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Implementation of Error Correction and Error Detection Technique in Data Link Layer Using Hamming Code Technique

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Abstract- Computer network are OSI (Open system interconnection) model provide in seven layers. Seven layers are different – different protocol used in computer network. In this paper, overview second layer are Data link layer. Data link layer are two parts one parts is header and second is trailer. Data link layer trailer parts are working in Error Correction and Error Detection. Error Correction and Error Detection technique working is Error Control in computer network. Sender send the frame (Data) are bit and burst then extra same bit or burst are handle using in Hamming code technique or send the receiver real frame. At the end of this paper result or Conclusion.

Keyword- Data link layer, Error Correction and Error Detection, VRC (Vertically redundancy check), LRC (Longitude redundancy Check), CRC (Cycle redundancy Check), Checksum and Hamming Code.

INTRODUCTION

Computer Network is a seven layer OSI (Open System Interconnection) Model. Data link layer are second layer is OSI model in computer network. Data link layer are two parts one is Header and second is trailer. Trailer parts are see in Error Correction and Error Detection in computer network. Data link layer are used in various technique Error Correction and error Detection.

a) Single bit : Single bit means Sender will be send single bit like 10101010 and Reciver will be recive are only sing bit.

b) Burst: Burst mans one or more bit are called burst.

For example: 1010101001010101010 10101010101010101.

Computer networking is seeing trailer parts of the computer network.

Single bit Error Correction and Error detection in data link layer are used in two techniques.

VRC means Vertical redundancy check.

LRC means Longitudinal Redundancy Check.

Burst bit Error Correction and Error detection in data link layer are used two techniques.

Checksum

CRC (Cycle redundancy check)

Main problem is VRC, LRC, CHECKSUM AND CRC techniques are:-

Data link layer are two parts one is header and second are trailer then send the data into the frame. Data link layer are used protocol are format are sender is first frame and last frame are see. But extra bit are same then sender are extra bit are same. Data link layer are same extra bit like for staring extra bit that main problem are same extra bit recive in receiver.

VRC TECHNIQUE:

VRC are single bit error correction and error detection technique. VRC are result only one bit parity check.

For example Data (frame) send to sender are like 11000011 that check even parity generator are even number of this data like VRC add the 0. 0 are redundant bit of result in add the 0 and send the sender like as 011000011 in Receiver.

Like sender sends data (frame) 11100000 that check odd parity generator parity bit 1. 1 are redundant bit of result in add the 1 and send the sender like as 111100000.

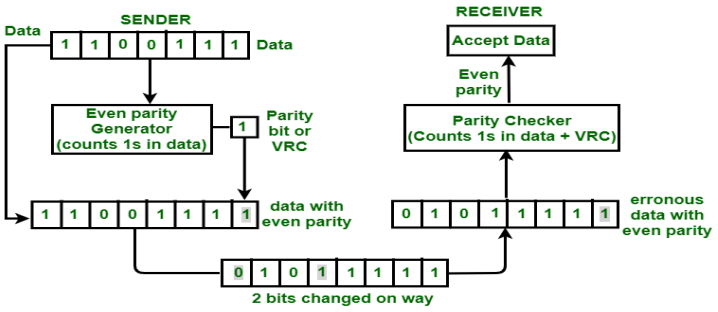

Figure 1 VRC

RESEARCH IN VRC TECHNIQUES USING HAMMING CODING TECHNIQUE:

Research in VRC Techniques used in hamming code. Hamming code are techniques used to error correction. Hamming example used to VRC Techniques.

For example: Send the frame in data link layer like 11101010 11111111 11101010 01111010.

Thus, Data link layer are used to protocol send to first frame and last frame but first frame are same as third frame then Receiver are Error generate. Then solve of this problem are used in hamming code.
Used in hamming code:
Step1. Hamming code third frame are same like 11101010.
Step2. Hamming code check the data bit.
Step3. Hamming code check the parity bit.
Step4. Hamming code find out the all parity bit.
Step5. Hamming code find out parity bit then parity bit converting the binary to decimal number.
Step6. Decimal number like 5 then change the five bit in third frame like five bit are 0 then change the 1 .
Step7. So, finally result are 11111010 then frame are send to receiver.

