

## Approach towards validity of Aggressive Packet Combining Scheme with Physical Level Representation

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**Abstract**— It is a research challenge for scientists and researchers to reliably transport data from source to destination. The received copies were found to be loaded with errors and the recovery of the correct original copy was a challenging job. The paper deals with some novel protocols related to physical level representation, circular shift based information transmission, masking scheme and modified packet combining technique through with this problem can be addressed to a considerable extent.

**Keywords**— Packet combining scheme; Aggressive packet combining scheme; bit shifting; physical level

### I. INTRODUCTION

In order to reliably transmit information from source to destination in computer/ data communication networks, ARQ(Automatic Repeat Request) techniques have been used which is also found in literature. Basic technique for the same included BEC (backward error correction) and FEC(forward error correction) [1–9]. Many studies [7–15] have established conclusively that BEC is more appropriate for wired transport whereas FEC is for wireless transmission. The packet combining scheme and its modifications that have got wide applications in variant BEC and FEC are elaborately studies elsewhere [3–10]. Aggressive Packet Combining (APC) is an important modification of packet combining scheme [16–25]. In this paper, we have proposed and reviewed different schemes of APC with physical level representation and analyzed to get throughput of APC instead of logical bit recognitions of the packet.

### II. REVIEW OF APC

Aggressive Packet Combining is a modified form of Packet Combining (PC) scheme and found its applications in wireless networks. Here three copies of packet are sent at a time during transmission. At the receiver side all the three copies are received erroneously. Receiver then applies majority logic bit by bit on the received three erroneous copies.

*For Example:*

Original Copy: 0101000

First copy: 01000000

Second Copy: 01010100

Third Copy: 01000000

Majority Logic: 01000000

After that, the receiver applies the error detection scheme to find out whether there is an error in the generated copy or not. In this case, as it is not correct, the receiver selects the least reliable bit from the majority logic. Here in the given example the 4<sup>th</sup> and the 6<sup>th</sup> bit from left are the least reliable bit. After selecting the least reliable bit, the receiver applies brute force correction to the 4<sup>th</sup> and the 6<sup>th</sup> bit, followed by error detection.

### III. PHYSICAL LEVEL REPETITIONS OF DIFFERENT PROTOCOLS

#### A. Protocol 1:

Suppose original data as “01111100” then physical level representations:

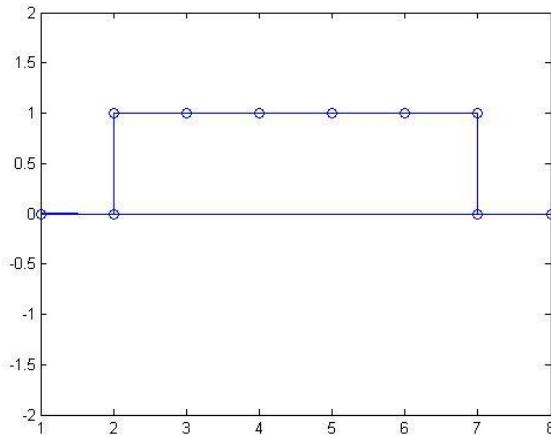


Fig 1.1 Physical Level Representation

As per proposed new protocol, 1st and 3rd copy will be sent as it is between sender as receiver but 2nd copy will be send as "10010011" (as per PRPC) .Moreover, assume that error places will be (-) error at 3rd place from MSB in 1st and 2nd copy and (+) error at 3rd place from MSB in 3rd copy in the environment of non-repeated error syndrome Fig. (1a-1e).

At receiver end

0 1 0 1 1 1 0 0
0 1 1 1 1 1 1 0 (Reverse of PRPC)
0 1 0 1 1 1 1 0 0
-----
0 1 1 1 1 1 0 0: original data stream

### Protocol II

We propose a novel approach to words the transmission of secure message on the basis of shift operation. Let us consider a data stream of N bits in order to send it inform of packets the bit size of each packet is  $n/m$  where m is total numbers of packets to be sent. Numerical justification is as follows:-

Let original information consists of Packets v . $P_1, P_2, P_3, \dots, P_m$

After circular left shift by n bits the modified packets are  $P'_1, P'_2, P'_3, \dots, P'_m$

After concatenation of the modified packets (Say  $I'$ ) A level of security is applied whereby  $I' \oplus K = I''$

Which is transmitted through the channel. In receiver side, the operation are the follows:-

$I'' \oplus K = I'$   
Then suggested  $I'$  into  $P'_1, P'_2, P'_3, \dots, P'_m$

After circulation of right shift by n bits on each of  $P'_1, P'_2, P'_3, \dots, P'_m$

After that  $P_1$  and  $P_2$  it become 01111100

11111111
-----
10000011

Physical level representation of 01111100

Physical level representation of 10000011

So, here  $A = 100000011$   
Reverse 100000011  
11111111  
-----  
01111100

### Protocol -III

On the basis of the masking scheme applied on the original data stream the index positioning of masked bits are i,j,k. In the receiver side if the index positions of the masked bits are known in that case the original information can be retrieved where by the bit value in the other position remains same while that in the masked position will be in 1's compliment form. Here n bit stream P as a followed.

Original stream of n bits is 0110011010 MSB by 1 and 0 is LSB after masking index portion it become 1100010010.

Let the original stream of data is 11001111 and the mask position if masked bits be 0, 4 and 5 . Hence the modified bit stream after masking will be 11111110. The receiver will get 11111110 after applying the Masking in the same index position, it will be 11001111 which is the original data.

### IV. CONCLUSION

Certain novel protocols related to physical level representation, circular shift based information transmission, masking scheme and modified packet combining technique have been pointed out. The numerical and graphical justifications have also been cited as and when appropriate.

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