Team Connected

Ayush Agarwal (Branch:ECE Roll_No-20095021)

Sandeepan Ghosh (Branch:ECE Roll_No-20095099)

Sachin Shaw (Branch:ECE Roll_No-20095095)

Submission Explanation:

We have submitted two files one for image transmission and another for audio transmission.

Image Transmission:-

- First read the image
- Then made it's 1D array
- Converted the decimal values of pixel into binary .
- It becomes string bcoz of previous operation so converted it back to number
- Converted 0s to -1s so that BPSK becomes easier
- Converted it to its electrical version instead of the message version we had , to simulate it on matlab
- Modulated it (BPSK) by multiplying with carrier wave
- Added awgn to it to simulate the effect of noise from the channel , as awgn is a good model of noise
- Demodulated it using an algorithm (by multiplying by cos and taking convolution)
- Reconstructed the message signal from the electrical version
- Reshaped the received 1D message to image

Audio Transmission:-

- In audio transmission we first read the audio file from Matlab's default handle.mat which is an audio file of 8 seconds approximately with a sample rate of 8192. The following steps have been applied only on the first 16384 samples that is 2 seconds of the audio file as processing long audio files leads to matlab running out of memory.
- Next source encoding has been implemented by converting the float values from –1 to 1 to bits with 1 bit for the integer part and 20 bits for the decimal part. An extra bit has been added at the start for the sign- 1 for negative and 0 for positive. So every sample is represented as 22 bits.
- Now channel encoding has been implemented using parity bit. We have used odd parity to generate a parity bit for every 22 bits which is essentially every encoded float sample.
- Following which for the modulation, channel transmission and demodulation part BPSK has been implemented and 10 dB of channel noise has been added using awgn.
- In a similar fashion channel decoding and source decoding has been implemented then and the final output is written to 'output.wav'.

Tools Used:

Matlab