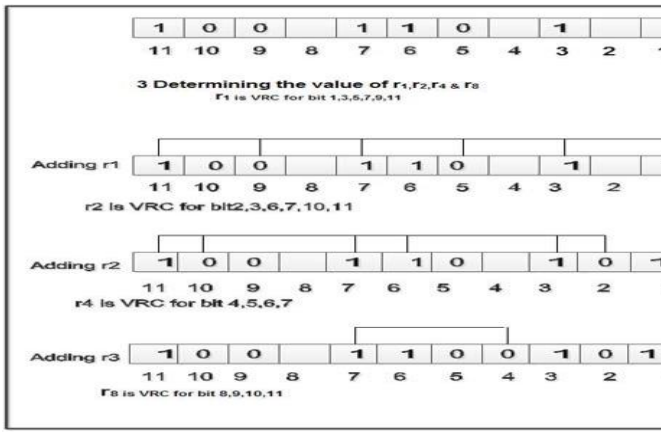

Figure 2 Hamming code use VRC

LRC TECHNIQUE:
Research in LRC Technique are using in hamming code. LRC technique working is LRC means Longitudinal Redundancy Check. In, LRC data add rows and columns and parity bit are check each row and columns. Used in x-or method in even number of data will be parity are 0 and odd number of data will be parity are 1 then result are used in parity bit redundant bits.

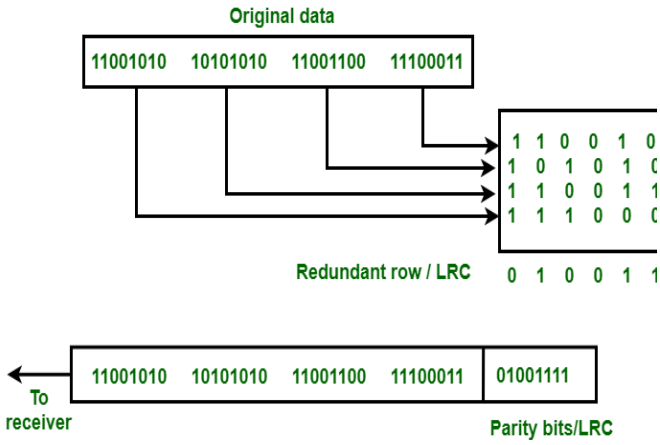

Figure 3 LRC

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Step.5 Hamming code finds out parity bit then parity bit converting the binary to decimal number.
Step.6 Decimal number like 5 then change the five bit in third frame like five bit are 0 then change the 1 .
Step.7 so, finally result are 11111010 then frame are send to receiver.

CHCKSUM TECHNIQUE:
Checksum is an Error Correction and Error detection technique in a data link layer. Checksum means Check + sum. Two sides are checksum number one are Sender side Checksum Creation and other side will Receiver side checksum Validation.
For example in checksum Sender send the data like 10010101 11111111 10101010 10101001.
Checksum are adding the all frame in send by sender and result will be added. Checksum are adding the result in 1 complement. 1 Complement are checksum result of the sender side again check receiver side receiver side check 1 complement of the sender side add again that add will be result 1 then send the data sender to receiver otherwise result are 0 cannot send the frame sender to receiver.
Main problem are same two burst in frame are using the hamming code.

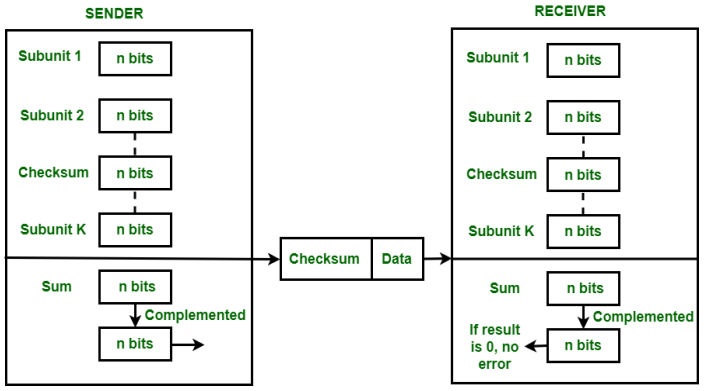

Figure 4 Checksum

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CRC TECHNIQUES:

CRC Cyclic Redundancy Check is used in technique Error detection and error Correction in data link layer. CRC are Find the length of divisor A. CRC are 1 mines in A-1 and using in binary division operation or result are remainder in CRC.
For example: Sender send frame 11111111 10101010 11111000 10101101. And number of input like $x^2+ 2+1$. Thus, CRC are used to input are 111 are divisor divide the number of the bit like 101010101010. CRC are reminder in result of redundant data in CRC. Again use in add the bit in receiver side then again same operation perform again reminder are 0 the send the frame are receiver.
Main problem are CRC technique in same number of frame and respect of the frame or bit then Error in Receiver. So problem is finding out used in hamming code technique.

