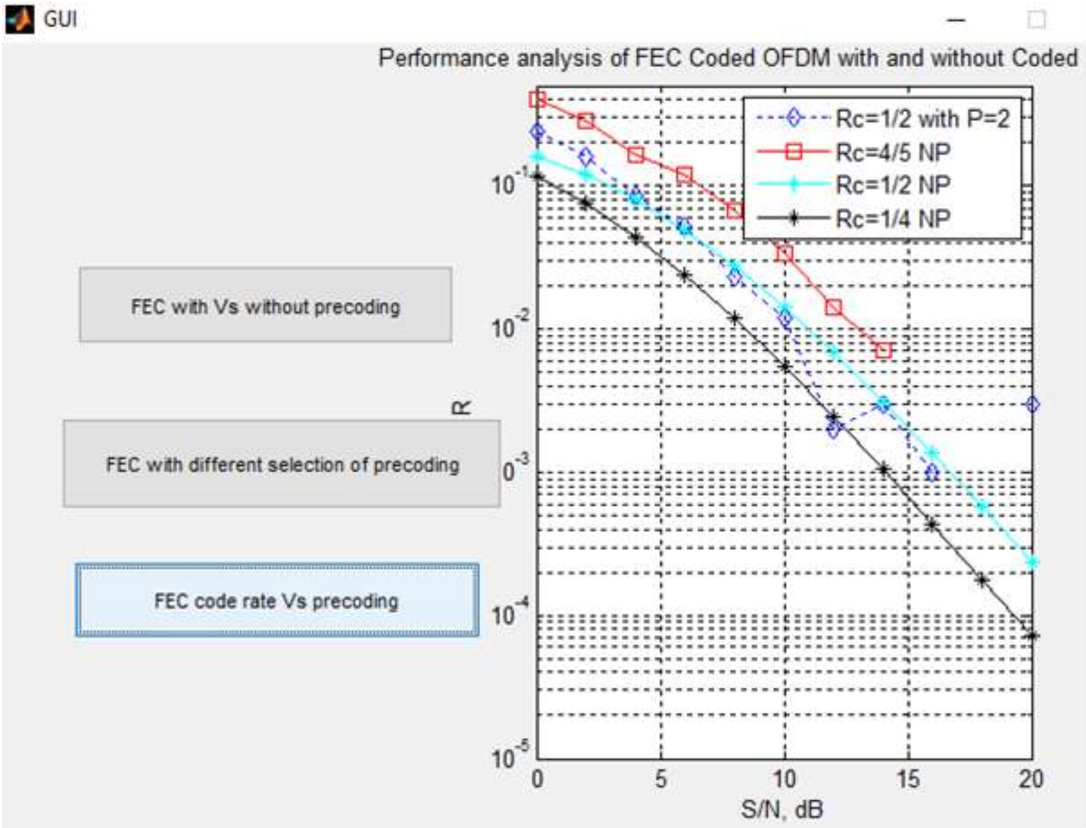
Samples Output



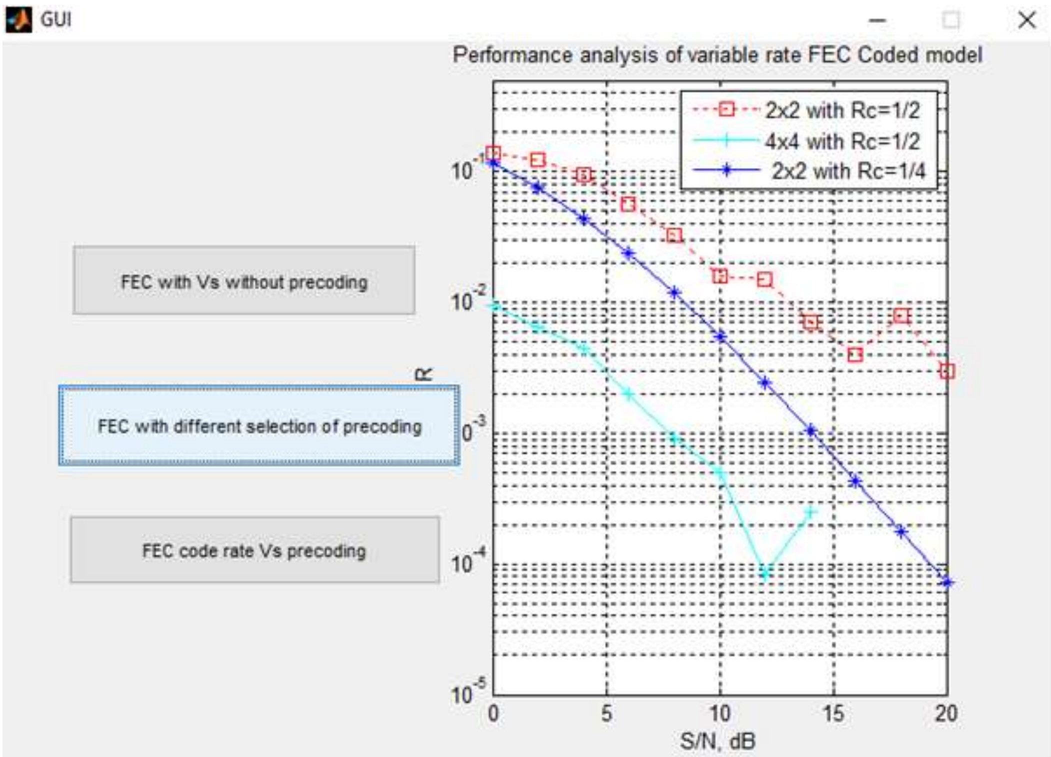
Performance Metrics Of Precoded Model



Performance Metrics Of Fec Model



Performance Metrics Of Mimo Fec Model



V. Conclusion

In this paper we enabled concurrent spectrum allocations as a band of frequencies to secondary users which are readily assigned to a Primary Users; Here we successfully minimizedinterference level raised in the each users at a specific time using diversity gain and multi beam forming techniques. Depending on the communication environment, we analyzes two methodologies in which parity bits are allocated to each packet and finally robustness of proposed system was analyzes by measuring BER and throughput of it.To reduce the complexity with improved data rate adoptive variable puncture rateis presented.

Future Work

The main idea of this study was to explore the feasibility of deploying a redundant bands to extend its data rate for the 5G in the near future. Here we have considered channel model as a highly traffic one. This channel model may not cover several scenarios where frequency bands are used as a medium of transmitting signal to the destination. We are going to measure the metric of two proposed channel allocation methods with various traffic rates.

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