Computer Networks and Lab

Course Code - CS252

LAB 3

Report

210050048-210050092-210050096-210050105

January 2023

1 Design

The model is based on transmitting appropriate frequencies encoding the bits of the message.

1.1 Sender:

- Sender takes input as bit string and transmits 3-bits at a time(1-frame=3 bits)

Calculating corresponding frequencies:

- The start of the message is indicated by a reserved sentinel frequency f_0
- After the sentinal next note indicates the number of bits in the message f_1, As the total number bits are less than 20 this frequency remains in practical range
- There is no need of sending sentinel at the end as we know the no of bits in the sequence
- The message bits are transmitted consecutively after f_1 note
- Each note is transmitted for a fixed time of t_1
- Redundant bits(2-frames) are sent after sending input sequence

1.2 Reciever:

- Receiving device records the notes transmitted for a fixed time and the analyzes the recorded audio
- The receiver observes the recorded audio in a moving window of $(t, t + t0)$ and gets the dominant frequency in that window
- t is incremented by t0 until we get the sentinal frequency as the dominant freqency and then we increment t by t_1 and observe each dominant frequnecy in the window
- We know till how many frequncies to observe after this and stop accordingly From the recieved frequency f_r we get the bits accordingly and add it to the bit string
- We then use Error detection techinque to find the error bit in the sequence

1.3 Implementation:

- Run python3 receiver.py
- Run python3 sender.py $1 $2 ($1=input string $2=index of error bit)

2 Detection

Technique: Hamming codes

2.1 Sender

- Let N $(a_0, a_1, a_2....a_{N-1},)$ be the bit sequence to be sent by receiver
- Map a_i with i(i is in binary)
- d = **XOR** of a_i $\ni$a$_i$ = 1
- Redundant bits of sequence = d

2.2 Receiver

- Apply the procedure for the received bits leaving redundant bits
- d1 = **XOR** of b_i $\ni$b$_i$ = 1 $b_0, b_1, b_2....b_{N-1}$, are received bits
- n=**XOR** of d and d1
- n represents position of error bit