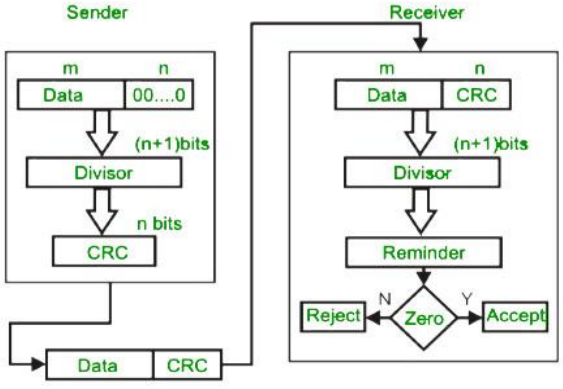

Figure 5 CRC TECHNQUES

RESEARCH IN CRC TECHNIQUE USING HAMMING CODING:

Research in CRC Techniques used in hamming code. Hamming code are techniques used to error correction. Hamming example used to CRC Techniques.
For example: Send the frame in data link layer like 11101010 11111111 11101010 01111010.
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Step.7 so, finally result are 11111010 then frame are send to receiver.

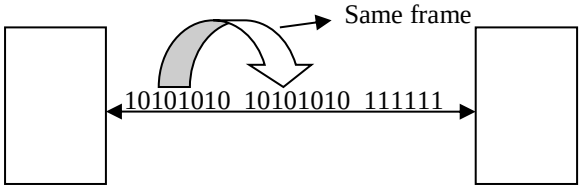
RESULT

The use is all Technique in data link layer like a VRC (Vertical Redundancy Check), LRC (Longitudinal Redundancy Check), Checksum and CRC (Cyclic Redundancy Check) using in diagram and Result show.

Bit Technique VRC and LRC using hamming code:

1. VRC Technique using hamming code result:-

Send the Sender like bit 10101010 10101010 11111111 10001111 to receiver.



2. Using hamming technique Result:

Figure 6

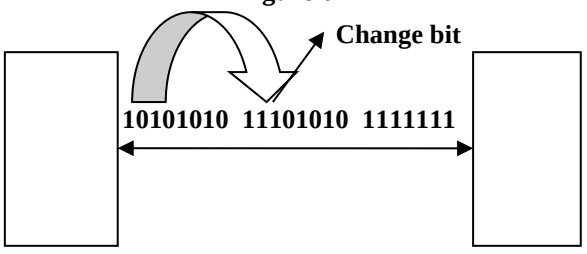
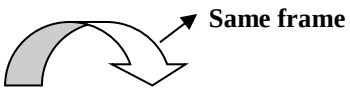


Figure: 7 VRC Technique using Hamming code

LRC technique using hamming code result:

Send the Sender like bit 10101010
10101010 11111111 10001111 to receiver.



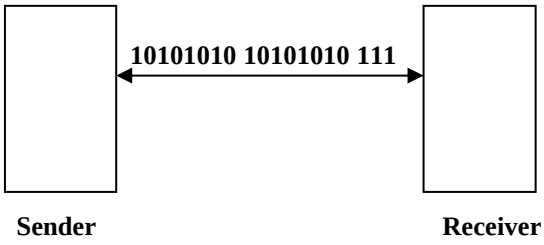


Figure: 8 LRC Technique

2.1 Using hamming technique Result:

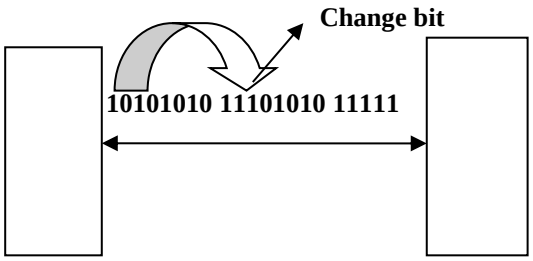


Figure: 9 VRC Technique using Hamming code

BURST TECHNQUE CHECKSUM AND CRC USING HAMMING CODE RESULT:-

Checksum technique using hamming code result:-

Send the sender like burst 1111000011110000 1111000011110000 0000000011111111 from to Receiver.

