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Topics :

1. Details of design
2. phy layer encoding
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DETAILS OF DESIGN AND HANDLING OF VARIOUS ASPECTS:

PHY LAYER ENCODING :- We are transmitting the bits using color signals. We will write a python script which will take the incorrect and correct message as input . Then we will use the appendCRC function in 'appendCRC.py' to append the CRC at the end of message. Then this CRC appended message will be passed as argument to makeSignal function of the makeSignal.py script which will flash the corresponding signals according to the following scheme:

        color1 : Red   (for 1 second)   : bit 0
        color2 : Green   (for 1 second)   : bit 1
        color3 : Yellow   (for 0.1 seconds) : intermediate for marking end of bit signal
        color4 : Light Blue   (for 1 second)   : for marking the start and end of packet

LINK LAYER FRAMING :- We are marking the end of a packet by using the color4.

RECEIVING SIGNALS :- We will be manually receiving the signals, i.e., one receiver will be sitting at the receiver computer to decode the light signals, which will be passed to a function decodeAtReceiver.

LINK LAYER RELIABILITY :- After receiving code, we will be checking the CRC using the function 'decodeAtReceiver.py' and matching it with the last two bits. If it does not match then we will send a 0 otherwise we will send a 1 using the same signal codes as described under

PHY LAYER ENCODING (including light blue once we are done). Sending a '1' is analogous to an ACK message and sending a '0' is analogous to a NACK message.

IMPLEMENTATION (ERROR DETECTION) :- We are using the CRC technique for error detection. Since there are atmost 2 bits which are wrong, we choose the polynomial function $x^2 + x + 1$ (as it has three 1s and is capable of detecting 1 and 2 bit errors.) Hence, we append 2 bits at the end of every packet.

code base :- python codes are submitted in the same directory