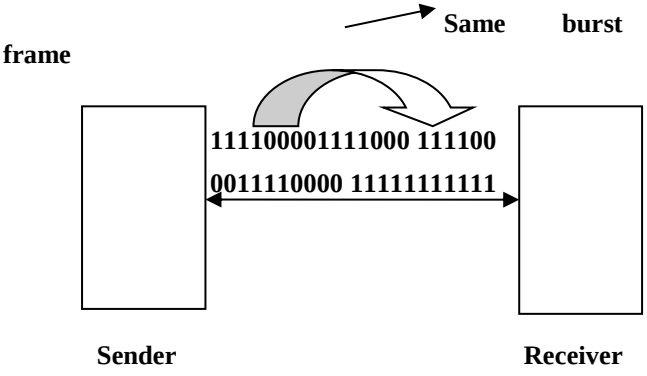
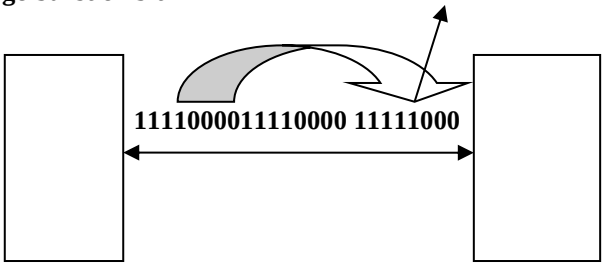


Figure: 10 Checksum

2.1 Using hamming technique result:

Change burst or bit



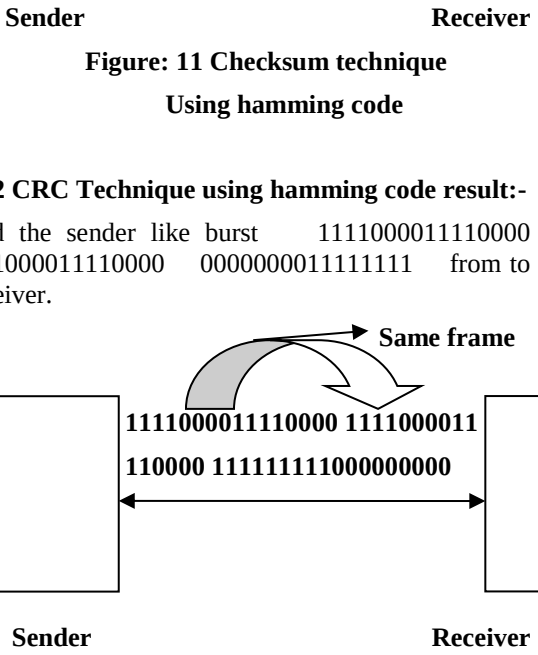


Figure: 11 Checksum technique Using hamming code

6.2.2 CRC Technique using hamming code result:-

Send the sender like burst 1111000011110000 1111000011110000 0000000011111111 from to Receiver.

Figure 12 CRC

2.1 Using Hamming technique result:

Bit or burst Change

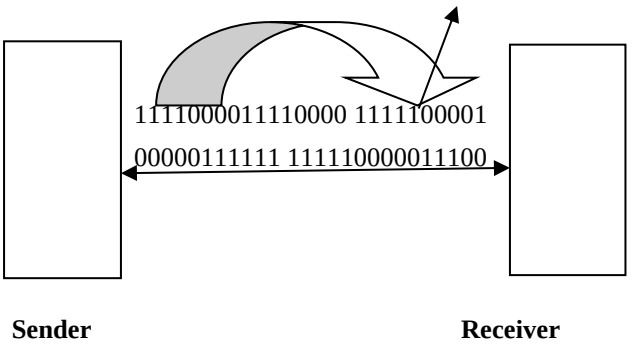


Figure: 13 CRC Technique using Hamming code

CONCLUSION

Data link layer are used to two parts one is header and second is trailer. Data link layer are trailer parts are used Error Correction and Error Detection technique like VRC, LRC, Checksum and CRC. Are technique are mainly issue same number of frame and

reject of the frame then frame are cannot transfer in sender to receive will be receiver are Error generating. So, this is problem in Data link layer trailer parts. I am used in hamming code technique this problem is found out the result. This chapter are two technique are used one is bit and second is burst error correction and detection technique. All technique are used is hamming code technique and find out the problem.

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